



Early Detection Saves Latin American Utility from Widespread Power Outage

C A S E S T U D Y

Challenge

A major government-owned utility in Latin America faced a critical challenge with its aging infrastructure. The utility had substations scattered throughout the country and was grappling with numerous issues, including multiple transformer failures in a short period, high maintenance costs across numerous transformers and insufficient data from existing monitoring solutions.

The utility's primary concern was the reliability of its transformers since unscheduled failures could cause significant disruption to both the utility and its customers. Within a utility service area, homes and businesses, and critical service providers, such as hospitals and fire stations, could lose power during a transformer failure affecting lives and livelihoods.



Background

The utility was looking for a solution that would provide visibility to its distribution network and that could easily integrate into its current SCADA (Supervisory Control and Data Acquisition) system. The utility needed a cost-effective solution that could be deployed across multiple transformers to allow crews to better plan maintenance and repairs due to greater insight and predictability of asset life span and performance.

The utility's standard practices for testing were based on a 12-month cycle. Testing methods involved using a portable dissolved gas analysis (DGA) machine or extracting oil from the transformer and sending it for testing to an internal lab. However, the utility found that the data supplied by previous methods was slow, inconsistent and unreliable. It was searching for an alternative that was:

- **Affordable**
- **Easy to implement**
- **Supplied reliable and actionable data**

Beta Testing H2scan Sensors

In 2023, the utility decided to beta test the H2scan [GRIDSCAN™ 5000 Multi-Sense Monitor](#) on a 30MVA (mega-volt ampere), 115kV class distribution transformer, manufactured in 1997. Not only was the transformer representative of the utility's aging infrastructure, but maintenance and operations staff were also concerned about potential failure based on previously acquired DGA data. Distribution transformers typically are not monitored, either in the U.S. or in Latin America.

In March 2024, a specific incident highlighted the utility's vulnerability while illustrating the value of the H2scan monitor. A line fault tripped a switch causing the transformer to emit gas. The event caused a through-fault in the transformer, overheating the liquid insulation and causing the production of hydrogen gas. Once the utility realized the sensor detected hydrogen gas, it sent out a crew to make repairs.

Without early detection and the remediation efforts of the repair crew, this incident could have disrupted service for the 3,225 users served in this area by this transformer. This would have cut electrical service not only to homes and businesses, but also to hospitals and pumping stations. Moreover, the downed line could pose serious safety risks to passersby or create a fire hazard.

The Solution



The performance of the H2scan GRIDSCAN 5000 Multi-Sense Monitor in this crisis showcased its key features. Its early detection capability provided a timely warning, allowing the utility to quickly identify and locate the problem.

Unlike the periodic testing it previously relied on, H2scan's solution offers continuous, real-time data, ensuring that issues are caught as they arise. This real-time monitoring is seamlessly integrated with the utility's existing SCADA systems, making adoption straightforward.

Moreover, the H2scan solution addresses two critical concerns for utilities: cost and scalability. Priced at half the cost of competitors' low-end options, it offers advanced technology without straining budgets. This affordability, combined with its ease of deployment, makes it ideal for widespread use across multiple transformers in a distribution network.

Essentially, the H2scan GRIDSCAN 5000 Multi-Sense Monitor fulfilled the checklist the utility had developed while seeking a solution to better track its fleet of transformers.

- **Affordable** – The H2scan monitor was half the cost of other options the utility explored.
- **Easy to implement** – The GRIDSCAN 5000 Multi-Sense Monitor carries a 10-year warranty on the sensing element, for a set-it-and-forget-it solution that eliminated the need for the portable DGA monitor or lab testing.
- **Reliable, actionable data** – The H2scan sensor supplies continuous monitoring with real-time data, enabling utility crews to take swift action to investigate the situation.

Success Factors

The utility's swift response, enabled by H2scan's technology, was key to its success. A crew quickly repaired the damaged overhead line, restoring service without significant user impact. But the benefits extended beyond this immediate fix.

After the incident, data from the GRIDSCAN 5000 Multi-Sense Monitor showed no continued gassing, indicating that while the through-fault had caused a temporary issue, the transformer suffered no permanent damage. This information gave the utility confidence to keep the transformer in service, forestalling replacement costs for an expensive piece of capital equipment.

Furthermore, this event sparked a series of proactive measures. The utility initiated changes to the system structure, conducted corrosion repairs and launched inspections to identify and correct similar anomalies. These actions demonstrate how early detection doesn't just prevent outages; it drives systemic improvements that enhance long-term grid reliability.

Broader Impact

This success story resonates far beyond this single utility. Many regions, particularly in Latin America, face similar challenges with aging infrastructure. Globally, distribution transformer monitoring is lacking, making H2scan's solution a game-changer. Its affordability and ease of implementation tick all the boxes for utilities seeking to monitor assets that were previously overlooked due to cost constraints.

As a result of this successful pilot, the utility is taking significant steps. It is including H2Scan's sensor in specifications for new units and planning retrofits for existing transformers. This decision reflects a shift from reactive to predictive maintenance, where transformers are proactively replaced before they fail, minimizing disruptions to the utility and its customers.

Key Benefits for Global Application

The GRIDSCAN 5000 Multi-Sense Monitor from H2scan offers a number of benefits to utilities globally:



- **Early Warning System:** Detects issues before they escalate
- **Cost-effective:** Half the price of less reliable competitors
- **Reliability:** Ten-year warranty on the hydrogen sensing element
- **Connectivity:** IoT/SCADA/ADMS ready with Modbus or DNP3
- **No Maintenance:** Patented auto-calibration eliminates drift and the need for periodic calibrations maximizing uptime
- **Easy to Install and Operate:** No moving parts and small form factor
- **Rugged and Reliable:** Rated for harsh environmental conditions



Safety, Reliability and Cost Containment

The Latin American utility's experience vividly demonstrates how H2scan's GRIDSCAN 5000 Multi-Sense Monitor turns reactive maintenance into proactive strategy. In this case, early detection prevented widespread power loss, protected critical infrastructure like hospitals and ensured public safety. Moreover, it inspired system-wide improvements, showcasing how the right technology can drive holistic grid enhancement.

Aging infrastructure and unpredictable failures are universal challenges. H2scan's technology not only fills these needs with its early-warning capability, cost-effectiveness and easy integration but also transforms grid reliability in the process.

For engineers and utility managers across the globe, the takeaway is clear: in the continuing efforts to supply an uninterrupted power stream to homes, business and critical services, transformer failures must be avoided. Continuous, reliable transformer monitoring can help. H2scan's GRIDSCAN 5000 Multi-Sense Monitor makes that process more affordable, accessible and actionable, to set new standards for grid resilience.

About H2scan

H2scan is a leading developer and manufacturer of high-performance hydrogen sensing solutions, dedicated to delivering the most reliable industrialized sensing solutions to OEM partners, distributors and end customers globally.

The company's latest Gen 5 solutions offer unparalleled accuracy, maintenance-free operation and cost-effectiveness in hydrogen sensing. Trusted by industry giants like ABB, Siemens, ExxonMobil, Shell, Procter & Gamble and others, its products are integral in shaping the new Hydrogen Economy for a clean, secure and affordable energy future.

H2scan products are also used by utilities for transformer fleet asset management, by the chemical industry to optimize hydrogen processes and for safety monitoring in enclosed areas susceptible to hydrogen leaks, energy storage charging out-gassing, and other similar hydrogen sources.

Built on solid-state technology pioneered at Sandia National Laboratory and the U.S. Department of Energy, H2scan boasts 44 patents covering its core technology, software and product innovations.

Learn more at www.h2scan.com.