

Data-driven predictive maintenance of transformers



COMEM

Just like proactive and regular healthcare for humans, proactive and predictive maintenance is fundamental for improved life quality and significantly increased transformer lifespan



By identifying and preventing premature transformer failures through monitoring, you can ensure business continuity and significantly reduce operational costs

Transformers are essential assets in power grids, industrial plants, data centers, and other consumer sites. They are designed to last for 30 – 40 years, but numerous factors, such as overloading, overheating, moisture, dissolved gases, and several others can cause them to age prematurely and fail.

Just like proactive and regular healthcare for humans, **proactive and predictive maintenance is fundamental for improved life quality and significantly increased transformer lifespan.**

We highly recommend you make decisions on transformer healthcare based on relevant data analysis, which consists of monitoring, testing, and consulting services. A digital transformation journey moves from a process-defined world to a data-driven world.

Transformer monitoring is vital because it helps to prevent failures, extend the lifespan of the assets, and reduce operational and maintenance costs. You can avoid costly downtime and keep operations running smoothly. Whether you need a solution for new applications or a

retrofit for existing installations, monitoring is the ideal solution to keep your assets under control.

Investing in transformer monitoring can be a significant change for your business. It gives you the power to track the health of your assets in real time, providing you with immediate information about any potential issues.

When transformers fail prematurely, the cost of damage can far exceed the cost of replacement.

By identifying and preventing premature transformer failures through monitoring, **you can ensure business continuity and significantly reduce operational costs.**

Real cases with a substantial impact on people and industry:

- *A transformer fault in Paris in December 2022 caused a blackout for 65,000 households.*
- *Two transformer failures in November 2022 at a Houston water purification plant affected two million customers.*

Transformer monitoring has the potential to deliver*:

- **75% reduction in repair costs** due to early detection
- **60% reduction in revenue loss** due to unanticipated problems or outages
- **50% reduction in risk of catastrophic failures**
- **up to 2% annual cost savings** of the price of a new transformer

*CIGRE, Technical Brochure 248

Predictive maintenance is a significant change in asset management. By regularly collecting and evaluating data, you can determine which transformer is most likely to fail soon. This approach empowers the end-user to schedule proper maintenance or replacement of the asset and ensure it is still in the best condition, leading to significant cost savings and increased power reliability.

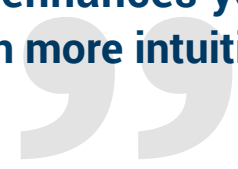
As part of our MeDICA ecosystem, eDAC can collect data remotely from various sensors installed on the transformer, including COMEM eDevices and third-party sensors, through an integrated 4G module.

Say goodbye to guesswork and hello to accurate, real-time insights with eDAC.

For cost-effective predictive maintenance, it is crucial to continuously integrate data about the asset health collected from transformer monitoring systems that use multiple sensors.



The MeDICA web interface is straightforward to use and enhances your digital experiences, making tasks simpler, navigation more intuitive, and accessibility to virtual information seamless



eDAC, our latest data aggregator, is a device designed to collect and process data from multiple sources. It presents the data in a unified view of what is happening inside the transformer.

As part of our MeDICA ecosystem, it can collect data remotely from various sensors installed on the transformer, including COMEM eDevices and third-party sensors, through an integrated 4G module.

Suppose you need to gather information about the partial discharge in the transformer bushings and detect faults early, diagnose them, and take corrective action to ensure the smooth operation of your transformer. In that case, we can connect the bushing monitoring system to our aggregator.

You can also use eDAC to monitor the **thermal model and overloading**, two other critical aspects that the end-user should address to have a more comprehensive understanding of its asset health.

Thermal modeling is used to determine the rise of hot spot temperature, which is the maximum temperature occurring in the winding insulation system.

In summary, it can help to:

- Determine the overall condition of the transformer.
- Predict the gradual deterioration of insulation.
- Avoid further damage to the transformer oil.
- Avoid costly repair downtime.

When a transformer is overloaded, its current exceeds its rated capacity. The rated capacity is defined by the transformer manufacturer and represents the maximum

current that the transformer can safely carry without overheating or causing damage or failure.

Overloading can lead to a significant reduction in performance and efficiency and may even cause damage or failure.

Monitoring transformer loading is essential for several reasons, including:

- **Ensuring safety:** Overloaded or underloaded transformers can pose a safety risk, potentially leading to equipment damage or failure.
- **Maximizing efficiency:** Using a transformer within its rated capacity

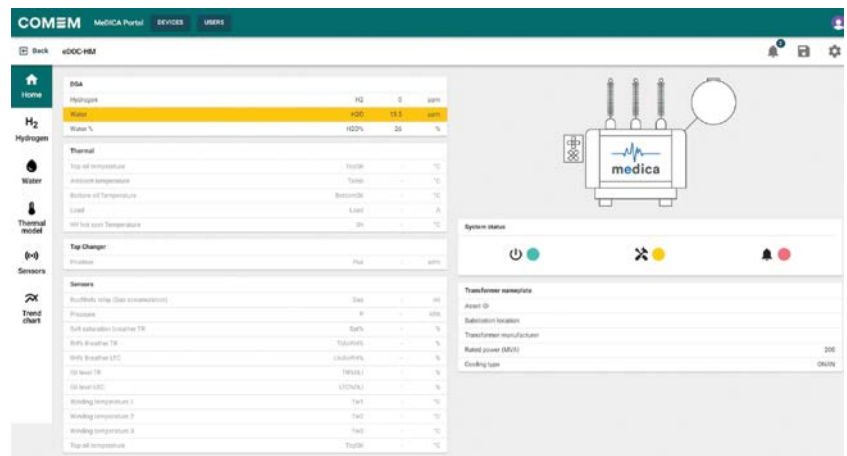
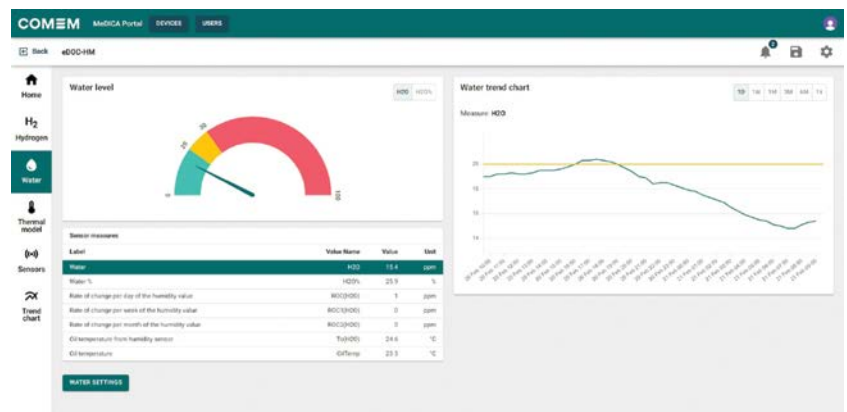
ensures the best efficiency, reducing energy waste and costs.

- **Extending asset lifespan:** Overloading can cause gradual insulation deterioration and lead to damage and costly repairs.

Prevention is better than cure.

Transformer monitoring can help to predict faults early, allowing for timely maintenance and repair.

With our eDAC, you can collect data from your installed monitoring sensors and measurement and safety electronic devices remotely or on-site.



If you could predict the future, you might be able to plan better, make your maintenance plan more effective, and avoid transformer failure that could affect your business





COMEM can work with you and develop a proper transformer maintenance plan based on data-driven preventive and predictive maintenance in order to increase the asset lifespan and optimize your maintenance cost

To access the data flow, we developed the **MeDICA web interface**. It allows you to control all settled sensors remotely.

You can access the web interface from your computer, smartphone, or tablet and get a quick overview of the asset's health status.

A **user-friendly interface** is essential in order to display all the data in an easy-to-read and easy-to-interpret way.

The **MeDICA web interface** is straightforward to use and enhances your digital experience, making tasks simpler, navigation more intuitive, and accessibility to virtual information seamless.

- You will not miss any alarm due to continuous remote monitoring.
- You will get a medical record of your transformer in just one click.
- You do not need any expertise to work with the collected data.

Predictive maintenance

If you could predict the future, you might be able to plan better, make your maintenance plan more effective, and avoid transformer failure that could affect your business.

Choose the right solution for your transformer

If you need a reliable Data Aggregator, choose eDAC, connect it to your



By signing a Service Agreement with COMEM, you will receive as part of the plan:

- A set of required sensors.
- Installation and commissioning.
- Web interface for remote access and monitoring of your equipment.
- Warranty for the period of the agreement and original spare parts.
- Dedicated assistance during the entire period of the agreement.
- Data collection and interpretation by our experts.

If you are interested, contact us, and our team of experts will help you with consultancy, pre-sales, and after-sales support, from data collection to data interpretation, analytics, diagnostics, and cure prescription.

Choose **MeDICA** and get a complete customer solution that includes products and services that can enable a longer and more efficient transformer life cycle.



**Monitoring Ecosystem
for transformer Diagnostics
with Integrated Customer
services & Analytics**



**Contact us & get support with
the product selection:
medica@it.comem.com**

installed monitoring devices, and direct the data flow into one reliable data collection system. This system fully integrates with your transformer protection and control systems and helps you with proper data elaboration.

Alternatively, you can choose MeDICA and build a personalized monitoring ecosystem to unlock the full potential of digitizing your transformer. **MeDICA** is a modular solution that can meet specific customer needs that vary over time. The solution includes hardware, such as safety monitoring devices, sensors, DGA analyzers, a data aggregator, and services. You can also connect third-party devices to **MeDICA**, making it a versatile and flexible solution.

Should you need any help in building your maintenance strategy, our service experts can support you with:

- Data collection and integration – from online monitoring and offline testing
- Data evaluation – to better predict and forecast the asset health status in the future.
- Reports generation & action recommendations

Decide if you want to buy or rent

Are you unsure whether to buy or rent? At COMEM, we are here to provide you with guidance and support. We can work with you and develop a proper transformer maintenance plan based on data-driven preventive and predictive maintenance in order to increase the asset lifespan and optimize your maintenance cost.