Energy efficiency of mobile network and ETSI standardization work

Dr. Jyrki Louhi

Nokia Siemens Networks

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Content

- Introduction
- Improving energy efficiency
- ETSI standardization work

1. Introduction

Environmental vision



World Connected

Net positive impact on environment

Combining environmental and business benefits

Maximizing positive influence

Minimizing environmental footprint

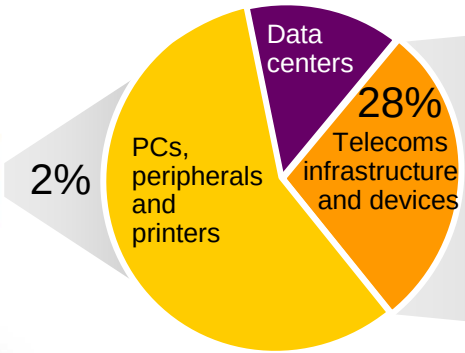
Green Radio of Nokia Siemens Networks helps to reduce our industry's own CO_2 footprint

Total CO_2 footprint from human activity

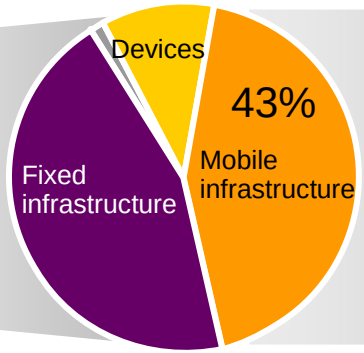


40GtCO_2e

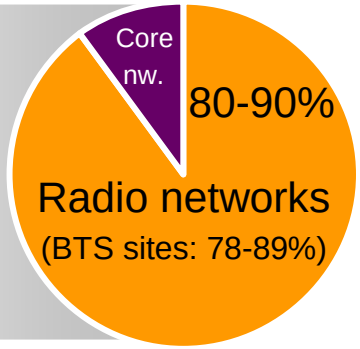
CO_2 footprint of ICT



CO_2 footprint of telecoms

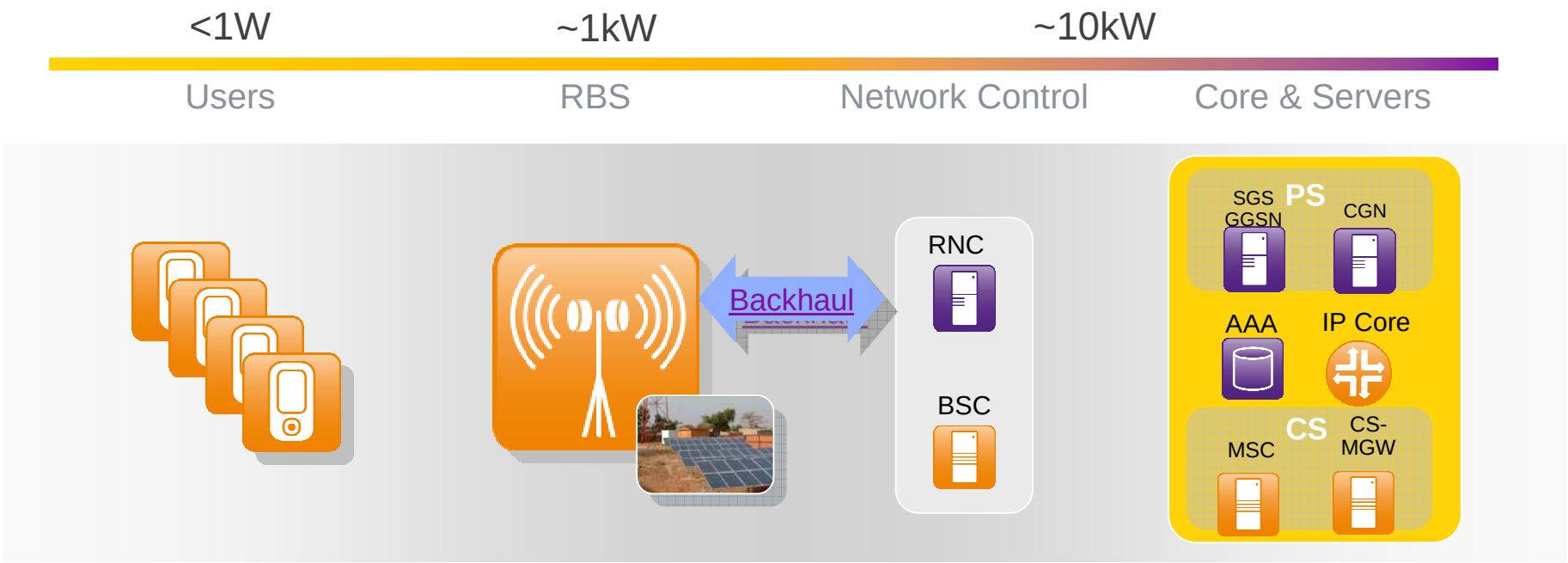


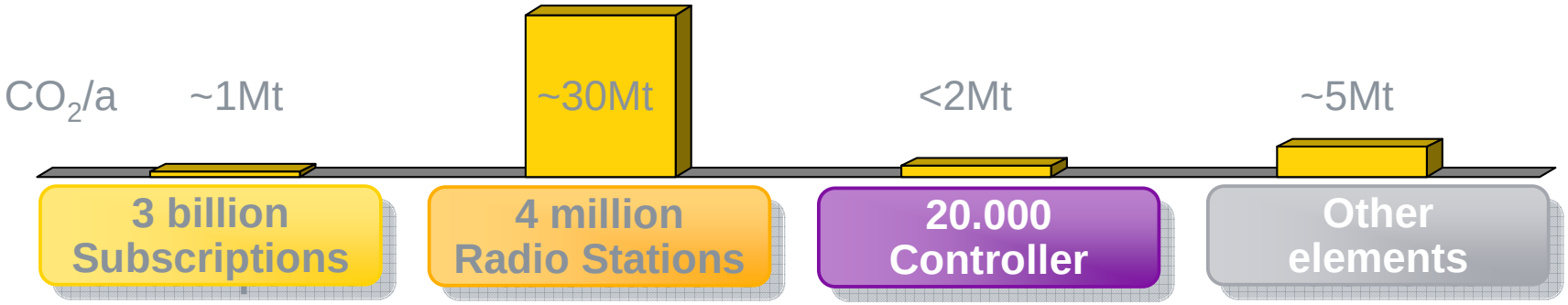
CO_2 footprint of radio networks



Sources: SMART2020 report (The Climate Group, 2008)
Nokia Siemens Networks mobile network assessment

Global CO_2 emission of cellular networks





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2. Improving energy efficiency

How to decrease Radio Network energy consumption and CO2 emissions?

Reduce energy consumption per site

- Use more energy efficient BTS
- Reduce energy used for site cooling
- Optimize energy consumption versus traffic

Reduce the number of BTS sites

- Increase cell coverage, when coverage limited
- Increase site capacity, when capacity limited

Use renewable energy sources

- Solar cells, wind and hybrid solutions on site
- Green energy: hydro, wind and bio generated grid electricity

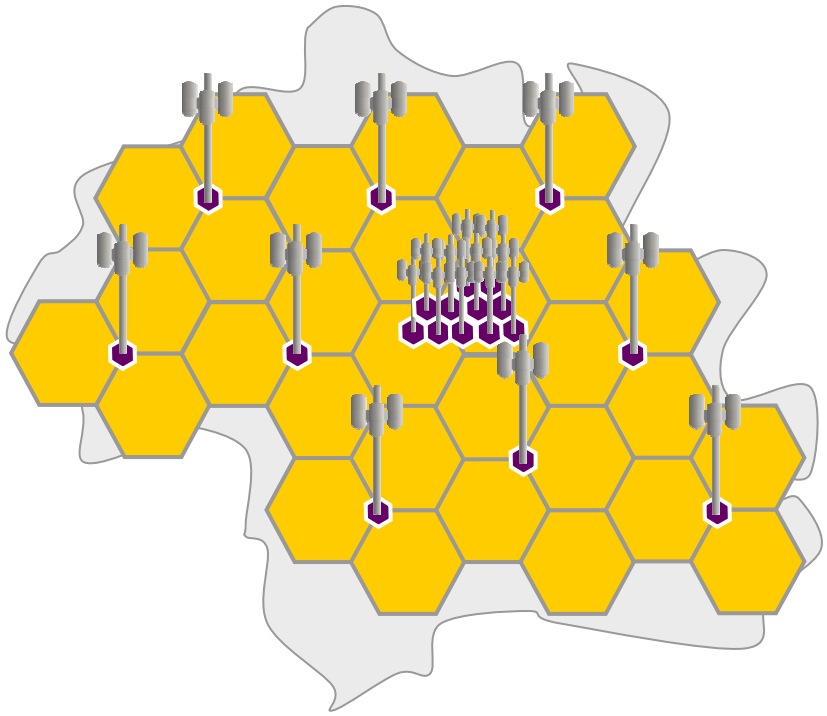






Coverage limited situation - Reducing the number of sites decreases energy consumption

- Requires network planning and site relocation
- Usable features dependent on operator starting point, available sites, geography, customers etc.
  - Lower frequency
  - Feederless sites
  - Diversity



Capacity limited case – Increase cell capacity and improve network energy efficiency

- GSM/EDGE BTS:
  - HR-AMR can double the BTS voice capacity
- WCDMA/HDSPA BTS offers significant capacity increase compared to GSM/EDGE:
  - 1+1+1 WCDMA BTS has the same voice call capacity as 8+8+8 GSM BTS
  - With data traffic the 1+1+1 HSDPA BTS have the same capacity as 20+20+20 EDGE BTS

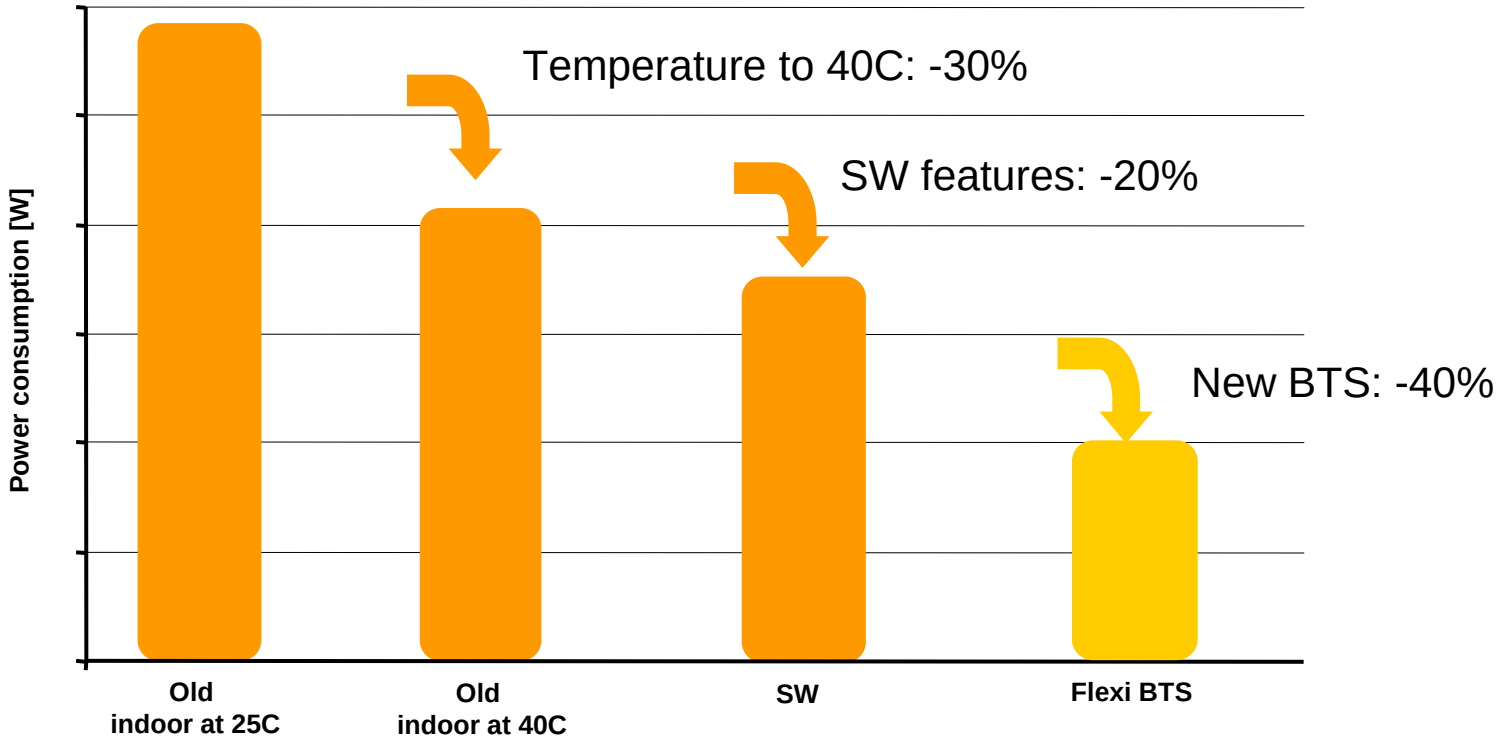






BTS site power reduction

Example of average power consumption of 4+4+4 GSM/EDGE BTS Site



3. ETSI energy efficiency work

ETSI work item DTS/EE-00007

Energy efficiency of wireless access network equipment (DTS/EE-00007)

- A work item under ETSI EEPS
- Work target is to generate ETSI Technical Speciation (TS) for energy efficiency of wireless access network equipment
- Work item approved at April 2008 by EE#32

Goals and benefits of work

For operator

- Easier to compare power consumption figures
- Less lab test effort
- Reliable figures
- Improved energy efficiency by transparency and competition.
- Contributing to CSR targets from either the company or government

For equipment vendor

- Clear international metrics instead of national / regional initiatives
- Promotes the improvement of wireless access network energy efficiency
- Harmonised lab testing
- Better interpretation of test results

Scope of work

Work scope as defined in work item form

- Define wireless access network energy efficiency metrics
- Define efficiency parameters and measurement methods for wireless access network equipment
- In first phase GSM/EDGE, WCDMA/HSPA and WiMAX are addressed.

Out of scope

- Energy consumption of user equipment
- Network planning and deployment

Three level metrix

- RBS equipment average power consumption for reference RBS equipment configurations and reference traffic loads.
- RBS site average power consumption which is based on measured RBS equipment power consumption and site level correction factors.
- Network level performance indicators which are based on RBS site energy consumption as well as site coverage area and capacity.

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Thank You