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CASE STUDY

From Reactive Troubleshooting to Proactive Asset Management

How a leading power generation company transformed raw data into maintenance decisions in the age of AI data center demand

HIGHLIGHTS

Fuel cost reduction and availability gains
$1.1M /unit/year

Demonstrated ROI within months of deployment
accelerated **Time-to-Impact**

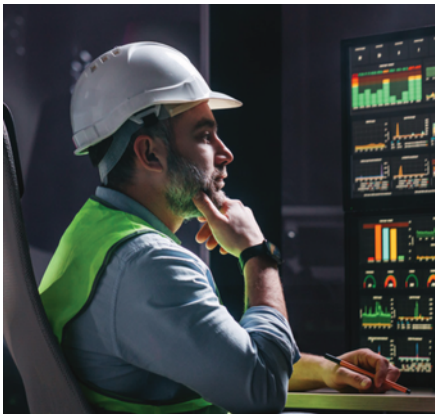
Maximum Achievable Capacity
$8M

Heat rate improvement
150 Btu/kWh

BACKGROUND

Power plants aren't short on data, but they are short on time and certainty. When thousands of tags, alarms, and trends compete for attention, truly meaningful early warnings can get buried until they become forced outages, derates, or avoidable heat-rate penalties.

What makes this worse is when teams get flooded with false alarms, they begin to distrust the data they receive. Real and impactful insights can get discounted and lost. Equipment issues increase. The organizations pulling ahead are the ones that can turn raw operating signals into prioritized, engineering-vetted actions fast enough to protect reliability and margins at the same time.



FROM UNMET DATA NEEDS TO A NEW DIGITALIZATION CULTURE

A North American power generation company is at the forefront of rapid data center expansion driven by AI demand.

With a geographically diverse fleet across the United States, the company has long invested in monitoring and asset performance technologies to support reliability. However, as operations grew more complex, plant teams faced an increasingly noisy data environment. Plant engineers were repeatedly buried in unneeded data, false alarms, redundant signals, and generic insights and recommendations that lacked operational relevance.

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Through a renewed focus on digitalization and decision discipline, the company worked with EtaPRO to streamline instrumentation; clarify, evaluate, and prioritize what truly mattered; and strengthen the connection between data and action.

This newly adopted culture of digitalization with EtaPRO's monitoring and diagnostics platform and expert services **bridged the gap between raw data and maintenance decisions,** allowing the power generation company **to move from reactive troubleshooting to proactive asset management**.

This cultural shift has become increasingly important as operation of aging generation assets, like coal-fired Rankine Plants as their previously assumed retirements are regularly being extended another 10 years a AI data center and manufacturing growth emerge.

> ***EtaPRO converted general awareness of heater issues into a targeted, prioritized list with associated work orders.***
>
> ***This enabled coordinated, proactive maintenance planning rather than piecemeal corrective action.***

WHAT CHALLENGES DID THE COMPANY SOLVE?

Fragmented and Underutilized Monitoring Systems
Despite investing in multiple monitoring platforms over time, plant teams struggled to extract value. Data was abundant but poorly organized, **generating false alarms and noise** that limited trust and adoption.

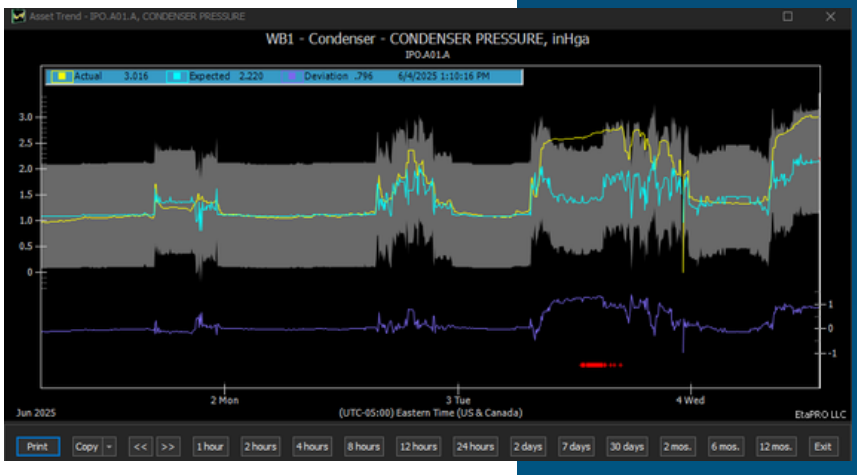
Lack of Actionable Equipment Health Insight
Critical early-stage degradation, such as subtle generator vibration behavior and feedwater heater issues, **could not be reliably identified** using conventional alarms and static thresholds.

Hidden Thermal Efficiency Losses
Condenser and heat rate degradation **appeared acceptable** based on absolute values, masking efficiency losses that silently increased fuel costs and reduced profitability.

Instrumentation Gaps & Data Quality Limitations
Flatlined signals, incomplete vibration coverage, and gaps in instrumentation **increased the risk** of missed or delayed fault detection across key systems.

High Risk of Unplanned Outages
Without condition-normalized analytics and expert review, latent issues risked escalating into forced outages, derates, or **high-cost** equipment failures.

Data Without Operational Context
Large volumes of operational data existed, but **lacked normalization, prioritization, and engineering interpretation**, making it difficult for plant staff to determine what required action and why.



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IDENTIFYING HIDDEN PROBLEMS ACROSS A NEWLY CONNECTED DATA ENVIRONMENT

EtaPRO's Remote Monitoring and Diagnostics Center (RMDC) supported the company's two units with continuous, physics-based digital twin model-based performance monitoring that delivered both recurring fuel cost savings and significant avoided-loss value. Within the initial few months of deployment, EtaPRO monitoring experts identified latent generator defects, quantified condenser efficiency losses that were previously masked by favorable operating conditions, and **converted long-standing feedwater heater concerns into a focused, actionable maintenance plan**.

The combined impact demonstrates how advanced performance intelligence can generate six-figure annual savings per unit while protecting against multi-million-dollar failure events.

The company is **accelerating EtaPRO analytics and RMDC services to additional units** as a result of this success.

Cultural & Workflow Barriers to Digitalization

New monitoring tools were often introduced without clear ownership, procedures, or integration into daily workflows, limiting their effectiveness at the frontline level.

By implementing EtaPRO, the company transformed to a digital culture, reduced barriers, and increased confidence in data and analytics.

HOW ETAPRO SOLVES UNIQUE CHALLENGES FOR STEAM TURBINES AND THERMAL PERFORMANCE

The power generation company operates large, complex steam turbine units where early-stage degradation can be difficult to detect using conventional alarms and static thresholds alone. The plant faced multiple, compounding challenges:

- Subtle generator vibration behavior not accompanied by elevated bearing metal temperatures
- Condenser performance degradation that appeared acceptable based on absolute pressure values
- Widespread feedwater heater (FWH) reliability and control issues spanning multiple systems
- Instrumentation gaps and flatlined signals that increased the risk of missed or delayed fault detection

Without condition-normalized analytics and expert review, these issues risked progressing into forced outages, derates, or sustained efficiency losses.

EtaPRO deployed continuous, physics-based performance models combined with expert remote monitoring oversight. This approach normalized equipment behavior against load, ambient conditions, and operating mode, enabling the detection of subtle deviations that traditional monitoring often overlooks.

EtaPRO's RMDC engineers **reviewed trends** across startups and operating regimes, **prioritized findings** by business impact, and **communicated clear, actionable insights to plant personnel**. This bridged the gap between raw data and maintenance decisions, allowing the company to move **from reactive troubleshooting to proactive asset management**.

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THE RESULTS

Generator Risk Avoidance
EtaPRO identified a progressive increase in generator bearing vibrations across multiple startups, **despite stable bearing metal temperatures** and incomplete vibration instrumentation. The trend was escalated as a reliability risk and ultimately linked to a generator rotor electrical defect. Early detection enabled planned mitigation rather than a forced failure, significantly reducing operational and financial risk.

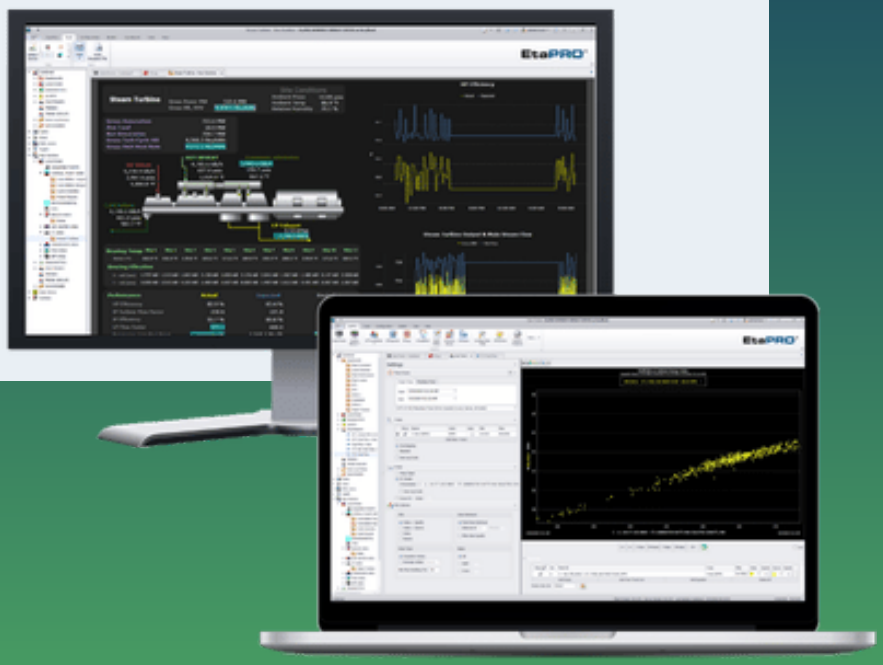
Condenser Efficiency Recovery
Load-normalized analysis revealed a 1 inHgA increase in condenser pressure that was **masked under colder operating temperatures**, corresponding to an estimated 150 Btu/kWh heat-rate penalty. Supporting indicators included hotwell subcooling and elevated dissolved oxygen. Subsequent plant inspection confirmed air in-leakage, validating the analytics-based diagnosis.

Feedwater Heater Performance
Multiple HP and LP feedwater heaters were found to exhibit level instability, valve leakage, and suspected tube leaks. EtaPRO converted **general awareness of heater issues into a targeted, prioritized list with associated work orders.** This enabled coordinated, proactive maintenance planning rather than piecemeal corrective action.

WHY IT MATTERS

The power generation company's experience **demonstrates the dual value** of EtaPRO RMDC: sustained efficiency improvement and protection against high-consequence failures. Importantly, **value was delivered even in the presence of imperfect instrumentation**, while simultaneously highlighting data-quality gaps for future improvement.

This combination of advanced analytics, expert oversight, and operational alignment makes the approach **highly scalable across the fleet**, where similar efficiency losses and latent reliability risks can be **identified and addressed before they impact** safety, availability, or profitability.



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WHY ETAPRO'S MONITORING AND DIAGNOSTICS PLATFORM IS UNIQUE

Enterprise monitoring and diagnostics software needs to be expertly integrated across systems; new procedures established, documented, and customized for plant equipment and set up; clearly defined information roles and responsibilities; and more. Unfortunately, technologies can get purchased and then given to frontline personnel with little support or realized purpose.

Unlike other technologies, EtaPRO is a singular platform for fleetwide asset performance monitoring with AI-powered digital twins, advanced pattern recognition, a high-speed historian, and more. In addition, EtaPRO software includes engineering support to help power generation companies utilize plant data rapidly and effectively. From expertise, intuitive user interfaces (UIs), customizability, and adoption and training services, **plant personnel can rapidly use the software effectively to gain a more global view of data, alarms, and distinguish noise vs. what's critical**.

For more information on how EtaPRO is helping plants improve reliability and proactive asset management, visit www.etapro.com.