

Optimal Capacity Design of Independent Micro-Grid System for High Proportion of Wind-Solar Combined Cooling Heating and Power System with Energy Storage

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Abstract. This paper researches the optimal capacity design of independent micro-grid system for wind-solar combined cooling heating and power system with energy storage, puts forward a dispatching method based on expert time-judge for dynamic control of wind-solar direct permeability and a hierarchical design based on energy storage module. Because of the uncertainty of wind -solar system, this paper adopts fuzzy parameters to describe the system constraints and clarify the opportunity constraints, then optimizes the capacity design on fuzzy constraints and particle swarm optimization, analyses the operation results of optimal capacity allocation under dispatching method and hierarchical design of energy storage.

Introduction

Based on actual situation of China's energy supply and demand, the remote areas mainly develop diesel and gas power generation. The cost of power system is high and the reliability of system operation is low. Actually, most of the western regions are rich in renewable energy[1], which can be used to build renewable energy power generation system. Considering the cold and hot needs of users, an independent micro-grid system with multi-potential complementary renewable energy can be constructed.

This paper considers the independent micro-grid system for high proportion of wind-solar combined cooling heating and power system with energy storage[2-3] and this puts forward a dispatching method based on expert time-judge for dynamic control of wind-solar direct permeability to enhance the reliability of the system, a hierarchical design based on energy storage module to reduce the battery charge and discharge times, then, designs a dispatching strategy, get the optimal capacity of system configuration, and discusses the influence of high proportion of renewable energy penetration for a dispatching method.



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