

Proactivity in Electricity Distribution Through Data



Continuous condition monitoring of transformers helps decrease breaks in electricity distribution. Thanks to the measurement data from its transformers, energy company Nivos can be proactive and react to potential problems in advance.

Nivos handles the electricity distribution in an area covering ten municipalities. When the network managers are able to anticipate problems, it is possible to minimize power outages in homes and workplaces.

In recent years, Nivos has invested in its electricity networks and especially in increasing their automation and intelligence. Indeed, automation has already brought about a major improvement in service reliability of the electricity network.

Decisions Based on Measurements

Nivos collects information on its transformers with Vaisala's

MHT410 Moisture, Hydrogen and Temperature Transmitter.

"We needed information to be able to react to possibly critical situations in advance and to make correct decisions based on the data," says Operations Manager Jarno Virtanen from Nivos.

When there is a developing problem in the transformer, its temperature rises, which leads to gases forming in the transformer oil. Their type and amount indicate what kind of a problem is imminent. This may make it possible to intervene before the transformer fails or at least to take the correct action without a lengthy investigation.

Continuous Monitoring for the First Time

The MHT410 transmitter was installed to Nivos' new main transformer located in Kapuli substation in Mäntsälä in Southern Finland. The condition monitoring data is sent from the transformer to Nivos' control room.

"For the first time, we can see how long it takes for a transformer to warm up when the temperature is -20 degrees Celsius. Likewise, this is the first time we can see the hydrogen content of the transformer oil. This information helps us optimize our operations."

Vaisala MHT410 enables continuous monitoring of the transformer's condition at Kapuli, while earlier condition monitoring relied solely on manually taken oil samples. This practice still goes on with Nivos' other transformers. However, the benefits of automatic and continuous



condition monitoring have already been acknowledged.

“It is completely different to follow the situation continuously than to take samples every now and then. After all, electricity networks can have quite exceptional switching situations – a transformer can have very high momentary loads and at other times be used only lightly.”

Long Life for Transformers

Nivos’ client list includes households as well as large international businesses. The Kapuli industrial area, in particular, has clients that use a lot of electricity, such as a data center. Nivos is also about to get new clients, like a greenhouse which also is a major consumer of electricity.



The company also serves a large geographical area. Nivos has seven main transformers for 14,500 residents, so each transformer delivers electricity to thousands of clients. If service is disrupted, electricity can be transferred from further way, but this generates extra load on the network, illustrating the importance of foresight in the maintenance of the equipment.

“The main transformers have a lifespan of 45 years. With continuous monitoring, we aim to make sure they last for the planned time. Our work revolves around asset and risk management.”

The measurement instruments also allow for being prepared for changes in the business. Data is used increasingly, and different

databases are brought together to make operations more efficient.

“In the future, it may be possible to combine transformer data with weather data and find ways to improve our operations further,” envisions Virtanen.

Nivos Oy

Operating in the Uusimaa and Päijät-Häme regions of Finland, Nivos Oy is a diversified energy company with an offering ranging from energy networks, energy and heating solutions, and internet to water supply. In 2018, the Group’s turnover was 33 million euros. Nivos has 80 employees, 60 of which work in the energy unit.

Vaisala MHT410 Moisture, Hydrogen and Temperature Transmitter

Vaisala’s MHT410 measures moisture, hydrogen, and temperature directly from the transformer’s insulating oil and provides both reliable information on the hydrogen trend as well as timely measurement data of changes in the oil’s moisture content. The measurements provide real-time information about possible transformer failures, making it possible to react to them quickly or even in advance. Predictive maintenance extends the lifespan of the transformer and decreases unexpected downtime.

The transmitter’s moisture and hydrogen sensors are in direct contact with the transformer oil, making it possible to detect changes in moisture levels quickly and reliably. The unique probe is easy to install using a ball valve.

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