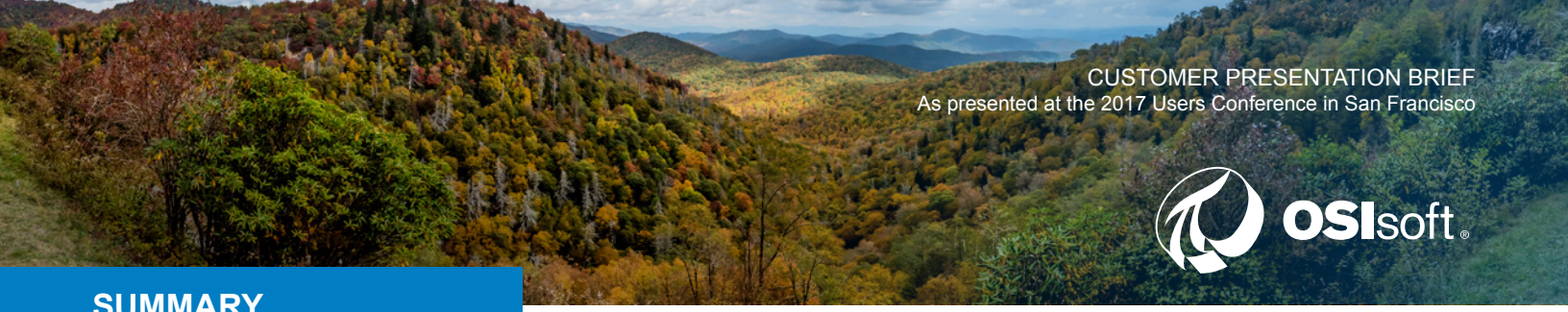


CUSTOMER PRESENTATION BRIEF
As presented at the 2017 Users Conference in San Francisco

OSIsoft.

SUMMARY

Scrubgrass Generating

Industry

Power Generation

Business Value

- Process Optimization for Real-Time Market Conditions
- Data Integration
- Weather forecasting
- Load Forecasting

PI System™ Components

- PI Server™
  - Data Archive
  - Asset Framework (AF)
  - Event Frames
  - Notifications
- PI DataLink™
- PI ProcessBook™

Scrubgrass: Data Saves Jobs in Coal Country

At OSIsoft's User Conference 2017 in San Francisco, Scrubgrass engineering manager Jeff Campbell told the story of how he used the PI System to:

- Combine a variety of data streams into a powerful tool that plant operators can use to make real-time decisions
- Generate forecasts for optimizing the timing of planned equipment outages, one of which saved Scrubgrass $160,000 in a single week
- Build a business case for saving the plant from shutdown

When your business model is exquisitely sensitive to a changing environment, an investment in real-time data can make the difference between survival and shutdown. That was the case for the Scrubgrass Generating Plant, a 35-employee, 85-megawatt waste-coal-fired power plant in Kennerdell, Pennsylvania. In the last few years, Scrubgrass has used OSIsoft data systems to overcome new market challenges that have already shuttered similar plants.

In Russellton, about 50 miles south of Scrubgrass, is a bleak moonscape: a vast, dark mountain of waste coal that was abandoned half a century ago and is slowly leaching acid and metals into nearby streams. The Western Pennsylvania landscape is littered with thousands of piles like this one, each home to millions of tons of low-quality "gob," a kind of coal 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, to 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 plantings.

For decades, Scrubgrass's business model made sense, thanks to a power purchase agreement that guaranteed the plant a profitable rate on the electricity it generated. But in 2013, Scrubgrass's power 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, causing 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, causing the plant to run 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 standard practice 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."

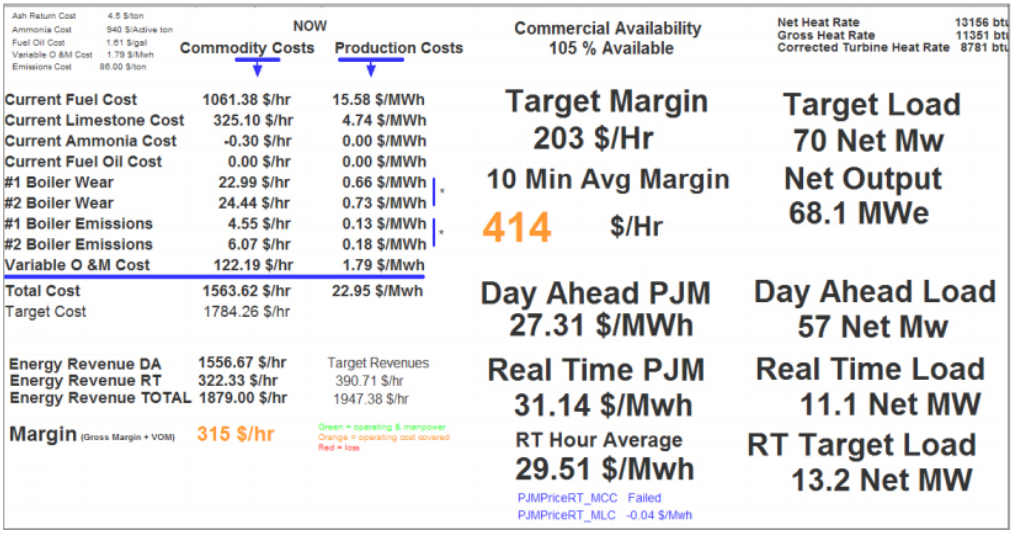
Scrubgrass's owners were on the verge of closing the plant. In order to make the daily operating decisions that would keep the plant in the black, Campbell needed a way to track exactly how much profit or loss the plant was operating with — not with a two-month lag, by looking at the plant's financial 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. 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 several million dollars a year difference to our costs," Campbell said.

To track 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 to capture and combine data from plant operations, commodity and energy prices on the web, daily emails containing spreadsheet data about energy markets, and long-term financial data.

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 generates in seconds 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 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.

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

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

— Jeff Campbell
Engineering Manager
Scrubgrass

Campbell, Jeff. *The Journey from Historian to Business Intelligence.* OSIsoft.com. 22 March 2017. Web. 25 May 2017. <http://www.osisoft.com/Presentations/The-Journey-from-Historian-To-Business-Intelligence/>.