

## A-Core Container

# Reason for the power consumption of Hungarian communication base stations



## Overview

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How to reduce the power consumption of BTS under the premise of meeting the network coverage?

Many people will think of improving BTS coverage and reducing the number of BTSs, but this is not the case. Today we will analyze the factors affecting the power consumption of base stations from theory.

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Understanding the power consumption streams, such as mechanical and communication power, and their relationship to the payload is crucial for analyzing its feasibility. Specifically, we focus on rotary-wing drones (RWDs), fixed-wing drones (FWDs), and high-altitude platforms (HAPs), analyzing their.

Mathematical optimization of energy consumption requires a model of the problem at hand. 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 radio base stations.

This thesis presents a comprehensive analysis of power consumption models of base stations. The research delves into the distribution of power consumption across different types of base stations, highlighting the

significant role of power amplifiers in macro stations and baseband processing units.

The first step when modeling the energy consumption of wireless communication systems is to derive models of the power consumption for the main system components, which are then combined with time-dependent traffic load models to estimate the consumed energy. This paper conducts a literature survey. How do base stations affect mobile cellular network power consumption?

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Do base stations dominate the energy consumption of the radio access network?

Furthermore, the base stations dominate the energy consumption of the radio access network. Therefore, it is reasonable to focus on the power consumption of the base stations first, while other aspects such as virtualization of compute in the 5G core or the energy consumption of user equipment should be considered at a later stage.

How does the energy consumption of radio base stations affect OPEX?

As the set of configurations gets larger the combinations of configurations on a hardware-software product, e.g., a 5G radio base station, increases quickly. As a consequence tractability decreases and optimization becomes harder. Figure 1.1: The effect of the energy consumption of radio base stations on the operator OPEX .

Is there a direct relationship between base station traffic load and power consumption?

The real data in terms of the power consumption and traffic load have been obtained from continuous measurements performed on a fully operated base station site. Measurements show the existence of a direct relationship between base station traffic load and power consumption.

What is the largest energy consumer in a base station?

The largest energy consumer in the BS is the power amplifier, which has a

share of around 65% of the total energy consumption . Of the other base station elements, significant energy consumers are: air conditioning (17.5%), digital signal processing (10%) and AC/DC conversion elements (7.5%) .

How can a power consumption model be used to estimate power consumption?

Quantification models are most suitable for quantifying overall power consumption of base station or even networks as part of large-scale evaluations. The number and complexity of parameters is limited, and simple usage with load profiles or traffic models is possible to estimate total energy consumption.

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