



# MAKING THE GRID GREENER WITH NB-IOT

The power grid is the world's largest and possibly most important machine. It powers our lives. By using green energy sources such as wind and solar power, grid owners are able to make the grid more sustainable. However, the variable nature of sunshine and wind present a challenge: how do you capture all of this energy when you can't predict it?

## CHALLENGE ADAPTING TO VARIABLE ENERGY SOURCES IN REAL TIME

Heimdall Power is a Norwegian technology company who have been named in the top 100 Cleantech companies in the world and the top 3 in Scandinavia. They're taken on a very important challenge.

Power grids have been developed over the past 100 years. They're designed to receive power from constant energy sources, but now they face a new challenge. They must manage and prioritise variable power generation from wind and solar. Currently, grid owners are forced to estimate how much green power they will receive and make up the rest from traditional power sources such as fossil fuels. If the wind blows more or the sun shines brighter, they aren't equipped to handle the extra energy generated and it can end up going to waste.

In order to make the most of green energy sources, grid owners need real-time visibility of how much capacity is available in each part of the grid. And they need to monitor some of the most remote parts of the world to do it.

## REMOTE GRID MONITORING



Real-time grid monitoring

TELIA NB-IOT

Direct-to-network connectivity



Real time visibility & grid optimisation



Variable power source monitoring

“With Telia NB-IoT, we get a very robust communication infrastructure. And that of course is one of our competitive advantages.”

Brage Johansen, Heimdall Power



SOLUTION

## REAL-TIME GRID MONITORING

To manage the grid in real time requires real-time monitoring. And for that, it would need to be digitised. Not just at production sites and transformers – which are already well connected – but the powerlines themselves.

So they developed the Neuron. A package of sensors that attaches directly to the power lines to provide real-time data in even the most extreme conditions.

## GETTING MORE OUT OF THE GRID

The Neuron monitors the temperature and sag of power lines to measure the true capacity available. This enables grid owners to increase grid capacity by an average of 25% simply by having real-time visibility rather than guessing with large margins of error. This makes it possible to get a lot more out of existing infrastructure rather than investing in new power lines.

The Neurons also have sensors to predict and locate faults, for example ice build-up or if a tree is interfering with a line. Neurons can show exactly where the potential problem is located and enable proactive action rather than waiting for a line to break and the disruption it causes.

## CONNECTING REMOTE LOCATIONS

The nature of the power grid means it runs through the most remote and unconnected parts of the world. To account for this, Neurons have 2 levels of connectivity. Neuron-to-neuron connectivity will transmit data from one sensor to the next. Then, when a neuron is within range of Telia's cellular network, Narrowband IoT (NB-IoT) is used to send the data to the cloud. Because NB-IoT has far greater reach than traditional IoT technologies, it makes it ideal for using in remote locations. And because Telia has the most extensive network infrastructure in the Nordics and Baltics, it's the perfect combination.

## PUTTING GREEN ENERGY FIRST

By digitising the power grid, it becomes easier to manage and more dynamic. When you have real time visibility you can distribute the power from wind and solar sources, and with real-time visibility of grid capacity, you can prioritise sustainable power sources and minimize the need for fossil fuel generation. It's good for business, good for the environment and good for all of us.



### REAL-TIME VISIBILITY

Making way for green energy and reducing fossil fuel generation

### VARIABLE INPUT

Generation varies depending on weather conditions

