

SolarInvert Energy Solutions

Power consumption of 5G base stations in the Democratic Republic of Congo





Overview

Does a 5G base station have a power consumption model?

This paper proposes two modified power consumption models that would accurately depict the power consumption for a 5G base station in a standalone network and a novel routing protocol for distributing the load on the base stations in the case of intercellular communication.

How does mobile data traffic affect the energy consumption of 5G base stations?

The explosive growth of mobile data traffic has resulted in a significant increase in the energy consumption of 5G base stations (BSs).

How can we improve the energy eficiency of 5G networks?

To improve the energy eficiency of 5G networks, it is imperative to develop sophisticated models that accurately reflect the influence of base station (BS) attributes and operational conditions on energy usage.

Should power consumption models be used in 5G networks?

This restricts the potential use of the power models, as their validity and accuracy remain unclear. Future work includes the further development of the power consumption models to form a unified evaluation framework that enables the quantification and optimization of energy consumption and energy efficiency of 5G networks.

Can network energy saving technologies mitigate 5G energy consumption?

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 mitigate 5G energy consumption.

What is 5G base station?



1. Introduction 5G base station (BS), as an important electrical load, has been growing rapidly in the number and density to cope with the exponential growth of mobile data traffic . It is predicted that by 2025, there will be about 13.1 million BSs in the world, and the BS energy consumption will reach 200 billion kWh .



Power consumption of 5G base stations in the Democratic Republic



Modelling the 5G Energy Consumption using Real-world

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Jan 16, 2025 · The energy intensity (the ratio of the quantity of energy consumption per unit of economic output) of the economy was 19.1 MJ per US dollar (2005 dollars at PPP) in 2012,

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The Long Road to Sobriety: Estimating the Operational ...

May 1, 2025 · It is quite likely that the huge energy efficiency gains achieved by technology evolution have at least been compensated by the surge in data traffic. Therefore, in this paper, ...



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Power Consumption of 4G and 5G Networks

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5G network deployment and the associated energy consumption ...







Jul 1, 2022 · In particular, this research took the UK as an example to investigate the spatiotemporal dynamic characteristics of 5G evolution, and further analysed the energy ...

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Jun 27, 2016 · The Democratic Republic of Congo (DRC) is currently experiencing a general energy crisis due to the lack of proper investment and ...

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Jul 18, 2010 · In this paper we developed such power models for macro and micro base stations relying on data sheets of several GSM and UMTS base stations ...

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Energy Consumption Modelling for 5G Radio Base ...

In this thesis linear regression is compared with the gradient boosted trees method and a neural network to see how well they are able to predict energy consumption from field data of 5G ...



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World Bank Document

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sector is to increase access to electricity. The Democratic Republic of Congo is a large country with 10 million ...

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What is a 5G Base Station?

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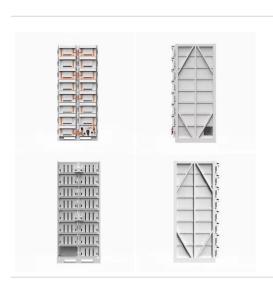
telco Vodafone, operates in several other African markets, including the Democratic ...

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Sustainable Connections: Exploring Energy ...

Dec 9, 2024 · A portion of the dataset is published on GitHub. We develop high-accuracy models to profile 4G and 5G base station energy consumption, ...

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5G base stations use a lot more energy than 4G ...

Apr 3, 2020 · Carriers have been looking at energy efficiency for a few years now, but 5G will bring this to top of mind because it's going to use more energy than ...

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The energy use implications of 5G: Reviewing whole network

...



Apr 1, 2022 · Addressing this gap, we conduct a literature review to examine whole network level assessments of the operational energy use implications of 5G, the embodied energy use ...

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Jul 1, 2024 · In this paper, we propose a game-theoretic model for studying load adaptive multi-cell massive MIMO system where each base station (BS) adapts the number of antennas to ...

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Research on Performance of Power Saving Technology for 5G Base ...

Jun 28, 2021 · Compared with the fourth generation (4G) technology, the fifth generation (5G) network possesses higher transmission rate, larger system capacity and lower tran



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





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Jul 1, 2024 · This paper conducts a literature survey of relevant power consumption models for 5G cellular network base stations and provides a comparison of the models. It highlights

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Power consumption analysis of access network in 5G mobile ...



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