



CUSTOMER CASE STUDY

Real-Time Performance Monitoring for Power Generation

Transitioning from reactive maintenance to predictive asset optimization

Solution: Real-Time Performance Monitoring System **Industry:** Power Generation

Use Case Focus: Asset Optimization and Monitoring

GOALS

- Enable real-time asset monitoring and troubleshooting guidance across complex power generation
- Optimize maintenance schedules to transition from reactive to predictive planning strategies.
- By combining operational and maintenance data, these interfaces provide a holistic view of the plant.
- Clarify the primary objective described in the source.

SOLUTIONS

- Deploy integrated performance dashboards to centralize visualization of critical power block
- Implement machine learning anomaly detection models to provide early warnings for equipment
- Embed root cause analysis logic to help operations teams trace abnormalities to system
- Apply the described approach to the core problem.

CHALLENGES

- Complex operating conditions allow minor performance deviations to cause significant cost
- Siloed operational and maintenance data limit holistic performance analysis across power
- Address the key constraints noted in the source.
- Reduce manual effort across the current process.

RESULTS

- Optimized Efficiency: Identify and correct subtle losses in thermal performance.
- Accelerated troubleshooting times by enabling faster, data-driven identification of problem
- Extended equipment lifespan by implementing predictive maintenance strategies that reduce
- Support predictive maintenance and reduce stress-related degradation.

EXECUTIVE SUMMARY

Power generation operators face complex conditions where undetected performance deviations lead to high operational costs and efficiency losses. To address these challenges, this real-time monitoring solution integrates performance dashboards, machine learning anomaly detection, and embedded root-cause logic. By centralizing power block KPIs and breaking down data silos, the system enables operations teams to proactively identify and correct subtle thermal losses. This comprehensive approach transitions plants from reactive maintenance to predictive optimization, resulting in extended equipment life, accelerated troubleshooting, and significantly reduced operational downtime.

The Performance Monitoring Imperative

Modern power generation units operate under highly dynamic conditions where minor performance deviations can quickly escalate into severe operational and financial losses. Historically, critical inefficiencies in combustion, steam cycles, and auxiliary equipment remained hidden due to isolated data silos and manual monitoring processes. This lack of visibility forced operational teams into a reactive posture, relying on after-the-fact diagnostics that increased downtime risk and accelerated equipment wear. Establishing a centralized, continuous visibility framework is therefore essential to detect subtle thermal losses and optimize overall plant efficiency.

Advanced Anomaly Detection and Root Cause Analysis

To overcome traditional operational silos, the solution deploys integrated dashboards that centralize key performance indicators such as heat rate, efficiency, and loading patterns. By combining operational and maintenance data, these interfaces provide a holistic view of the plant. Advanced machine learning models run continuously in the background to detect performance anomalies and flag deviations before they manifest as critical failures. Furthermore, embedded diagnostic logic guides technicians through root-cause analysis, helping them trace system abnormalities directly to specific system behaviors or external drivers.

Driving Efficiency and Asset Longevity

Transitioning from reactive diagnostics to predictive maintenance delivers immediate financial and operational advantages. By identifying and resolving minor thermal deviations early, power generation facilities maintain optimal heat rates and prevent unnecessary fuel consumption. These timely interventions also protect high-value machinery from stress-related degradation, substantially extending overall equipment lifespan. Empowering operations and maintenance teams with reliable, real-time data builds cross-departmental trust and enables collaborative decision-making, establishing a robust foundation for long-term operational excellence and sustained profitability.