

SolarTech Power Solutions

Energy-saving design of outdoor base station



Overview

In response to the current widespread issue of high energy consumption in 5G base stations, this article conducts overall design, hardware design, and software design of the base station energy-saving system based on the energy-saving principle of intelligent fresh air systems. Why is a base station important?

Environmental protection is a global concern, and for telecom operators and equipment vendors worldwide, developing green, energy-saving technologies for wireless communications is a priority. A base station is an important element of a wireless communications network and often the main focus of power saving in the whole network.

How ACS cooled a base station can save energy?

Compared with a traditional equipment room, an ACS-cooled room can save up to 70% energy. A sharp decrease in power consumption in a base station makes it possible to replace the traditional electrical power supply with solar or wind energy. Among other solutions, solar and hybrid solar-wind power has gradually been applied in base stations.

How can a soft base station reduce power consumption?

The 2G/3G swapping project of a leading telecom operator in Asia-Pacific is a good example of how power consumption can be reduced using the SDR soft base station platform. In the old network, one base station used three cabinets for GSM900, GSM1800, and UMTS2100 devices. Its overall power consumption was 4280 W.

How much power does a base station use?

In the old network, one base station used three cabinets for GSM900, GSM1800, and UMTS2100 devices. Its overall power consumption was 4280 W. After the old base station was swapped with SDR, UMTS900 system was included and power consumption decreased by 57%.

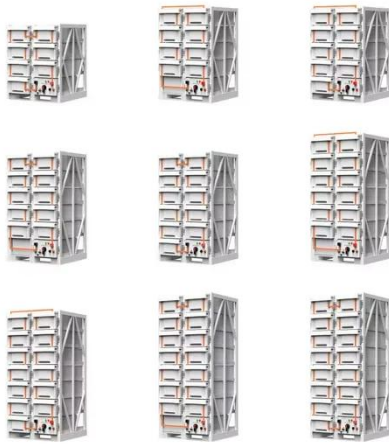
Why does a base station have low power utilization?

In a base station, the number of carriers is usually configured according to peak hour traffic. As a result, in idle hours, the power of some carriers is used in control channels rather than in traffic channels, leading to very low power utilization.

What is a green base station solution?

The green base station solution involves base station system architecture, base station form, power saving technologies, and application of green technologies. Using SDR-based architecture and distributed base stations is a different approach to traditional multiband multimode network construction.

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Energy-saving and economic analysis of passive radiative sky ...

The widespread application of 4G and the rapid development of 5G technologies dramatically increase the energy consumption of telecommunication base station (TBS). Remarkably, the ...

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Mar 16, 2022 · The widespread application of 4G and the rapid development of 5G technologies dramatically increase the energy consumption of telecommunication base station (TBS). ...



Energy saving based lighting system optimization and smart ...

Mar 1, 2020 · o Intelligent lighting control system can improve the energy-



saving design and is capable of the refined control model. o Solution with digital technology can increase ...

Outdoor Base Station Energy System - Aevstel

The Avestel outdoor base station energy system integrates the design concept of outdoor cabinet and outdoor power supply system, with refrigeration unit, environmental monitoring, fire ...



Energy Efficient Thermal Management of 5G Base Station ...

Nov 30, 2023 · The rapid development of Fifth Generation (5G) mobile communication system has resulted in a significant increase in energy consumption. Even with all the effort

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

May 7, 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-saving and economic analysis of passive radiative

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Research on Energy-Saving Technology for Unmanned

...

Dec 18, 2023 · The energy-saving system components of the base station utilize the temperature difference between indoor and outdoor temperatures to form heat exchange, relying on a large ...





Thermal management of standby battery for outdoor base station ...

Jun 5, 2018 · Because of its low price, high safety, life span, and energy density, the lithium iron phosphate battery is widely used in modern battery storage. In the outdoor stationary base ...

An optimal siting and economically optimal connectivity ...

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- LiFePO₄
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- Easy to expand
- Floor mount&wall mount
- Intelligent BMS
- Cycle Life:≥6000
- Warranty :10 years



Modeling and aggregated control of large-scale 5G base stations ...

Mar 1, 2024 · A significant number of 5G base stations (gNBs) and their backup energy storage systems (BESSs) are redundantly configured, possessing surplus capacit...

STUDY ON AN ENERGY-

SAVING THERMAL ...

May 17, 2024 · unication base stations has become one of the important ways to save energy. Practical applications showed that the outdoor communication base station has a high ...



Dynamic Hierarchical Reinforcement Learning Framework for Energy

Apr 2, 2025 · The energy consumption of 5G base stations (BSs) is significantly higher than that of 4G BSs, creating challenges for operators due to increased costs and carbon emissions. ...

Power Consumption Modeling of 5G Multi-Carrier Base ...

Jan 23, 2023 · Importantly, this study item indicates that new 5G power consumption models are needed to accurately develop and optimize new energy saving solutions, while also ...



ENERGY-SAVING MEASURES AND

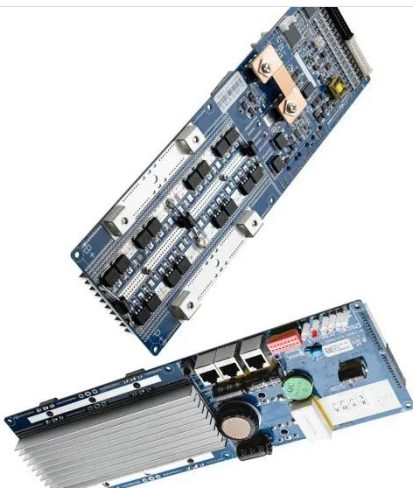
TEMPERATURE ...



May 17, 2024 · The average daily power of the current temperature control equipment has dropped significantly, and the energy-saving rates of the spring, summer, autumn and winter ...

Energy-saving analysis of telecommunication base station ...

Nov 1, 2013 · Zhou et al. [52] investigated the energy saving potential of TSHXs that would use the relative coolness of outdoor air to provide the cooling requirements of 31 Chinese ...



Thermal management of standby battery for outdoor base station ...

Jun 5, 2018 · In order to extend the life span of standby battery for outdoor base station, a semiconductor thermoelectric device/phase change materials (PCMs) coupled battery thermal ...

Base station energy-saving intelligent ventilation

system

Jan 22, 2018 · The base station energy-saving intelligent ventilation system introduces cool outdoor air into the communication base station and the computer room according to the ...

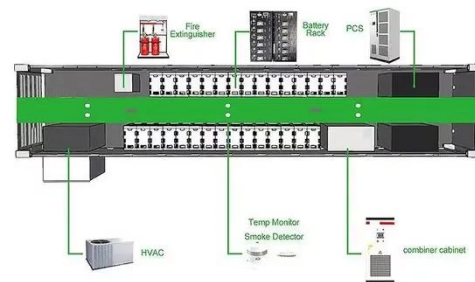


STUDY ON AN ENERGY-SAVING THERMAL ...

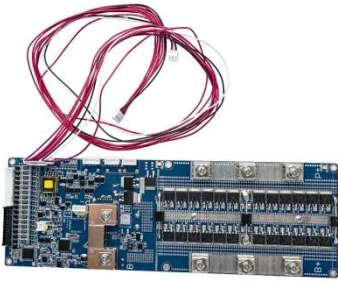
May 2, 2024 · In order to solve the poor heat dissipation in the outdoor mobile communication base station, especially in summer, high temperature alarm phenomenon occurs frequently, ...

Thermal management of standby battery for outdoor ...

3 days ago · The combination of semiconductor thermoelectric device and phase change materials can keep the outdoor standby battery pack for base station at optimum temperature ...



Energy Savings through Dynamic Base Station Switching ...



Jul 23, 2013 · In this paper, we investigate the design of energy efficient wireless access networks based on switching BSs. First, we suggest a basic distributed BS switching strategy, and, by ...

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

Feb 13, 2020 · The research shows that the method proposed in this paper has a certain energy-saving effect, can meet the energy efficiency requirements of 5G ultra dense base station, and ...



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Mar 1, 2022 · Request PDF , Energy-saving and economic analysis of passive radiative sky cooling for telecommunication base station in China , The widespread application of 4G and ...

Energy saving based

lighting system optimization and smart ...

Mar 1, 2020 · To evaluate the energy-saving potential and identify the efficiency improvement opportunities for lighting operations in metro systems, an intelligent energy management ...



Proactive Energy Saving Technique for Cellular Base ...

May 3, 2023 · Design an energy saving model for cellular base station: the prediction of cellular traffic load on base station is used with a algorithm for managing the power utilization of base ...

Research on ventilation cooling system of communication base stations

Jul 15, 2017 · To meet the design requirements of the green base stations [21], [22] and reduce operation cost of base station, this paper focuses on the effects of building structural design ...

Applications





Energy-saving analysis of telecommunication base station ...

Nov 1, 2013 · In Chinese telecommunication base stations, the air conditioning energy consumption is almost 47% of the total energy consumption. However, air-to-air thermosyphon ...

Analysis of energy efficiency of small cell base station in ...

Jan 25, 2023 · Base Stations (BSs) sleeping strategy is an efficient way to obtain the energy efficiency of cellular networks. To meet the increasing demand of high-data-rate for wireless ...



Renewable Energy Sources for Power Supply of Base ...

Sep 8, 2022 · Abstract -- An overview of research activity in the area of powering base station sites by means of renewable energy sources is given. It is shown that mobile network ...

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