



SolarTech Power Solutions

Battery energy consumption ratio of communication base stations



Overview

What percentage of the energy consumption comes from ran (radio access network)?

Figure 1.1(c) then shows that of the energy consumption of the network, 70%-90% comes from the RAN (Radio Access Network) of which 70% of the energy consumption comes from the Radio Base Stations, see Figure 1.1(d).

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

As the set of configurations gets larger the combi-nations 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 .

How much energy does a BS consume?

In the BS itself, the air interface i.e., radio and power amplifier (PA) consumes approximately 50%, while the digital signal processing consumes approximately 15% of the total energy of the network . The term “Green Cellular Network” has gained huge popularity since the current telecom industry is more cautious about the improvements in EE.

How BS affect the energy consumption of a cellular network?

To contribute to the expansion of mobile traffic, a large number of BS are required. In a regular cellular network, the BSs consume more than half of the total energy, therefore their increased numbers have a significant influence on the overall energy consumption.

Can a neural network predict energy consumption from field data?

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.

What is the impact of base stations?

The impact of the Base Stations comes from the combination of the power consumption of the equipment itself (up to 1500 Watts for a nowadays macro base station) multiplied by the number of deployed sites in a commercial network (e.g. more than 12000 in UK for a single operator).

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