



# Network AI - Green Radio

## Network AI

Telenor Group has set up thousands radio units in order to provide customers with excellent coverage in all of its markets in the Nordics and Asia. Our radio network needs to seamlessly serve millions of customers and cover huge areas. We are providing coverage to all kinds of devices in varying and often challenging conditions - e.g. indoor, along roads, railways, and tunnels.

Mobile phone networks are complex systems that require lots of effort to set up, tune and control. That's why Telenor Research is investigating how data, algorithms and AI can help us configure and run all those radios in an efficient way - in order for customers to have the best possible connection and network experience. As our "raw" material, we use billions of datapoints generated from logs in the network elements.

## Green Radio

In the 'Green Radio' project, our goal is to reduce power consumption and CO2 emissions by using data driven methods and AI. Power consumed by the cell tower radios is the main contributor to telecom operators' CO2 footprint. Telenor Group's ambition is becoming carbon neutral by 2030, so it is high on Telenor's agenda to reduce network energy usage.

How does AI help us? We have developed algorithms that use data to profile and predict load for each of the thousands of individual radio units in a network. This prediction is then used to automatically put radios in low-power 'sleep-mode' in areas where it is likely that there will be few customers using their phones. The job of the algorithm is to maximise power saving, while ensuring that customers are not suffering from low network capacity.

For instance, in residential areas, the algorithm will detect a trend of high load in the evenings. While in a commercial district we will see high load in the daytime during the weekdays only. On top of that, we will see everything in between. Plus, the weather, holiday seasons, festivals, etc., will influence the load on a radio unit and must be handled by the power saving algorithm. Ensuring that each radio has the best updated configuration is not possible without using algorithms and data.

The Green Radio algorithm was first developed and piloted in collaboration with radio and network expert teams in Telenor Denmark. We were able to show that the Green Radio approach could more than double the saving effects from using sleep-mode functions on Telenor's 4G network. Estimated incremental saving on energy usage was 2.5%. Even for a rather small operation like Telenor Denmark, this amounts to saving 700 tons of CO2 - equivalent to a full year of driving for about 250 standard cars in Denmark.



So, what's next? We are extending adaption to 3G power-saving use cases in collaboration with Grameenphone, our operation in Bangladesh. It's a completely different market than Denmark, as an emerging market where we have more than 70M customers. An adapted version of the algorithm will be tested.

We have also worked closely with GSMA to promote the Green Radio approach at telecom industry events such as the Mobile World Congress and by launching the Green Radio AI challenge. With 5G being rolled out across the globe, mobile network power usage is expected to increase dramatically, so the need for 'Green Radio' and similar algorithms is becoming increasingly important.

Learn more:

More details on the Green Radio work in DK

- <https://www.telenor.com/lean-green-telco-machine-how-ai-is-greening-mobile-networks/>

GSMA Global AI challenge PR material:

- <https://www.gsma.com/artificialintelligence/global-ai-challenge/2019-2/>
- <https://www.youtube.com/watch?v=clSCXG3aa-8>

Contact person:

Johannes Bjelland, johannes.bjelland@telenor.com