Steelcase Meets Efficiency and Sustainability Goals with Control System and Energy Monitoring Software Solutions from Rockwell Automation

World’s Largest Office Furniture Supplier Celebrates 100 Years by Reducing its Energy Consumption and Carbon Footprint

Background

Success in business is no longer accomplished by producing more products in less time. Improving efficiencies and identifying areas of improvement is the name of the game for best-in-class organizations. Steelcase is no exception. To help maintain its position as the world’s largest office furniture supplier, Steelcase management set aggressive goals for improving the company’s bottom line through improved efficiency and sustainability efforts. The deadline: the company’s 100-year anniversary in 2012.

“Our business is very competitive,” explained Bruce Reynolds, manager of corporate communications at Steelcase. “To be successful, we have to constantly improve our production practices. The recent recessions emphasized the importance of consistently driving manufacturing efficiencies – driving cost out of production meant savings to our bottom line.”

Steelcase implemented a new control system to more cost-effectively operate its boilers, and installed energy management software to gain better insight into companywide energy consumption. Due to these and other efforts, the company met all of its efficiency and sustainability goals, including reducing energy consumption by 15 percent and shrinking its carbon footprint by 25 percent.

Solutions

Rockwell Automation PlantPAx Process Automation System
• Allen-Bradley ControlLogix programmable automation controllers offer advanced boiler control
• EtherNet/IP network allows for seamless communication between controllers
• FactoryTalk View Site Edition human-machine interface software provides operators comprehensive insight into boiler operations

Energy Management
• Rockwell Software RSEnergyMetrix software (now called FactoryTalk EnergyMetrix) provides Web-based energy-use data from across the enterprise
• Allen-Bradley PowerMonitor power meters and standard Logix-based programmable automation controllers collect electric, gas, steam and air consumption data

Global Solutions
• The Rockwell Automation Global Solutions team provided domain expertise, project management and implementation of an enterprise-wide energy monitoring solution

Services and Support
• 24/7 TechConnect remote support and Knowledgebase online database access provides easier troubleshooting and access to engineering best practices

Results

Reduced Energy Consumption, Carbon Footprint
• System, combined with other efforts, decreased energy consumption by 15 percent and carbon footprint by 25 percent

Decreased Service and Support Costs
• TechConnect contract saves $25,000 annually in support fees

EnergyMetrix software from Rockwell Automation allows Steelcase staff to quickly create reports that visualize energy usage.
Challenge

The Energy Center at Steelcase’s Grand Rapids headquarters is home to four boilers (two coal-based and two gas-fired) that produce and distribute steam throughout the manufacturing process areas. “The energy center is truly the lifeblood of our Grand Rapids facility,” explained Eric Newsome, senior automation engineer, Steelcase. “If it goes down, so does production, and with the volume of orders we’re meeting each day, downtime simply isn’t an option.”

The reliability required of the boilers left no room for error. Unfortunately, the existing Honeywell TDC2000 distributed control system (DCS) running the boilers was more than 25 years old, and locating spare parts had become extremely challenging. Bill Boss, the chief boiler operator at Steelcase, bought used parts wherever he could find them, and whenever a problem arose with the system, he was forced to call in support from the DCS vendor. “It was a black box system that we couldn’t troubleshoot ourselves,” explained Boss. “The vendor had the software tools and the expertise we needed, and whether we had a service contract or paid by the phone call, getting help was becoming prohibitively expensive.”

In addition to looking at boiler reliability, the company also was evaluating its overall energy monitoring capabilities. Management set a goal to reduce energy consumption by 15 percent in 2011 and to reduce the company’s carbon footprint by 25 percent during the five years leading up to Steelcase’s 100th anniversary in 2012.

Management also wanted to comply with ISO-14001. The international standard was designed to help companies identify, control and improve the environmental impact of their activities and products by implementing a systematic approach to setting and achieving environmental objectives. “A lot of companies require their vendors to be ISO-14001-compliant,” said Reynolds, the corporate communications manager. “Compliance is recognized as a sign of commitment to the environment, and it’s a key part of our strategy for balancing people, planet and profit.”

Before making improvements, Steelcase relied on manual data collection practices to monitor water, air, gas, electric and steam (WAGES) consumption throughout its facilities. “We had one guy responsible for visiting the meters installed on each substation in each building once per month,” explained Newsome, the senior automation engineer. “He wrote down the readings, entered the data into a spreadsheet, then reconciled the utility bills. The process worked fine – until that guy went on vacation.”

With the primary data collector out of the office, data collection practices changed, resulting in a database filled with skewed information that took weeks to resolve. “We needed a way to automatically gather real-time data so we could identify opportunities for improvement,” said Kay Bolinger, senior facilities engineer, Steelcase. “As our manufacturing infrastructure became leaner and our IT infrastructure expanded, we realized it was time for us to consider a comprehensive WAGES metering strategy.”

Solutions

Steelcase needed a cost-effective control system for its Energy Center that would be easy for the company to maintain, troubleshoot and optimize on its own. After reviewing several options, the team ultimately selected the PlantPAx™ process automation system from Rockwell Automation to replace its existing DCS. “Our engineers were familiar with Rockwell Automation products, which we knew would ease maintenance and troubleshooting,” said Newsome. “Plus, we already had a TechConnect™ support contract with Rockwell Automation, which provided the added level of service we needed.”
The Rockwell Automation Global Solutions team surveyed the existing infrastructure and mapped out a specific roadmap for implementing the PlantPAx system prior to design and installation. "The Rockwell Automation team came to our project having executed dozens of similar, successful engagements," said Boss, the boiler operator. "They gave us a lot of advice on how to accommodate fuel source fluctuations so our boilers could operate at top efficiency regardless of what type of coal we were using."

The PlantPAx system also was able to utilize existing Allen-Bradley® 1771 Remote I/O™ modules on ancillary equipment controllers, communicating with a central Allen-Bradley ControlLogix® controller via an EtherNet/IP™ network. A standard PC in the control room runs FactoryTalk® View Site Edition human-machine interface software to provide operators with comprehensive insight into boiler operations. "Most of our plant processes run on Allen-Bradley controls, so plantwide integration and optimization was much easier using the PlantPAx system," said Boss.

After looking at options for improving the efficiency of its boilers, Steelcase then looked to get better insight and control of the energy consumption in its facilities. Having worked closely for more than 25 years with Kendall Electric, a Rockwell Automation PartnerNetwork™ member and authorized Allen-Bradley distributor, Steelcase was quite familiar with Rockwell Automation products. The company saw value in working with Rockwell Automation to improve its enterprisewide energy monitoring. Ultimately, the Steelcase team selected Rockwell Software® RSEnergyMetrix® software (now called FactoryTalk® EnergyMetrix™), favoring the standard off-the-shelf reporting features it included.

Steelcase worked with the Rockwell Automation Global Solutions team to implement about 100 points of Allen-Bradley PowerMonitor™ electric metering devices throughout the company's Grand Rapids and Mexico facilities. Some of the site metering points also gather gas, steam and air consumption data to be sent directly to ControlLogix and Allen-Bradley MicroLogix™ controllers, which act as energy data concentrators. From there, energy data is communicated via an EtherNet/IP network to the EnergyMetrix software database that is hosted on Steelcase's virtual server. "Implementing this type of a solution on a virtual server was a fairly new concept," explained Bolinger, the facilities engineer. "The Rockwell Automation team worked tirelessly to get the new system running, and they taught us a lot about the system along the way so we could get the most out of our investment."

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Results

The control system upgrade and energy monitoring projects implemented at Steelcase helped the company achieve its aggressive efficiency and sustainability goals, and provided significant cost savings across the organization.

Because of its open platform, the Steelcase team can maintain the new control system almost entirely on its own. Also, management can access and troubleshoot the system remotely, which significantly reduces unplanned downtime. For Steelcase, the benefits are visible down to the bottom line. “Because we could add PlantPAx system support to our existing TechConnect contract and eliminate the service agreement with our old DCS vendor, we’re saving around $25,000 per year,” said Newsome, the senior automation engineer. “And, if there’s something we’re unsure of, we can utilize the Rockwell Automation TechConnect team or Knowledgebase online database for timely and cost-effective support that ultimately gives us peace of mind.”

With the new energy management solution, Steelcase can document and quickly address energy events such as voltage sags, surges or outages. By doing so, the team can reduce downtime and help protect critical production assets from potentially harmful operating situations. Energy management software provides the Steelcase team with visibility into its energy consumption – a critical component for ISO-14001 compliance.

“We can see when something is running hot and consuming more energy than it should, which is an indicator that something needs fixing on the equipment,” explained Newsome. “The Rockwell Automation solution helps us validate maintenance projects and proactively address potential issues before they occur.”

Prior to the new energy management system, the Steelcase team needed to “guessimate” the losses resulting from air leaks. Now, management can identify the exact air loss amounts, which ultimately help justify the cost of the system. With improved insight into energy consumption, the Steelcase team can more easily justify investments in newer, more energy-efficient technology.

Steelcase was one of the first to use the wireless Allen-Bradley PowerMonitor W250 power meter to gather consumption information on individual production lines. Ultimately, the team hopes to capture exactly how much energy it takes to produce a specific product, so the company can include energy costs on its bill of materials.

“Rockwell Automation engineers truly took a team-centered approach with us, sharing their expertise and helping us take ownership of our own systems,” said Newsome. “Our relationship with Rockwell Automation makes us feel very confident in our abilities to support and optimize the technology we have installed, now and in the future.”

The results mentioned above are specific to Steelcase’s use of Rockwell Automation products and services in conjunction with other products. Specific results may vary for other customers.