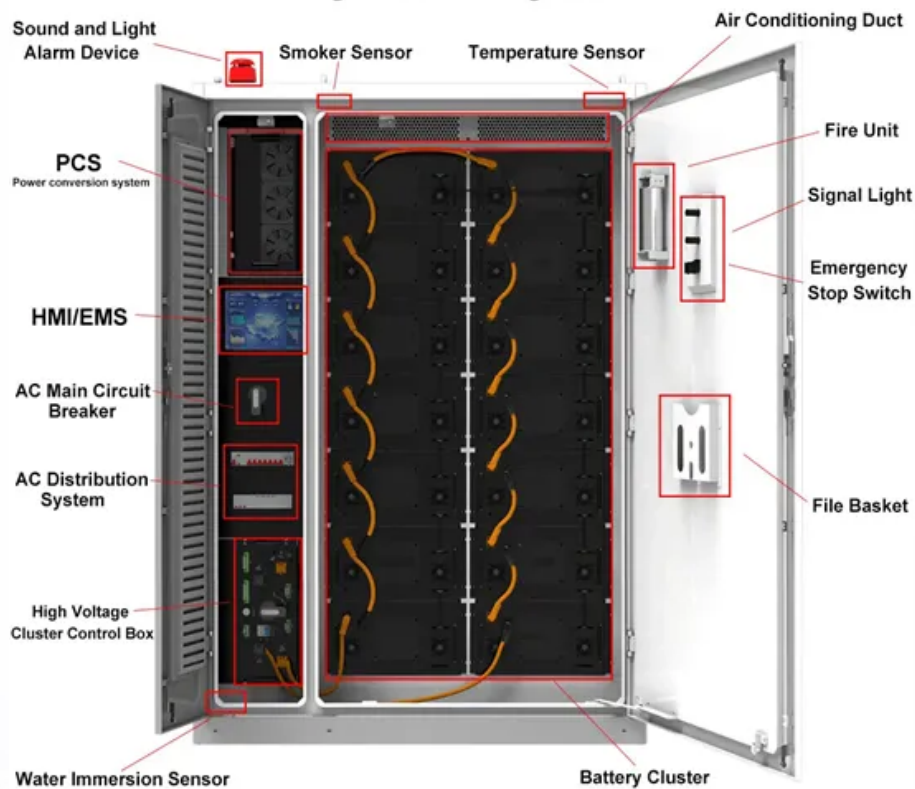


## SolarTech Power Solutions

# China Communications 5G Base Station Energy Method

### System Layout



## Overview

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Temporal distribution of misalignment factors of the entire mobile network in Nanchang using the threshold-based energy-saving method. b, Spatial distribution of.

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our Editorial Policies and the Editorial Policy.

Further information on research design is available in the Nature Portfolio Reporting Summary linked to this article.

T.L., D.J., Y.L. and T.J. conceived and designed the study. L.Y. and Y.Z. collected and provided the data. T.L., Y.M., T.D. and W.H. carried out the simulations and analyses. All authors contributed to the discussions on the methods and the.

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.

How much energy does a 5G base station use?

China Mobile's measurement report<sup>9</sup> indicates that the energy consumption of a 5G base station is 4.3 kWh, which is four times that of a 4G base station at 1.1 kWh. One 5G base station is estimated to produce 30 t of carbon emissions in one year of operation<sup>10</sup>.

How many 5G base stations are there in China?

By the end of 2020, three major domestic mobile network operators have built over 718,000 5G base stations in China and achieved 5G coverage in more than 300 cities throughout the country (see Fig. 1 and Table S1). 5G base stations are mainly distributed along with coastal cities in the southeast

provinces.

What is 5G base station equipment architecture?

The 5G base station equipment architecture mainly adopts the BBU + AAU method. The BBU is the baseband part and can be further divided into two logical network elements, CU and DU. The CU handles the protocol stack functions above the PDCP layer of the wireless network, while the DU handles radio protocol functions below the PDCP layer.

How much carbon is produced by 5G in China?

which is four times that of a 4G base station at 1.1 kWh. One 5G base station is estimated to produce 30 t of carbon emissions in one year of operation<sup>10</sup>. Thus, 5G networks in China are roughly estimated to produce over 60 Mt of carbon emissions annually at the national level<sup>11</sup>.

Why is 5G more energy efficient than 4G?

Due to the high radio frequency and limited network coverage of 5G base stations, the number of the 5G base stations are 1.4~2 times than that of the 4G base stations, and thus the energy consumption is also 2~3 times higher (Israr et al., 2021).

## China Communications 5G Base Station Energy Method

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### Coordinated scheduling of 5G base station energy ...

Sep 25, 2024 · College of Electrical and Information Engineering, Hunan University, Changsha, China With the rapid development of 5G base station construction, significant energy storage ...

### Base Station Energy Saving based on Imitation Learning in 5G ...

Sep 1, 2024 · Base Station Energy Saving based on Imitation Learning in 5G Network Ziyi Li<sup>1</sup>, Yu Wang<sup>2</sup>, Yanlin Fan<sup>2</sup>, Zhaobo Wang<sup>1</sup>, Shangjing Lin<sup>1</sup> and Lei Sun<sup>3</sup> Published under licence ...



### Evaluation Method Based on Temporal Clustering for 5G ...

May 15, 2025 · Abstract. In modern wireless communication networks, the effective application of power-saving technologies is crucial for improving energy efficiency and extending the

lifespan ...

## Modelling the 5G Energy Consumption using Real-world Data: Energy

Jun 26, 2024 · This paper proposes a novel 5G base stations energy consumption modelling method by learning from a real-world dataset used in the ITU 5G Base Station Energy ...



## Optimal configuration of 5G base station energy storage

Mar 17, 2022 · sting 2G/4G base station energy storage configurations. Reference [15] proposed a capacity calculation method, and configuration results of energy storage batteries for three ...

## Real-time power scheduling optimization strategy for 5G base stations

Jan 1, 2023 · To alleviate the pressure on society's power supply caused by the huge energy consumption of the 5th generation mobile communication (5G)



base stations,a joint distributed ...



## Evaluating the Comprehensive Performance of 5G Base Station...

Jan 31, 2022 · In recent years, 5G technology has rapidly developed, which is widely used in medical, transportation, energy, and other fields. As the core equipment of the 5G network, 5G ...

## Power consumption based on 5G communication

Oct 17, 2021 · At present, 5G mobile traffic base stations in energy consumption accounted for 60% ~ 80%, compared with 4G energy consumption increased three times. In the future, high ...



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

May 4, 2024 · In order to increase the contribution of the communication industry to mitigate the global greenhouse effect, future efforts must focus on reducing the carbon emissions

...

## Distribution network restoration supply method considers 5G base

Feb 15, 2024 · Aiming at the shortcomings of existing studies that ignore the time-varying characteristics of base station's energy storage backup, based on the traditional base station ...



## fenrg-2022-919197 1..13

Sep 10, 2023 · Multiple 5G base stations (BSs) equipped with distributed photovoltaic (PV) generation devices and energy storage (ES) units participate in active distribution network ...

## Carbon emissions and mitigation potentials of 5G base station in China

Jul 1, 2022 · This study aims to understand the carbon emissions of 5G network by using LCA method to divide the boundary of a single 5G base station and discusses the carbon emission ...







## Multi-objective cooperative optimization of communication base station

Sep 30, 2024 · The analysis results of the example show that participation in grid-side dispatching through the flexible response capability of 5G communication base stations can enhance the ...

## Application of AI technology 5G base station

Dec 9, 2020 · There are mainly two method of base station energy saving, which are hardware power saving and software energy saving. It is based on lowering the basic energy ...



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## China plans to upgrade its 5G network, accelerate 6G

...

Jan 6, 2025 · China will continue to accelerate the research, development, and innovation of 6G cellular technology and upgrade its 5G mobile network to reach 5G-A level in its new data ...

## Evaluation Method Based



## on Temporal Clustering for 5G ...

May 15, 2025 · Experimental results show that the pro-posed method significantly enhances the optimization of energy-saving strategies and the overall energy efficiency of communication ...



## Final draft of deliverable D.WG3-02-Smart Energy Saving ...

Oct 4, 2021 · Change Log This document contains Version 1.0 of the ITU-T Technical Report on "Smart energy saving of 5G base station: Based on AI and other emerging technologies to ...

## Energy-efficiency schemes for base stations in 5G ...

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 ...



## Optimal configuration of 5G base station energy storage ...



Feb 1, 2022 · A multi-base station cooperative system composed of 5G acer stations was considered as the research object, and the outer goal was to maximize the net profit over the ...

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## 5G Network Deployment Scheme and Communication ...

Feb 28, 2025 · Abstract. This article addresses the deployment of 5G networks in intelligent manufacturing factories, focus-ing on issues such as high energy consumption, signal ...



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## Distributed Optimization Operation of Distribution Network

Secondly, based on energy boundary projection, a backup energy storage aggregation regulation model is established. The sexual aggregation method is used, and then a cooperative game ...

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