



Industrial Energy

Product Description

Application: Energy Management System
Product: SmartProcess® Energy

Background

Managing a Power and Utility operation to minimize the costs of electricity, steam, cooling, and other utilities is a difficult task that requires constant attention and a great deal of information coordination. Operations personnel must continually make multiple decisions including:

- Adjustment of Steam Supply to Meet Process Demands
- Selection of Various Possible Fuels Based on Cost and Availability
- Loading of Available Boilers Based on Cost and Ability to Produce
- Amount of Electricity to Purchase versus Generate
- Loading of Turbines Based on Cost and Steam Availability
- Economic Loading of Chillers, Compressors, and Cooling Towers
- Response to Disruptions and Equipment Breakdowns

The problem is that almost nothing is steady state in the Power and Utility environment. At most sites, it is difficult to arrive at the optimal operating setpoints for the powerhouse process equipment because the ideal position is constantly changing. In addition, there is too much data to process to determine an optimum setup quickly.

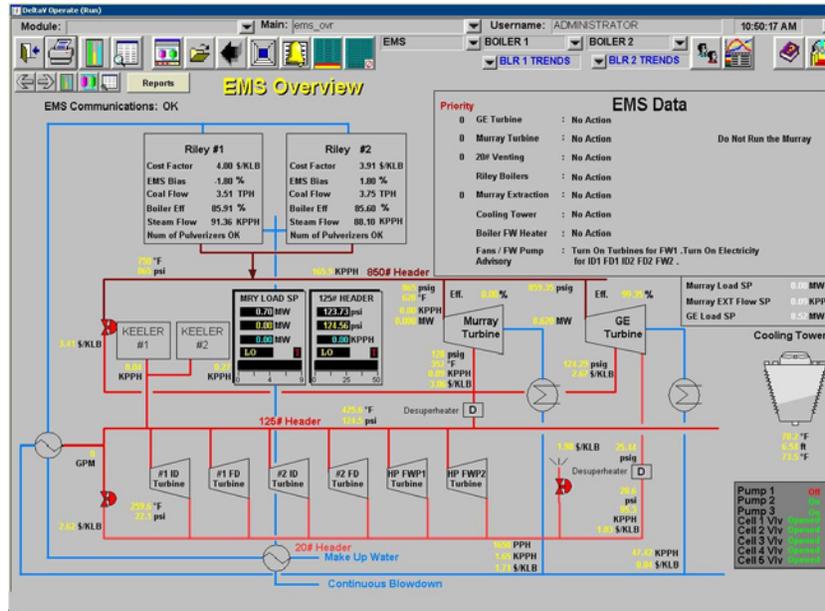
Operations personnel need a tool to analyze operating situations in real-time and make recommendations or control moves that will minimize the costs of supplying required utilities.

Product Description

The Emerson SmartProcess® Energy system is used to reduce the total cost of energy and utilities at a mill/plant/campus by automating critical decision making. The SmartProcess Energy product employs facility specific models and rule sets to continually determine the optimum setpoints for all process units.

SmartProcess Energy can operate in either **Advisory** or **Direct Control** mode. In Advisory mode the system makes setpoint change recommendations to operating personnel that can result in cost savings. Operations must then make the suggested adjustment to realize the benefit. In Direct Control mode, the system accomplishes setpoint changes itself by communicating directly with the unit process control systems. A number of modules make up the SmartProcess Energy system including the following:

- Process Data Analysis and Validation
Statistical Regression Algorithms
- Fuel Train Optimization
Boiler Models, Per Unit Cost to Produce, Per Fuel Cost to Produce
- Purchased Power Optimization
Turbine Models, Per Unit Cost to Produce, Purchase Contract Profile
- Decision Logic
Business Models, Fuzzy Logic Rule Sets
- Enhanced Operator Interface Displays



Unique Capability

Energy management functionality has been offered to industry in various forms in the past. Most of these offerings have been limited in scope, robustness, and maintainability. Emerson's SmartProcess Energy solution has unique capability that provides the end user with superior value:

- The system is able to tolerate instrumentation failures and measurement errors through the use of extensive data analysis and validation functions.
- High fidelity process unit modeling is included to allow the highest degree of accuracy in calculations and decision making.
- Models and rule sets for decision making provide flexibility and the ability to respond effectively to the widest possible variety of real-time conditions.
- The system is implemented using standard real-time open architecture hardware and software components such that the system is stable and maintainable.

Savings Results

SmartProcess Energy is operating in multiple locations in North America. End users are seeing two types of savings results. Incremental savings are being continuously obtained from small operating adjustments discovered through the constant attentiveness of SmartProcess Energy and the ability of the system to process large amounts of data. In addition, users find times when the system identifies large opportunities for savings such as a change in fuel utilization.

In total, users are realizing savings in the range of \$0.5 to \$1.0MM annually.

Beginning the Implementation Process

The process of implementing SmartProcess Energy begins with a review of existing Power and Utility operations and recent operating data. Emerson utilizes off-line modeling tools to determine the level of savings benefit that can be expected from an implementation.