

Distribution of China s hybrid energy 5G base stations





Overview

We collected 5G base station numbers in 2020 and 2021 in 31 provinces and province-level municipalities (PLM), the period with the rapid growth of the 5G base stations in China.

Does China have a 5G network?

Given that China currently has the largest 5G network in the world (~1.53 million base stations by the end of 2021, Table S1) and that base station number was projected by up to 6–8 million by 2030 (CCID Consulting, 2020), concerns are being expressed regarding 5G mobile networks' environmental effects and sustainability.

How much CO₂ will China's 5G network produce?

Under the model predicted 5G base stations, China's 5G network could yield 0.15–0.29 GtCO₂ /yr emissions subject to the nation's BDDL from 40 to 80 % by 2030. Both 5G base stations and CO₂ emissions are significantly lower than the previous estimates.

How much carbon does 5G emit in China in 2021?

The results indicate that, due to the high carbon emissions resulting from the new infrastructure, the carbon emissions of 5G base stations in China in 2021 amounted to 49.2 MtCO₂ eq.

How many 5G base stations are built in China?

As 5G serves as the foundation for the construction of new infrastructure, China, as the world leader in 5G base station construction, has already built over 1.4 million 5G base stations in 2021 alone. In the same year, 5G base stations in China produced approximately 49.2 million tons of CO₂ eq.

Are 5G base stations sustainable?

However, due to their high radio frequency and limited coverage, the construction and operation of 5G base stations can lead to significant energy consumption and greenhouse gas emissions. To address this challenge,



scholars have focused on developing sustainable 5G base stations.

What is the energy consumption of 5G communication base stations?

Overall, 5G communication base stations' energy consumption comprises static and dynamic power consumption . Among them, static power consumption pertains to the reduction in energy required in 5G communication base stations that remains constant regardless of service load or output transmission power.



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5G Power: Creating a green grid that slashes costs, emissions & energy

As of June 2019, China Tower boasted a combined 1.954 million sites with a value of 315.36 billion yuan (US\$44.3 billion). On June 6, 2019, the Ministry of Industry and Information ...

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Collaborative optimization of distribution network and 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 ...

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Load Forecasting of 5G Base Station in Urban Distribution Network

5G is the abbreviation of the 5th generation mobile communication technology. China is one of the earliest countries in the world to implement 5G commercially. The application of 5G network ...

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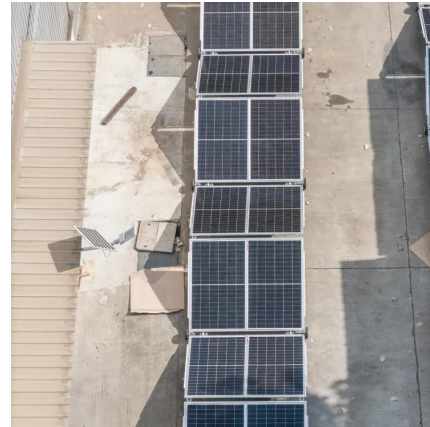
China Base Station Energy Storage Market , HuiJue Group E-Site

The China base station energy storage market has surged 38% YoY, yet power reliability remains precarious in remote areas. Could hybrid



storage systems hold the key to sustainable telecom ...

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Hybrid load prediction model of 5G base station based on ...

Abstract To ensure the safe and stable operation of 5G base stations, it is essential to accurately pre-dict their power load. However, current short-term prediction methods are rarely applied ...

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Synergetic renewable generation allocation and 5G base station

The growing penetration of 5G base stations (5G BSs) is posing a severe challenge to efficient and sustainable operation of power distribution systems (PDS) due to their huge ...

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Coordinated scheduling of 5G base station energy storage for ...

To enhance the utilization of base station energy storage (BSES), this paper proposes a co-regulation method for distribution network (DN) voltage control, enabling BSES ...

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Multi-objective cooperative optimization of communication base station

To achieve "carbon peaking" and "carbon neutralization", access to large-scale 5G communication base stations brings new challenges to the optimal operation of new power ...

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Renewable energy powered sustainable 5G network ...

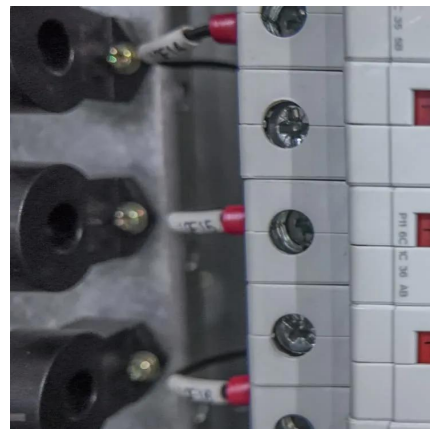
Renewable energy is considered a viable and practical approach to power the small cell base station in an ultra-dense 5G network infrastructure to reduce the energy provisions ...

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Improved hybrid sparrow search algorithm for an extreme ...

Improved hybrid sparrow search algorithm for an extreme learning machine neural network for short-term photovoltaic power prediction in 5G energy-routing base stations Ming Yan^{1,3} ...

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Low-Carbon Sustainable Development of 5G Base Stations in China

Figure 8.6 depicts the distribution of 5G base stations in China, which shows that the construction of 5G base stations from 2020 to 2021 was mainly concentrated in coastal cities.

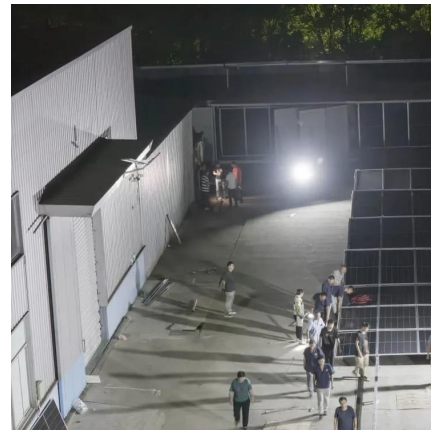
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[MULTI-OBJECTIVE INTERVAL PLANNING FOR 5G BASE ...](#)

A multi-objective interval collaborative planning method for 5G base stations and distribution networks containing photovoltaic power sources is proposed, which considers communication ...

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Optimization of Active Distribution Network Operation Considering

Abstract: The massive access of 5G base stations (5G BSs) provides new possibilities for the low-carbon development of future power systems. By incentivizing 5G BSs to participate in ...

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Multi-objective cooperative optimization of communication base ...

To achieve "carbon peaking" and "carbon neutralization", access to large-scale 5G communication base stations brings new challenges to the optimal operation of new power ...

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Optimizing the ultra-dense 5G base stations in urban outdoor ...

The optimal solutions and comparative experiments demonstrate that the proposed model can provide reasonable and robust results to support 5G cellular network planning. ...

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MULTI-OBJECTIVE INTERVAL PLANNING FOR 5G BASE STATIONS AND DISTRIBUTION

A multi-objective interval collaborative planning method for 5G base stations and distribution networks containing photovoltaic power sources is proposed, which considers communication ...

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Improved hybrid sparrow search algorithm for an extreme ...

Abstract Given the advancements in solar power generation and fifth-generation (5G) technologies, it is crucial to reduce energy consumption based on accurate predictions of the ...

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The carbon footprint response to projected base stations of China's 5G

We collected 5G base station numbers in 2020 and 2021 in 31 provinces and province-level municipalities (PLM), the period with the rapid growth of the 5G base stations in ...

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[Optimal configuration of 5G base station energy storage](#)

created the demand for backup energy storage batteries. To maximize overall benefits for the investors and operators of base station energy storage, we proposed a bi-level optimization ...

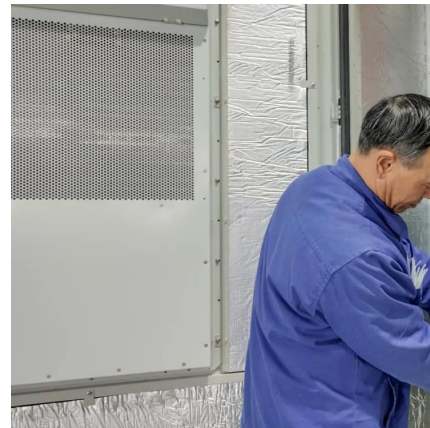
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Two-Stage Robust Optimization of 5G Base Stations Considering

The innovative approach of "5G base stations + distributed renewable energy sources + repurposed electric vehicle batteries" utilizes the distributed renewable energy. This ...

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