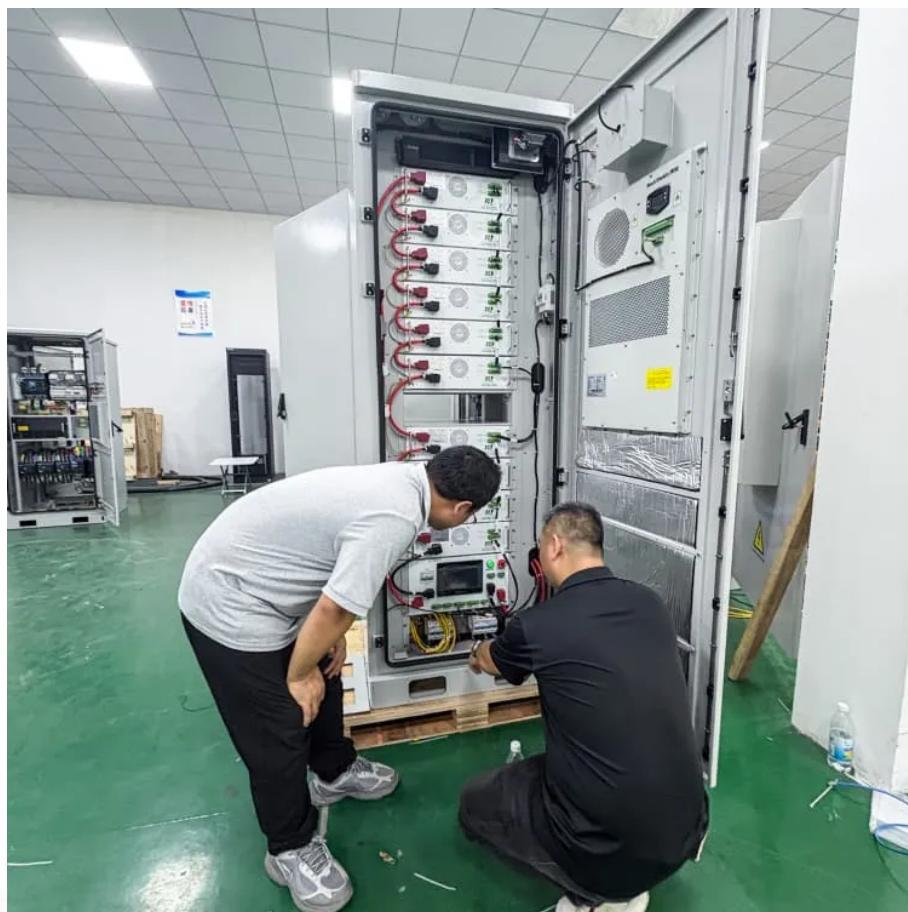




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# Benefits of green base stations for mobile communications





## Overview

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The main goal of designing green base stations is to save energy and reduce power consumption while guaranteeing user service and coverage and ensuring the base station's capability for evolution. Are green cellular base stations sustainable?

This study presents an overview of sustainable and green cellular base stations (BSs), which account for most of the energy consumed in cellular networks. We review the architecture of the BS and the power consumption model, and then summarize the trends in green cellular network research over the past decade.

Can low-carbon communication base stations improve local energy use?

Therefore, low-carbon upgrades to communication base stations can effectively improve the economics of local energy use while reducing local environmental pollution and gaining public health benefits. For this research, we recommend further in-depth exploration in three areas for the future.

Will communication base stations reduce electricity consumption?

Our findings revealed that the nationwide electricity consumption would reduce to 54,101.60 GWh due to the operation of communication base stations (95% CI: 53,492.10–54,725.35 GWh) (Figure 2 C), marking a reduction of 35.23% compared with the original consumption. We also predicted the reduction of pollutant emissions after the upgrade.

Why are green wireless communications important?

Green wireless communications have been an important area of study targeting the trade-off between increased mobile communications and energy consumption. The use of such technology is motivated by the prospect of higher data rates and improved performance over the existing networks [2, 3].



## Benefits of green base stations for mobile communications

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### Green Base Station Solutions and Technology

Mar 20, 2011 · Green Base Station Solutions and Technology Environmental protection is a global concern, and for telecom operators and equipment ...

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### Multi-objective cooperative optimization of communication base ...

Sep 30, 2024 · This paper develops a method to consider the multi-objective cooperative optimization operation of 5G communication base stations and Active Distribution Network ...

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### Green UAV communications for 6G: A survey

Sep 1, 2022 · Prolonging the lifetime and developing green UAV communication with low power consumption becomes a critical challenge. In this article, a comprehensive survey on green ...

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

May 4, 2024 · Goncalves et al. (2020) explored carbon neutrality evaluation of 5G base stations from the perspective of network structure and carbon sequestration. Despite the growing ...

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### Renewable energy powered sustainable 5G network ...

Feb 1, 2021 · Moreover, the work in Ahmed et al. (2018) explores the radio resource management strategies for renewable energy powered cellular base stations and presents a comprehensive ...

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### Understanding Base Stations: The Backbone of Wireless Communication

Jan 6, 2025 · Conclusion Base stations are the backbone of modern wireless communication networks. They ensure that mobile devices can connect to the internet, make calls, and send ...

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### Green Communications: A Call for Power Efficient ...

Apr 4, 2013 · This paper reviews recent energy efficient advances made at specific point within the communications cycle such as components, network operation and topology, and ...

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### Low-carbon upgrading to China's communications base stations ...

Nov 21, 2025 · These outcomes demonstrate that upgrading to low-carbon base stations not only ensures economic feasibility but also delivers significant environmental and public health ...

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### Green networks in action: China Mobile

Nov 19, 2024 · In Xiong'an New Region, China Mobile's low-carbon initiatives like cooling cubes and outdoor base stations are saving hundreds of thousands of kWh annually, making a big ...

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### China Mobile - Renewable energy and green base station ...



Aug 7, 2025 · China Mobile added 467,000 5G base stations while achieving a 2% reduction in overall base station energy consumption in 2024.

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Green and Sustainable Cellular Base Stations: An Overview ...

Apr 25, 2017 · Energy efficiency and renewable energy are the main pillars of sustainability and environmental compatibility. This study presents an overview of sustainable and green cellular ...

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Energy-Efficient Base Stations

Jul 24, 2015 · Energy saving potential of integrated hardware and resource management solutions for wireless base stations," in 2011 IEEE 22nd International Symposium on Personal Indoor ...

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Comparative Analysis of Solar-Powered Base Stations for ...

Aug 20, 2017 · Abstract: The rapid growth of mobile communication technology and the corresponding significant increase in the number of cellular base stations (BSs) have ...

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The Importance of Renewable Energy for Telecommunications Base Stations

Aug 23, 2024 · Installations of telecommunications base stations necessary to address the surging demand for new services are traditionally powered by conventional energy sources, ...

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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 ...

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The Importance of Renewable Energy for ...

Aug 23, 2024 · Installations of telecommunications base stations necessary to address the surging demand for new services are traditionally powered ...

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LTE Base Stations: The Backbone of Mobile Connectivity

May 17, 2024 · Businesses benefit from improved connectivity, supporting real-time communication, cloud-based applications, and remote work, enhancing overall productivity. ...

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Green Communications , Engineering And Technology Journal

It contributes to global environment improvement and achieves commercial benefits for telecommunication operators. The main goal of designing green base stations is to save ...

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Energy-Efficient Base Stations , part of Green Communications

Aug 29, 2022 · With the explosion of mobile Internet applications and the subsequent exponential increase of wireless data traffic, the energy consumption of cellular networks has rapidly ...

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