AVEVA

Scrubgrass saves jobs in coal country with the PI System™ and real-time data

Scrubgrass
Industry - Power generation

Challenge

- Combined a variety of data streams into a powerful tool for making real-time decisions

Solution

- Generated forecasts for optimizing the timing of planned equipment outages, saving $160,000 in a single week

Result

- Enabled real-time financial decision-making, resulting in the plant staying open

When your company's survival depends on understanding and responding to market prices that change every few minutes, having access to real-time data is critical. Lacking this access, the owners of the Scrubgrass Generating Plant, a 35-employee, 85-megawatt waste-coal-fired power plant in Kennerdell, Pennsylvania, were on the verge of closing the plant. The two-month lag in the availability of profit/loss data made it impossible for plant operators to make real-time daily operating decisions. In a bid to keep the company afloat, Scrubgrass chose to invest in real-time data. It turned to the PI System.

Volatile market presents challenges

Russellton, about 50 miles south of Scrubgrass in western Pennsylvania, is a bleak moonscape littered with dark mountains of waste coal. These piles are home to millions of tons of low-quality gob, a kind of coal that was too full of rock and impurities to be worth burning – until the advent of modern fluidized-bed combustion systems in the 1980s.

The Scrubgrass plant was built in 1993 to transform this waste coal into electrical power – and, along the way, transform the blighted landscape as well. Year after year, plants like Scrubgrass are slowly mining out Pennsylvania's toxic, flammable gob piles and refilling the sites with alkaline ash and new tree plantings.

Scrubgrass was profitable for decades thanks to a power-purchase agreement that guaranteed the plant a profitable rate on the electricity it generated. But in 2013, this purchase agreement expired, putting the plant at the mercy of the real-time energy market, where the price of a megawatt of power changes every few minutes.

"If you're a merchant plant, you can lose a ton of money extremely fast and not even know it," said Jeff Campbell, Scrubgrass's engineering manager. To complicate the picture, another powerful market force was transforming the energy landscape in Pennsylvania: the Marcellus shale gas boom. Cheap natural gas was flooding the market right in Scrubgrass's backyard. This caused wild price fluctuations and often driving the market price of a megawatt of electricity below what it typically costs a plant like Scrubgrass to produce it. As a result, the plant was running at a rapid financial loss.

Standard practice in the industry is to run boilers at full capacity and ride through down periods in the market. But this routine was putting plants like Scrubgrass out of business. "You drive through the bad periods and you're done – you're cooked," Campbell said. "Every five minutes, you need a business decision."

Scrubgrass's owners were on the verge of closing the plant. In order to make the daily operating decisions that would keep the plant in the black, Campbell needed a way to track exactly how much profit or loss the plant was operating with – not with a two-month lag, by looking at the plant's financial data in the rear-view mirror, but in real time.

"There's a best spot to run this plant for any kind of pricing condition," Campbell added. "It's not full load, it's not minimum load. There's a spot in the middle, and it's unique to every situation. And if I run at that spot, I can make a several-million-dollars-a-year difference to our costs."

Chasing the sweet spot

To determine that ever-shifting sweet spot, Scrubgrass needed to integrate data from a variety of incompatible sources and get that data into a form that could be used quickly and easily to drive real-time decisions in the plant's control room. Campbell used a suite of PI System software components and tools to capture and combine data from plant operations. Other information included commodity and energy prices on the web, daily emails containing spreadsheet data about energy markets, and long-term financial data.

"The PI System is one of the biggest reasons Scrubgrass is still operating."
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Jeff Campbell,
Engineering Manager, Scrubgrass Generating Company

A PI ProcessBook display provides Scrubgrass plant operators with data on production costs, revenue, pricing, target loads versus actual loads, and target margins versus actual margins to inform plant-operating decisions.

By modeling fluctuating plant costs against the shifting energy market, Campbell developed a system that tracks the plant's profit margin in real time. The plant uses PI ProcessBook to display the results on a screen in the plant's control room so plant operators can track the effects of their decisions on profit margin as they happen. The system runs with very little manual data entry and, in seconds, generates statistical analyses that once took Campbell hours to create.

The system sometimes delivers surprising results. One of the analyses Campbell now runs routinely – a trend forecast that uses PI DataLink to combine weather and grid load forecasts with day-ahead energy pricing data in Microsoft Excel – recently saved the plant $160,000 in a week by showing that a planned boiler shutdown would lose money for the plant. By demonstrating the bottom-line value of using real-time data to drive plant operations, Campbell was able to build a solid financial case for keeping the plant open.

"The PI System is one of the biggest reasons Scrubgrass is still operating," Campbell said.

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