

Energy Internet with Low-Temperature Resistance for 5G Base Station Use



Overview

5G mobile communication system achieve better network performance while causing a significant increase in energy consumption, which hinders the sustainable development of the telecom industry. Even with many efforts for energy efficient systems, 5G mobile communication system achieve better network performance while causing a significant increase in energy consumption, which hinders the sustainable development of the telecom industry. Even with many efforts for energy efficient system designs and equipment operation are developed, there is still a plenty of potential for energy savings in HVAC operation of 5G base station site since a significant amount of energy is consumed for thermal management by the HVAC system to control the indoor environment within an acceptable temperature range for safe and reliable operation of the base station (BS) equipment. In this work, a coordinated optimization approach for energy efficient thermal management of 5G BS site is proposed. The approach collaboratively optimized the HVAC system and the BS. 5G networks energy efficiency system optimization HVAC thermal management wireless communication system

1. GSMA (2019). 5g-era mobile network cost evolution. URL <https://www.gsma.com/5g/5g-era-mobile-network-cost-evolution/>. Google Scholar

2. Climate Home News (2017). 'Tsunami of data' could consume one fifth of global electricity by 2025. URL <https://www.climatehomenews.com/news/2017/09/20/tsunami-of-data-could-consume-one-fifth-of-global-electricity-by-2025/>. Google Scholar

3. Global e-Sustainability Initiative (2012). SMARTer 2020: The Role of ICT in Driving a Sustainable Future. URL <https://gesi.org/research/gesi-smarter2020-the-role-of-ict-in-driving-a-sustainable-future/>. Google Scholar

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Article Content

Feb 23, 2026

Energy Saving Technology of 5G Base Station Based on Internet of

For time and space constraints, 5G base stations will have more serious energy consumption problems in some time periods, so it needs corresponding sleep strategies to reduce

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Energy Efficient Thermal Management of 5G Base Station Site Based

The rapid development of Fifth Generation (5G) mobile communication system has resulted in a significant increase in energy consumption. Even with all the effort.

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Our research addresses the critical intersection of communication and power systems in the era of advanced information technologies. We highlight the strategic importance of

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Abstract: The energy consumption of 5G networks is one of the pressing concerns in green communications. Recent research is focused towards energy saving techniques of base

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In spite of promising outcomes in optimizing energy usage for Radio Access Network (RAN) Base Station (BS) hardware, deployment, and resource management, existing methods

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Abstract With the rapid development of communication technology, the large-scale deployment of base stations (BSs) has led to an increase in power consumption. To reduce power consumption, energy

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5G base stations and the challenge of thermal

5G telecommunication problems and solutions hinge on thermal management. Here we look at why it's a problem and your options for addressing it.

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Evaluation of the power-saving effect of 5G base station based on AI

2 Software energy-saving functions of 5G Currently, the mainstream software energy-saving functions for 5G base station equipment include Symbol aggregation shutdown, channel

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Final draft of deliverable D.WG3-02-Smart Energy Saving of 5G Base Station

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 forecast and optimize

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A Survey on Recent Trends and Open Issues in Energy Efficiency of 5G

A survey on these technologies for the 5G Radio Access Network (RAN) can be found in . This survey has been aimed to contribute towards a greener and a sustainable

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A Predictive Energy Saving Technique for 5G Network Base Stations

In this chapter, we have studied the recent advancement in 5G applications using machine learning, then a model is proposed for predicting the data traffic in base station by using supervised &

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

Accurate energy consumption modeling is essential for developing energy-efficient strategies, enabling operators to optimize resource utilization while maintaining network performance. To address this,

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(PDF) A Review on Thermal Management and Heat

PDF | A literature review is presented on energy consumption and heat transfer in recent fifth-generation (5G) antennas in network base stations.

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An Intelligent Energy Saving Strategy Recommendation Method of 5G Base ...

In order to find a better model of energy saving for 5G base stations to reduce energy consumption, this paper proposes an intelligent energy saving strategy re

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Finally, we demonstrate the excellent thermal management applications of the PCN films for the fifth generation (5G) of cellular technology base stations and

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

Abstract 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 both

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A Review on Thermal Management and Heat Dissipation Strategies for 5G ...

A literature review is presented on energy consumption and heat transfer in recent fifth-generation (5G) antennas in network base stations. The review emphasizes on the role of computational science in

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Final draft of deliverable D.WG3-02-Smart Energy Saving of 5G Base

This technical report explores how network energy saving technologies that have emerged since the 4G era, such as carrier shutdown, channel shutdown, symbol shutdown etc., can be leveraged to

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Improving Energy Efficiency of 5G Base Stations: A ...

In wireless cellular networks, optimising the energy efficiency (EE) of base stations (BSs) has been a major architectural chal-lenge. The BSs are major consumers of energy among different components

Sep 10, 2025

A technical look at 5G energy consumption and performance

How can 5G increase performance and ensure low energy consumption? Find out in our latest Research blog post.

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Dynamical modelling and cost optimization of a 5G base station for ...

For energy efficiency in 5G cellular networks, researchers have been studying at the sleeping strategy of base stations. In this regard, this study models a 5G BS as an $(M^{\infty}/G/1)$ feedback retrial

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Optimal energy-saving operation strategy of 5G base station with ...

To further explore the energy-saving potential of 5 G base stations, this paper proposes an energy-saving operation model for 5 G base stations that incorporates communication caching and

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Renewable energy powered sustainable 5G network infrastructure ...

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 from the

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Coordinated Optimization for Energy Efficient Thermal Management of 5G ...

Even with many efforts for energy efficient system designs and equipment operation are developed, there is still a plenty of potential for energy savings in HVAC operation of 5G base station

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