SEIZE THE MOMENT:

SMART CAPITAL DEPLOYMENT FOR IMMEDIATE GRID RELIABILITY

Unexpected capital becomes available. Now your utility faces a critical question: How do you invest quickly in solutions that can deliver real, immediate value? While most utility spending supports multi-year infrastructure projects, there's a compelling opportunity that generates immediate returns yet requires minimal lead times. This opportunity also addresses one of the industry's most urgent challenges: transformer reliability. The answer is single-gas hydrogen monitoring.

The biggest T&D Need

All utilities are concerned about their transformer fleet, with many operating transformers that have been in service for 40+ years. Given the rising cost of transformers - up 65% since 2020, and with lead-times stretching from one to three years - the stakes have never been higher.

When a transformer fails, the costs accumulate: service disruptions, environmental hazards from oil spills or fires, and subsequent public relations crises. *These failures are almost always unforeseen but can be avoided if detected early*.

Transformer faults typically progress from first symptoms to complete failure in six months. By identifying changes in the transformer condition during this critical timeframe, operators can intervene before the damage becomes irreversible. *Proactive condition monitoring is pivotal for modern asset management*.

The science behind transformer failures

Transformer faults create heat that, in turn, releases gases into the transformer oil, primarily hydrogen, the earliest and universal signal of a transformer abnormality. While traditional lab oil analysis only occurs at one- to four-year intervals, continuous online hydrogen monitoring provides immediate, actionable data on the asset condition. This

Single gas transformer monitoring is a *quick and easily deployed technology* - but delivers meaningful value:

- Avoids costly unplanned outages
- Optimizes asset life and maintenance spend
- Improves personnel safety
- Advances digitalization and predictive maintenance initiatives

By adopting H_2 monitoring across the fleet, organizations gain a fast time-to-value, measurable ROI, and greater confidence in their transformer health strategy.

approach is cost-effective for broad deployment across *transmission and distribution* fleets, providing a complete approach to asset management.

Historically, condition monitoring was limited to a subset of critical transformers due to high monitoring costs and complex infrastructure that made fleetwide monitoring impractical. That has now changed. Fleetwide monitoring is not only possible, but it's also affordable, with single-gas hydrogen (H_2) sensors.

Five Reasons to Monitor Key Gas (H_2) Continuously

1. **Immediate time to value**. With no civil construction or complex engineering required, and a three-week lead time for H2 monitors and a two-hour installation, large deployments can be completed in weeks.
2. **Immediate cost savings and a compelling ROI**. Hydrogen monitoring defers capital expenditure and reduces recurring maintenance costs. H_2 monitoring is affordable and self-funding for HV, MV and critical LV transformers.
3. **Actionable insight based on real-time condition data**. Helps utility and industrial customers make informed maintenance and service continuity decisions.
4. **Reduced unplanned outages.** This supports key reliability metrics like System Average Interruption Frequency Index (SAIFI) and Average Interruption Duration Index (SAIDI)
5. **Provides actionable data for AI-driven predictive maintenance**. Continuous hydrogen monitoring contributes to digitalization and business agility.

How H2scan Enables Fleetwide Monitoring

H2scan's GRIDSCAN® Hydrogen Sensors provide accurate hydrogen, temperature and moisture measurement directly in the transformer oil or headspace. Key features include:

- Patented self-calibration with a 10-year sensing element warranty
- IoT and SCADA connectivity
- 1-2 hour installation on energized transformers

Complementing these sensors, Fleet Advisor™ offers a secure, scalable IoT platform for fleetwide transformer management. Designed for cyber-security and minimal IT overhead, it collects and processes data independently of operational networks and evolves as your needs grow.

Conclusion

Online hydrogen monitoring ensures tomorrow's reliability, safety, and efficiency in transformer management. The adoption of fleetwide, real-time gas detection transforms asset maintenance into a strategic function - giving utilities and industries control to prevent failures, optimize capital spend, and support a safe, sustainable operation. And equally important: utilities can source and deploy continuous hydrogen monitoring within weeks, to leverage available capital funds for a quick installation with long-term benefits.