

USE CASE

Boiler and Steam Systems Reliability

edgeRX™ by TDK SenseI | Predictive Maintenance using Edge AI

OVERVIEW

Boiler and steam systems are critical to industrial operations, supporting heating, power generation, sterilization, and process workloads. Unexpected failures in these systems can lead to production downtime, safety risks, and energy inefficiencies. TDK SenseI's edgeRX™ provides an AI-driven machine health monitoring solution that continuously tracks equipment condition, enabling predictive maintenance through real-time insights, anomaly detection, and actionable alerts directly at the asset.

PROBLEM

Boiler and steam systems operate under high pressure and temperature, making them susceptible to gradual degradation such as pump wear, valve failure, scaling, improper heat transfer, and abnormal vibration in rotating components. Traditional maintenance approaches often fail to catch early warning signs.

Key challenges include:

Unplanned outages due to sudden equipment failure impacting steam supply and production continuity

Energy inefficiencies caused by undetected issues like fouling, misalignment, or poor heat transfer

Limited real-time visibility into system performance between scheduled inspections

High maintenance costs and safety risks associated with emergency repairs in high-pressure systems

EXPECTED OUTCOMES

By deploying edgeRX™ on boiler and steam systems, organizations can transition to a proactive maintenance model that improves reliability and operational efficiency.

Expected benefits include:

Improved energy efficiency by identifying inefficiencies caused by mechanical or thermal issues.

Lower maintenance costs through planned interventions instead of emergency repairs.

Enhanced system reliability and lifespan with continuous monitoring and adaptive AI models.

Better maintenance planning using real-time alerts and historical performance trends.

SOLUTION

TDK SenseI's edgeRX™ delivers a complete, low-touch predictive maintenance platform combining smart sensors, edge AI processing, gateway connectivity, and cloud-enabled analytics. It is designed to monitor key boiler and steam system components—such as pumps, motors, fans, and auxiliary equipment—in real time.

How edgeRX™ addresses boiler and steam system challenges:

Continuous condition monitoring: Sensors capture vibration, temperature, and performance metrics across pumps, motors, and rotating components.

Edge-based analytics: AI models process data locally, enabling faster detection of anomalies without relying solely on cloud processing.

Predictive insights: Machine learning identifies subtle changes in system behavior that may indicate wear, imbalance, or inefficiency.

Actionable alerts: Maintenance teams receive real-time notifications to investigate and correct issues before failure.

SUMMARY

TDK SenseI's edgeRX™ enables predictive maintenance for boiler and steam systems by combining continuous sensing, edge AI analytics, and actionable insights into a single platform. By detecting early signs of degradation and enabling proactive maintenance, edgeRX™ helps organizations improve system reliability, reduce downtime.

