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Distributed power generation of communication operators base stations



Overview

What is a distributed collaborative optimization approach for 5G base stations?

In this paper, a distributed collaborative optimization approach is proposed for power distribution and communication networks with 5G base stations. Firstly, the model of 5G base stations considering communication load demand migration and energy storage dynamic backup is established.

What is a collaborative optimal operation model of 5G base stations?

Afterward, a collaborative optimal operation model of power distribution and communication networks is designed to fully explore the operation flexibility of 5G base stations, and then an improved distributed algorithm based on the ADMM is developed to achieve the collaborative optimization equilibrium.

What is cooperation between communication operators and DSOs?

Figure 1 illustrates the concept of cooperation between communication operators and DSOs at the energy layer and communication layer. As shown in Figure 1, we consider a city-level distribution power system consisting of multiple MGs with DERs as well as battery storage systems. The DSO transmits electricity to the MG via power towers.

What is the architecture and coordination optimization model of 5G base station?

The architecture and coordination optimization model composed of a 5G communication network and distribution network is proposed in Section 3. Afterward, a distributed coordination algorithm is designed in Section 4 with simulation results presented in Section 5. Finally, Section 6 concludes the paper.

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2. Model of 5G base station

The operating cost of ADN containing 5G communication base stations mainly includes the cost of power purchase from external markets, the cost of power purchase from internal distributed ...

The high-energy consumption and high construction density of 5G base stations have greatly increased the demand for backup energy storage batteries. To maximize overall ...

At present, powering BSs through distributed energy resources (DERs), such as photovoltaic (PV) generation and energy storage (ES), has become a common solution to ...

In the communication power supply field, base station interruptions may occur due to sudden natural disasters or unstable ...

Afterward, a collaborative optimal operation model of power distribution and communication networks is designed to fully explore the operation flexibility of 5G base ...

On the one hand, communication operators participate in energy market transactions; comprehensively consider the communication load of BSs, the distributed ...

Multiple 5G base stations (BSs) equipped with distributed photovoltaic (PV) generation devices and energy storage (ES) units ...

Large-scale deployment of 5G base stations has brought severe challenges to the economic operation of the distribution network, ...

The calculation example analysis results show that communication load transfer can effectively reduce the power consumption of 5G base stations during low load periods and increase the ...

Our study introduces a communications and power coordination planning (CPCP) model that encompasses both distributed energy resources and base stations to improve communication ...

Multiple 5G base stations (BSs) equipped with distributed photovoltaic (PV) generation devices and energy storage (ES) units participate in active distribution network ...

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On the basis of ensuring smooth user communication and normal operation of base stations, it realizes orderly regulation of energy storage for large-scale base stations, ...

Therefore, aiming to optimize the energy utilization efficiency of 5G base stations, a novel distributed photovoltaic 5G base station DC microgrid structure and an energy ...

The communication base station installs solar panels outdoors, and adds MPPT solar controllers and other equipment in the computer room. The power generated by solar ...

Large-scale deployment of 5G base stations has brought severe challenges to the economic operation of the distribution network, furthermore, as a new type of adjustable load, ...

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In today's 5G era, the energy efficiency (EE) of cellular base stations is crucial for sustainable communication. Recognizing this, Mobile Network Operators are actively prioritizing EE for ...

On the one hand, communication operators participate in energy market transactions; comprehensively consider the communication load of BSs, the distributed ...

Recently, 5G communication base stations have steadily evolved into a key developing load in the distribution network. During the operation process, scientific dispatch-filing and management of ...

Therefore, considering the configuration of renewable energy, the adjustability of energy storage battery, and the space-time ...

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