For numerous years, Kansai Electric Power Co., Japan’s second largest power company, operated as a regional
monopoly, providing the majority of power to the Osaka, Kyoto and Kobe areas. However, in 2011, the Fukushima
earthquake triggered a tsunami that disabled the power supply and cooling at the Fukushima Daiichi nuclear
power plant, resulting in one of the worst nuclear meltdowns since Chernobyl. After the crisis, in 2016, the
Japanese government passed the largest energy reforms since 1951, closing most of its nuclear plants, and fully
liberalizing the nation’s electrical market, which until then consisted of ten regional monopolies.

For Kansai, the energy reforms brought new opportunities, such as the opening of a $200 billion dollar market
with lots of new, competing producers. But there were also new challenges. Kansai needed to optimize its nine
domestic power plants to be more competitive, but it also wanted to acquire new customers and create new value
added services. Using a combination of the PI System, AI and IoT technologies, it all became possible.

POWER IN KNOWLEDGE SHARING: HOW KANSAI
ELECTRIC USED DATA TO TRANSFORM ITS POWER PLANTS

A RAPID PI SYSTEM DEPLOYMENT ACROSS POWER PLANTS

To stay competitive, Kansai needed to improve operations, maximize resource availability and optimize maintenance practices, and that meant gathering and analyzing operational data in real time. In 2016, Kansai installed the PI System at three of its plants as part of an initial trial. At the plants, approximately 100 employees spent four months creating over 200 operational monitoring displays. By 2017, Kansai was ready to roll out the PI System to all of its power plants with the help of internal teams who introduced the PI System to other personnel and created context-rich data models for operational data using OSIsoft’s Asset Framework (AF). The team also setup an information sharing site about the PI System to communicate best practices across the plants.

REAL-TIME INSIGHTS FOR REAL-TIME DECISIONS

Using data from the PI System, Kansai opened up a new world of operational insights, including:

- Reduced boiler failures, the leading cause of downtime in steam power plants, by using data to detect leaks earlier and determine optimal repair periods.
Improved gas turbine availability by monitoring vane data. A slow turbine can lead to a plant shutdown. With the PI System, Kansai can determine any abnormalities and use historical and real-time data to respond accordingly.

Optimized boiler performance by using PI Vision to visualize the boiler and identify the cause of inefficiencies through heat balance analysis.

Utilized and improved its spray water injection control on its HRSG superheater by using real-time visualizations of water operations.

Changed its maintenance program from time-based to condition-based to help the team estimate the time it will take for equipment to reach end-of-life and prepare accordingly.

Overall, with the improved plant performance, unplanned downtime reduction, maintenance cost reduction and quality improvements, Kansai estimates that they have reduced costs by $3 million dollars per year at one plant alone.

LEVERAGING BEST PRACTICES TO FORM THE KVACS PROGRAM

Given the success, Kansai plans to combine an AI-enabled digital twin of its coal fired operations with sensor data from the PI System. From there, they can evaluate operating parameters to identify best practices for coal power plants. The company plans to introduce this as a new service to help other power producers improve operations. But that’s just one part of their initiative.

Capitalizing on the successes of its digital transformation, Kansai took its best practices and introduced the Kansai Value Creation Services program, or K-VaCS. As part of its commitment to partner with its customers under the K-VaCS program, Kansai will collaborate with power producers to improve efficiency of their thermal power plants using real-time data. K-VaCS will provide services and technology to detect system abnormalities, reduce downtime and improve operations for utilities and others in the electric power supply chain. The remote monitoring service, one of K-VaCS services, has already started to help an early customer, the Bluewaters Power Station in Australia, with O&M cost savings through improved efficiency and reduced downtime. Using insights from operational data, Kansai can understand operational performance and equipment health to help engineers and operators make data-driven decisions and track subsequent progress.

For more information about Kansai and the PI System, watch the full presentation here.