



Reduce base station energy consumption with Nokia's EdenNet SON Energy Saving Management solution

Executive Summary



Reducing base station energy consumption by 15 percent

Nokia's EdenNet SON Energy Saving Management solution (ESM) utilizes closed-loop automation and machine learning (ML) to maximize the energy efficiency of a network carriers' operations. It supports cost savings of approximately 15 percent while helping to realize the full potential of the 5G network as well as supporting an operator's climate change targets.

ESM takes advantage of Nokia's centralized self-organizing networks platform (cSON) by combining its energy efficiency features with the in-built capabilities in a base station. Nokia's self-organizing networks automate operations across multiple technologies, eliminating complexities from multi-vendor and multi-layered networks, boosting network performance, and driving efficiencies. The Nokia ESM enables network carriers to automatically optimize every cell in their radio access network for the most energy-efficient performance.

Near-real-time network monitoring in RAN

The Radio Access Network (RAN) plays an important role by monitoring the network load in near-real-time and executing the settings to switch cells on or off by using ML depending on which cells are required. This means a coverage area can be more efficiently serviced with fewer cells. It does this by transitioning a cell to its energy-saving state and proactively moving user equipment to the remaining active cells that need it. The feature also automatically recognizes the order of cells that require switching on or off in the most efficient manner.

Driving cost savings in Power Saving Group mode

Nokia ESM's energy efficiency feature includes a 'Power Saving Group' functionality for cells that cover the same coverage area or footprint. The network load of these cells is monitored by the RAN, which automatically triggers a 'switch off' during periods of decreased activity or 'low load' and powers the network back-on when the load increases. This drives energy as well as cost savings. A power-saving group consists of both coverage and capacity cells. The capacity frequency can participate a load-based switch-off, however, the coverage layer doesn't switch off and remains in service when the capacity cell switches off.

Machine Learning in ESM

Previously, network carriers would have to configure energy-saving activation periods manually, however, the inclusion of ML in ESM, automatically optimizes the best activation and deactivation time periods based on the network load. Each cell's load period is different and can be busier at different times. Machine Learning (ML) helps to predict the period of cell-switch-off by predicting optimal periods of low load in the power saving group and configuring optimal activation periods. Energy savings are made through this cell switch-off.

5G Energy Savings Management

Nokia's ESM platform improves the RAN energy efficiency for 5G networks by offering enhanced usability and an accurate configuration that provides the maximum opportunity for cell switch-off. It does this by:

- Ensures the correct energy savings configuration
- Automatically groups cells to the correct Power Saving Group
- Automatically configures coverage and capacity layers, as well as the order of cell switch-off
- Provide control for configuring the time period a cell is switched off and exclude certain cells from being switched off if they are configured with pre-defined RAN features
- Automatically switches off the 5G coverage layer if there is LTE coverage

Building zero-emission radio access networks

Nokia is playing a role in the fight against climate change by cutting emissions and enabling smart solutions. It has delivered zero-emission products to over 150 customers globally and the base station sites we modernized in 2020 are now using 54 percent less energy on average. Nokia is also supporting its suppliers and customers to do the same and continues to work with our customers to cut waste, improve energy efficiency, and deploy smart solutions by accelerating digitalization and automation in a range of industries, from manufacturing and mining to logistics and transport.



About Nokia

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.

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