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China s communication base station flow battery costs



Overview

Spot prices for LFP cells reached \$97/kWh in 2023, a 13% year-on-year decline, while installation costs for base station battery systems fell below \$400/kW for the first time. Do communication base station operations increase electricity consumption in China?

Comparing data from 2021, 2025, and 2030, we found that the electricity consumption due to communication base station operations in China increased annually.

Can solar power improve China's base station infrastructure?

Traditionally powered by coal-dominated grid electricity, these stations contribute significantly to operational costs and air pollution. This study offers a comprehensive roadmap for low-carbon upgrades to China's base station infrastructure by integrating solar power, energy storage, and intelligent operation strategies.

Why are China's leading communications companies incorporating energy storage batteries and photovoltaic power?

In addition, China's leading communications companies are progressively incorporating energy storage batteries and photovoltaic power generation to offset the mounting cost pressures stemming from the continued expansion of energy usage. The relative importance attached to this issue depends on the sense of urgency.

How much energy does a communication base station use a day?

A small-scale communication base station communication antenna with an average power of 2 kW can consume up to 48 kWh per day. ^{4,5,6} Therefore, the low-carbon upgrade of communication base stations and systems is at the core of the telecommunications industry's energy use issues.

Should China upgrade to low-carbon base stations?

These outcomes demonstrate that upgrading to low-carbon base stations not only ensures economic feasibility but also delivers significant environmental and public health benefits, reinforcing the strategic value of decarbonizing China's communication infrastructure.

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.

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