

# Evaluation of the energy consumption of the 5G Radio Access Network

## Motivation

The increase of energy prices has prompted telecommunication operators to evaluate the impact of the energy consumption of their radio access network (RAN). For an operator, the RAN represents about 75% of their energy consumption, and is therefore a crucial element to reach a net zero carbon footprint. One of the main problems is that the consumption of the RAN is not proportional to the data traffic, as is illustrated in the figure below. Moreover, it is unclear which are the components of a base station that contribute strongly to the energy consumption in practice.

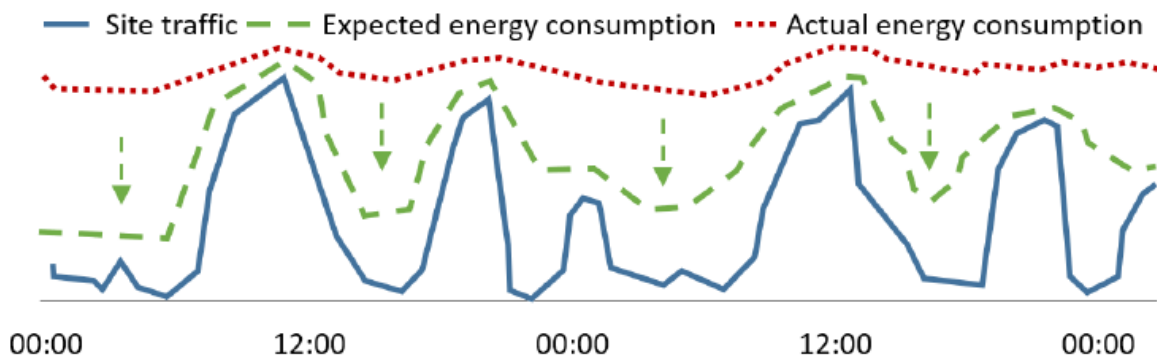


Figure: Energy consumption vs data traffic for a base station

## Objective

This Master's thesis will start from a database containing the measured energy consumption and data traffic of deployed 5G base stations in Belgium for two major operators. The student will first need to compare the energy consumption to the data traffic, and then parameterize the energy consumption based on the type of base station (number of sectors, number of antennas, number of frequency bands, ...). The student will also construct a prediction model to project future energy consumption based on multiple deployment hypotheses.

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