510 kWh smart grid

The summary of the literature review is shown in Table 1.

The research is structured from three parts. The first section constructs a new model. The second part is the performance testing. The third part is the discussion and experimental results. The flowchart of the proposed method is shown in Fig. 1.

Flowchart of the proposed method

This section first introduces the scheme design for optimizing the operation and scheduling of microgrid clusters. Then the construction process of the microgrid scheduling optimization model based on IMFO is designed.

Microgrid cluster is composed of energy sources like wind turbines, fuel cells, solar photovoltaic arrays, and gas turbines. How to ensure the stable operation of new energy in microgrid clusters and minimize the operating cost of microgrids while meeting the negative charge demand of users is still an urgent problem. Therefore, the research is to improve the optimization scheduling, reduce operating cost, and reasonably allocate the power generation of each unit in the microgrid cluster. Therefore, a model for optimizing the operation scheduling of microgrid cluster is constructed. The internal structure of the microgrid cluster is displayed in Fig. 2.

Microgrid cluster structure

In Fig. 2, the microgrid cluster consists of multiple microgrids. In order to achieve an optimized scheduling model for microgrid clusters, the objective function is to minimize environmental and operational costs [21]. The environmental cost includes the penalty fees for pollutant gas emissions [22]. The main pollutant gases are carbon dioxide, sulfur dioxide, and nitrites [23]. In addition, the study also aims to maximize the economic benefits generated by microgrid cluster. The constructed objective function is displayed in Eq. (1).

Optimization scheduling method for microgrid cluster

In the islanding operation mode, the complexity of internal scheduling and energy storage management of microgrids has increased. It is necessary to reduce the high cost of local power generation and maintenance while balancing supply and demand. In grid connected operation mode, microgrids improve the flexibility of energy dispatch by exchanging electricity with the distribution network, and optimize operating and environmental costs through electricity market transactions.

Biomimetic schematic diagram of IMFO

In IMOF, the individual positions of the moth population are initialized firstly, as expressed in Eq. (8).

IMFO algorithm step diagram

Contact us for free full report

Web: https://kary.com.pl/contact-us/
Email: energystorage2000@gmail.com
WhatsApp: 8613816583346