

CASE STUDY

stc improves RAN
energy efficiency with
Artificial Intelligence
powered energy savings
management

- 6 percent average reduction in energy consumption on top of RAN energy saving features
- No degradation in network KPIs

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“At stc, we are committed to tackling key environmental challenges in our industry. We are collaborating with Nokia in four areas characterized by climate, society, digitalization, and future of work, aiming to reduce carbon emissions and promote sustainable practices.

We are very happy with the results of automation with MantaRay SON. With the new Artificial Intelligence and Machine Learning powered Energy Savings Management module, we were able to reduce energy consumption by 6 percent across our 4G network without any degradation in network KPIs. This was thanks to AI/ML-based optimization of base station energy-saving features.

Improvements in RAN energy efficiency have a big role in reducing CO2 emissions in line with our target of reaching net zero.”

Mohammed M. Albadrani

Operations VP, stc



stc is the largest operator in Saudi Arabia, focused on innovation and the evolution of technologies that enable digital transformation in this fast-growing market, supporting Saudi Vision 2030.

stc is continuously evolving and growing its mobile network to offer enhanced coverage and capacity for its subscribers. Since the first deployment of Nokia Self-Organizing Networks (SON) back in 2021, stc has been running over 30 SON modules continuously in closed-loop automation with excellent results for RAN optimization.

In this document, we refer to Nokia SON with its new product name, MantaRay SON, which has inherited all the existing capabilities of the previous product generation.

About 80 percent of a mobile network’s energy is consumed by base station sites and the energy use is increasing annually driven by the growing demand for mobile broadband services. Improving radio network energy efficiency has a direct impact on reducing carbon emissions.

This case study describes how the Artificial Intelligence (AI) and Machine Learning (ML) powered Energy Savings Management module of MantaRay SON helped stc reduce 4G radio network energy consumption and related emissions without compromising any network KPIs.



OBJECTIVE

Increasing energy efficiency in the radio network with no degradation in network KPIs

The key target of stc is to provide a superior user experience for all of its subscribers. To meet the growing demand for high-speed mobile services, the complexity of the operator's network has also increased.

stc runs multiple generations of radio technologies including 4G and 5G, which has led to increasing energy consumption and related costs.

In its Environmental Position Statement, stc commits to conserving energy and promoting energy efficiency. The operator welcomes new technology innovations that help improve the energy efficiency of its networks and reduce CO2 emissions linked to its business activities.

stc's objective is to tackle environmental concerns without compromising network performance.

SOLUTION

AI/ML-powered energy savings management with MantaRay SON

Based on the positive experience with MantaRay SON, in 2022 stc decided to implement the new Energy Savings Management (ESM) SON module, which is powered by AI/ML.

MantaRay SON ensures an accurate radio network configuration that provides stc with the maximum opportunity for energy savings, leveraging the in-built energy-saving capabilities of AirScale base stations.

The ESM module automatically groups radio cells into Power Saving Groups. It also automatically configures coverage and capacity frequency layers.

The ESM module uses AI/ML to automatically predict low traffic periods and optimize the activation and deactivation times based on the network load fluctuation.

During low traffic load, the ESM module allows the radio network to switch off the capacity layer. When the load increases, it switches the cell back on. The coverage layer remains in service even when the capacity layer is switched off.

The ESM module optimizes the thresholds for cell shutdown and excludes certain cells from being switched off. It also manages the optimal order for switching the cells off and back on. Additionally, the ESM module can automatically switch off the 5G coverage layer if there is 4G LTE coverage.

RESULTS

Consistent energy savings across all radio cells with no compromise in network performance

Nokia AirScale radio access products include several energy-saving features, which all contribute to overall energy efficiency in the network.

stc was able to achieve significant additional energy savings by automating these energy-saving features with MantaRay SON.

The Energy Savings Management module was first running in 7-hour iterations to train the AI/ML engine. It was then running for 24 hours fully leveraging the AI/ML capabilities with the following results:

- 6 percent average energy savings on top of RAN features in all traffic conditions
- No degradation in network KPIs

By keeping radio network energy consumption and related costs under control with intelligent management of energy-saving features, stc is able to offer a superior mobile user experience for its subscribers while paving the path for a carbon-neutral future.



MantaRay SON enables additional energy savings on top of RAN features

Many operators report double digit growth in energy consumption as they are evolving their networks to meet the ever-growing demand for high-speed mobile broadband services.

In mature markets, the mobile network operators can spend approximately 15 – 30 percent of their OPEX in energy, whereas in developing markets the share can be up to 50 percent.

About 80 percent of a mobile network's energy is consumed at base station sites. Similarly to stc, operators can achieve significant energy savings by automating the management of in-built energy-saving features in the radio network.

On average, up to 70 percent of resources in a mobile operator's network can be idle, however, the resources are necessary to serve the peak traffic volumes.

With the AI/ML-powered Energy Savings Management module of Nokia MantaRay SON, automating energy savings is possible in all types of radio networks without compromising throughput or other network KPIs.

Energy-efficient radio networks are key to the green transition of the telecommunications industry, paving the way for a carbon-neutral future.



Visit MantaRay SON webpage to learn more.

Nokia OYJ
Karakaari 7
02610 Espoo
Finland

Tel. +358 (0) 10 44 88 000

CID: 213678

nokia.com

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

As a B2B technology innovation leader, we are pioneering the future where networks meet cloud to realize the full potential of digital in every industry.

Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.

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