

DIGITAL

Innovative Technology Enables Improved Critical Asset Management

How EcoStruxure™ Transformer Expert helps monitor aging transformers to anticipate risks and better optimize their lifespan

CERN – Geneva, Switzerland

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Connecting assets and the universe

Established in 1954, the European Organization for Nuclear Research, or CERN, is based in a northwestern suburb of Geneva, on the France–Switzerland border. CERN is one of the world's largest and most respected centers for scientific research.

The mission of CERN aims to better understand what the universe is made of and how it works. To do this, they provide scientists with a unique complex of particle gas pedals that allow them to push the limits of human knowledge, perform world-class research in fundamental physics, and unite people from all over the world to explore the frontiers of science and technology for the benefit of all.

In this research environment, the availability of facilities remains crucial.

CERN uses 1.3 terawatt hours of electricity annually, and transformers play an essential role in the reliability of this supply. Most of the transformers at CERN are over 30 years old and approaching average end-of-life. The question was whether the transformers needed to be refurbished, or whether the insulation was degraded enough to require replacement. But how can you tell?

An article in Transformers Magazine about smart sensors and connectivity caught the attention of Giuseppe Cappai, High Voltage Maintenance Manager for CERN.

Affordable and efficient solution with IoT sensors

Transformer downtime is a critical issue for any business or activities, and replacement represents a huge CAPEX decision and downtime that impacts critical operations.

Giuseppe Cappai was looking for an affordable solution to understand the remaining life of CERN's aging transformers, anticipate and manage their end-of-life for smooth replacement and prioritize the upgrade investment.

An expert in transformers, Giuseppe had explored other solutions, but the traditional Dissolved Gas Analysis (DGA) approaches were insufficient to provide a clear picture. EcoStruxure Transformer Expert is an easy-to-deploy, disruptive monitoring solution including IoT sensors and software which present capabilities not found in other competitors. Beyond just measurement and data, the solution correlates temperature, moisture, vibration and partial discharge trends to determine insulation and operating risk of the transformer and makes recommendations on best practice management.

After investigating EcoStruxure Transformer Expert in September 2021, Giuseppe agreed to a one-year pilot to monitor one of the medium-sized substation transformers, which was 36 years old and rated at 38 MVA, 66/18 KV. The objective of the trial was to evaluate the solution and compare the results with existing equipment and traditional DGA analysis.



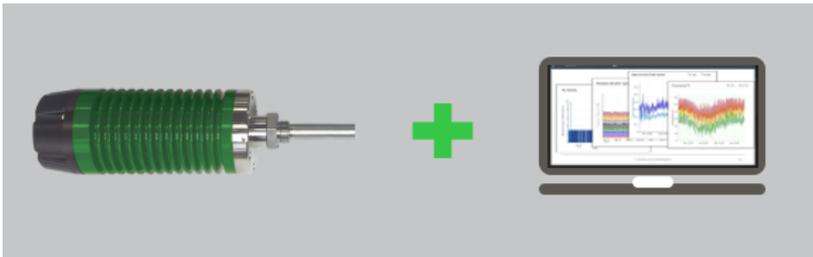
Deployment of EcoStruxure Transformer Expert on eight transformers

After one year of successful testing, CERN decided to deploy the solution on eight transformers.

All installations of the EcoStruxure Transformer Expert were done in a short period of time.

A win/win partnership

In early October 2021, Giuseppe suggested a configurable sensor temperature offset that he would like to see incorporated in the software. This suggestion was considered by the R&D of Schneider Electric for inclusion in the roadmap and was implemented in late October 2021.



All three (application + comms + sensor) All-in-one IoT sensors + software analytics monitoring solution

“The relationship with the Schneider Electric Services team has been great. You have listened and responded to my suggestions. I feel we are on a journey together to solve problems and really appreciated the fast response from the team.”

— Giuseppe Cappai,
High Voltage Maintenance Manager for CERN

Goal

Implement an affordable and efficient solution to improve critical transformer asset management.

Story

A nuclear research organization relies on an innovative IoT solution to understand transformer risk and optimize remaining life.

Solution

Monitor the behavior, analyze risk, and recommend best practice asset management of eight transformers using EcoStruxure Transformer Expert.

Results

Following the outcomes of the online analysis, maintenance actions were implemented and replacement plans made to minimize the risk of these critical assets impacting operations.

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Schneider Electric

35 rue Joseph Monier
92500 Rueil-Malmaison, France
Phone: + 33 (0)1 41 29 70 00

www.se.com

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