

What is the optimal capacity configuration model for a grid-connected microgrid?

An optimal capacity configuration model of the grid-connected microgrid is proposed, which comprehensively considers economic cost, renewable energy utilization efficiency and carbon emissions. Through the combination with the previous work, it provides a new solution to the problem of microgrid planning.

Does capacity configuration optimization improve the stability of microgrids?

To improve the accuracy of capacity configuration of ES and the stability of microgrids, this study proposes a capacity configuration optimization model of ES for the microgrid, considering source-load prediction uncertainty and demand response (DR). First, a microgrid, including electric vehicles, is constructed.

Is microgrid a good model for capacity planning?

An optimal grid-connected microgrid capacity configuration model is proposed. A case study is carried out to validate the proposed capacity planning solution. Microgrid is considered an efficient paradigm for managing the massive number of distributed renewable generation and storage facilities.

Does es capacity and Dr reduce the cost of a microgrid?

The simulation results show that the optimal configuration of ES capacity and DR promotes renewable energy consumption and achieves peak shaving and valley filling, which reduces the total daily cost of the microgrid by 22%. Meanwhile, the DR model proposed in this paper has the best optimization results compared with a single type of the DR model.

Is there a capacity planning solution for grid-connected microgrid based on scenario generation?

This paper presented an optimal capacity planning solution for grid-connected microgrid based on scenario generation considering multi-dimensional uncertainties. The efficient DCGAN based scenario generation method is developed to describe the uncertain behaviors of renewable power generation.

Do peak-to-valley differences affect the stability of a microgrid?

High peak-to-valley differences on the load side also affect the stable operation of the microgrid. To improve the accuracy of capacity configuration of ES and the stability of microgrids, this study proposes a capacity configuration optimization model of ES for the microgrid, considering source-load prediction uncertainty and demand response (DR).

Objective function 3 for the wind-solar hydrogen storage-independent microgrid, due to many external influences, ... This paper in the microgrid capacity optimization configuration model allows for a wind-optical-hydrogen-storage microgrid system to provide some support. Starting from the energy demand side, this model can not only configure ...

Electrochemical energy storage has been widely applied in IES to solve the power imbalance in a short-term scale since it has the excellent performance on flexibility, responsiveness and reliability [7]. However, it also has the disadvantages of low power densities and high leakage rates [8]. Hydrogen energy is a new form of energy storage which has ...

However, the two-stage robust planning model considering uncertainty needs to be based on the linearized model of low-frequency energy storage capacity configuration for a data center microgrid ...

In order to reduce the comprehensive power cost of the independent microgrid and to improve environmental protection and power supply reliability, a two-layer power capacity optimization model of a microgrid with ...

The cases are given to optimize objective functions in microgrid. These case studies will be analyzed in the next subsection to ensure optimal operation in microgrid. 6.1 Results analysis. This section confirms the superior performance of the proposed optimization method by addressing a multi-objective capacity problem related to resources.

Additionally, it enhances the microgrid's capacity to absorb energy generated by wind and photovoltaic sources. 3 Hence, in the microgrid system design process, the initial step involves addressing the capacity configuration challenge within the microgrid system. This stands as a prominent and challenging issue in ongoing research on the optimization and design of ...

Optimal configuration of independent microgrid based on Monte Carlo processing of source and load uncertainty YAO Qingcheng(), YUAN Xiaoling() College of Energy and Electrical Engineering, Hohai University, Nanjing 211100, Jiangsu, ...

Aiming at the uncertainty of RES, we propose a multi-objective robust optimization model of island microgrid capacity configuration based on an information gap theory. An ...

The deployment of a green power alternative within an isolated network, powered by renewable energy sources, in the "Three North" region of China can facilitate the substitution of high-energy-consuming industrial loads with green power. However, an inadequate power supply configuration may lead to economic and reliability issues. To address this ...

In view of optimizing the configuration of each unit's capacity for energy storage in the microgrid system, in order to ensure that the planned energy storage capacity can meet the reasonable operation of the microgrid's control strategy, the power fluctuations during the grid-connected operation of the microgrid are considered in the planning and The economic benefit ...

To improve the accuracy of capacity configuration of ES and the stability of microgrids, this study proposes a capacity configuration optimization model of ES for the ...

&lt;p&gt;This paper investigates the issues of topology design and capacity configuration in multi-microgrid (MMG) systems. Firstly, we analyze the limitations of current researches about MMG planning, which mainly focus on either topology design or capacity configuration separately, and propose the idea of joint planning simultaneously considering both aspects. Secondly, we ...

Abstract: In order to realize the capacity configuration of independent power supply island microgrid, considering the usual and extreme scenarios, an alcohol/oil generator island ...

The solid Oxide Fuel Cell (SOFC) technique with electric to gas technique is an investment-worthy way to enhance the consumption of renewable energy in microgrids. Moreover, SOFC's high fuel adaptability and efficient cogeneration are ideal for stationary power generation. However, due to SOFC's slow load response and high cost, the capacity configuration ...

For the capacity configuration of microgrid, the multi-agent system (MAS) theory can offer positive help [23]. MAS refers to an interaction and interconnection system consisting of multiple agents with independent functions, communication capabilities, assessment capabilities and decision-making capabilities [24], [25].

This paper proposes an optimization method of capacity configuration considering subsidy based on independent microgrid system, containing wind turbine (WT), ...

Firstly, this paper proposes a microgrid capacity configuration model, and secondly takes the shortest payback period as the objective function, and uses the improved sparrow search algorithm (ISSA) for optimization. ... Optimal configuration of independent microgrid capacity based on improved grey wolf algorithm. J. Sol. Energy 43 (01), 256 ...

Chen et al. optimized the optimal capacity configuration for a microgrid system to mitigate the variability of renewable sources. Wu et al. built upon this, identifying the minimum one-time investment cost of energy storage units and the lowest total annual running cost of the system and considering both costs as multi-objectives, and using ...

In this paper, an optimal capacity planning model for the grid-connected microgrid is developed fully considering the renewable generation uncertainties through ...

This analysis is the capacity optimization configuration design of the microgrid including the hydrogen production system, and the simulation analysis is carried out by using the Homer simulation software. ... J., Fang, K.: An optimization method for independent microgrid capacity allocation considering subsidies. Power Grid Technol. 42(07 ...

The energy management of microgrids involves optimizing the capacity configuration, which significantly

impacts the economic and stable operation of microgrids. This paper presents a control strategy for microgrid operation that effectively manages distributed power sources and energy storage to optimize capacity configuration.

Once the battery's maximum discharge capacity is reached, any additional power needed will be procured from the grid. ... moving from a variable independent of microgrid (MG) configuration to a ...

We propose a hierarchical collaborative optimization configuration framework for the multi-energy microgrids system, which realizes the independent autonomy of the lower layer and the centralized coordination design of the upper layer. In microgrid, the source-load-storage interact and self-balance locally.

Keywords: renewable energy, hydrogen storage, capacity configuration, IMOSSA algorithm, multi-objective.

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Considering the typical microgrid design scenario of sizing generation to match peak load, Table 1 provides a rough sense of the power generation capacity required for a microgrid depending on the number and type of loads connected to the microgrid. Table 1. Rule-of-thumb generation capacity for possible loads served by a microgrid. 4. Microgrid

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