Managing Energy Consumption for Optimal Productivity and Higher Profitability

Rockwell Automation solutions for energy management
Experience the Transformation

Transform your production.
How will you adapt production to meet new regulatory requirements?
Does your production schedule match your optimal energy footprint?

Transform your practices.
How will you minimize risks from volatile energy prices?
Are you leveraging price incentives for load management?

Transform your point of view.
Where do your energy dollars go?
How can you manage energy more strategically?

Rising costs. New regulatory requirements. Corporate sustainability initiatives. Consumer demands. All put tremendous pressure on your company’s strategy for consuming energy in your manufacturing and production facilities. Whether your energy costs are from natural gas, coal, or electricity, it’s time to make the transformation.

“The complete integration of load management, demand response, and energy efficiency across an entire industrial plant may be within reach within the next decade.”

Aimee McKane, Senior Program Manager
Lawrence Berkeley National Laboratory
Solutions for Energy Management

Take control
Rockwell Automation helps you manage energy consumption in a way that brings meaningful value to your business by focusing on the factors you can control within your individual production processes.

We take an “inside-out” approach to energy management – one that starts with leveraging your existing automation and power system investments.

Chart your success
Planning is critical to successful energy management. Rockwell Automation gives you a roadmap that helps:
• Measure and monitor energy consumption
• Manage peak usage patterns for the production facility
• Predict the impact of production changes on energy costs
• Automate production for optimal energy consumption
• Optimize energy generation to ensure a reliable and efficient supply to manufacturing
• Predict energy demand and match it with cost-optimized supply

Manage strategically
Traditionally, energy use has simply been a growing cost of doing business. It’s time to turn a new page. Working with Rockwell Automation, you’ll become an active participant in the global energy supply – we’ll help you make the transformation from passive energy user to strategic manager of energy resources.

You’ll gain better control over how you use energy to achieve optimal productivity and higher profitability.
Solutions for Energy Management

Prepare for and respond to regulatory changes
Increase energy savings
Lower production costs
Optimize profits

You have questions, we have answers. Whether you’re just starting to consider an energy management program or looking to take an existing program to the next level, we can help.

How do I start?
You can’t manage what you don’t measure. We can help you monitor your utility spend by tracking all water, air, gas, electric and steam usage. Our energy consulting services team conducts energy assessments to help identify cost-saving behavioral, programming and process changes, and capital investments that will reduce your energy consumption and improve your bottom line.

Where exactly is my energy being used?
Power monitors paired with energy management software put critical energy information at your company’s fingertips. Role-specific dashboards drill into water, air, gas, electric and steam consumption. They help identify the assets that use the most power and monitor each aspect of the production. You’ll get a comprehensive view of utilities expenditures so you can make ongoing improvements to your processes to optimize usage.

How do I improve control of my energy consumption?
Identifying energy-intensive assets is the first step. Next, we’ll help you adopt a modular approach to transforming energy consumption by using the same control and power systems that automate your facilities today. Optimizing the performance and efficiency of these systems – including motors, drives, combustion and power house control – can provide an immediate and measurable impact on energy use and operational efficiency.

Can I make my processes more efficient?
The most successful manufacturers respond quickly to changing customer demands. And they minimize the impact of rising energy and material costs. Model predictive control technology adds an intelligence layer on top of automation systems to help achieve multiple business objectives – cost reductions, decreased emissions, consistent quality and production increases – every production minute.
Challenge: Corporate sustainability imperatives
Owens Corning is a world leader in building materials systems and composite solutions, with a corporate commitment to sustainability. As part of a company-wide effort to reduce energy costs, the company’s Guelph Glass Plant installed real-time metering equipment to measure and monitor energy use for its major manufacturing processes.

The 400,000 square-foot facility in Guelph, Ontario, Canada produces tens of thousands of tons of glass fiber annually for its customers to make products such as interior car-door panels, ladder rails, bath tubs and windmill blades. Energy intensive blowers, fans, pumps and compressors are required to move, heat and cool the tons of molten glass used to produce glass fibers.

Since 2007, the Guelph plant has invested nearly $344,000 in energy conservation projects as part of a multi-million dollar investment in energy efficiency at Owens Corning operations around the world. The investment in 10 energy-efficiency projects at the Guelph plant reduces electricity consumption by more than 2.3 megawatt-hours annually and saves more than $150,000 a year.

Goal: Reduce plant-wide electricity consumption
One of the challenges for the Guelph site was to find ways to reduce the energy costs of the fans on a critical cooling section of the process. Owens Corning aimed to reduce the speed of the 125Hp cooling fan, and of the three 40Hp recirculation fans on the oven, while not affecting the integrity of the product.

Improper cooling can reduce the tensile strength of the web of glass fibers and cause it to break as it is being wound into rolls. Using real-time metering equipment, the plant engineers evaluated the potential savings of installing variable frequency drives (VFDs) on the fans, and verified that reduced fan speed would not affect product volume and quality.

“Real-time metering lets you know where you use energy. And if you make changes, you can see where the paybacks are. You don’t know what you’re losing unless you measure it.”
Frank Peel, Electrical Engineering Specialist. Owens Corning

Measurement was also essential to determine the potential return on investment required to apply for the Ontario Power Authority’s Electricity Retrofit Incentive Program (ERIP). The ERIP promotes hydro conservation and management by focusing on improvements in lighting, motors, heating, ventilation, air conditioning (HVAC) and overall electrical systems.

By employing VFDs, this project aimed to reduce the fan speeds to 80 percent for 50 percent energy savings, with return on investment in less than one year.

Solution: Variable frequency drives
Owens Corning’s Guelph plant engineers turned to the experience of longtime business partner Rockwell Automation®, and its local distributor, Westburne Ruddy drives specialist. They recommended the Allen-Bradley® PowerFlex® 700 AC drive to control the 125Hp cooling fan, and installed three PowerFlex® 70 AC drives on the 40Hp oven recirculation fans.

The installation of the PowerFlex VFDs helps Owens Corning achieve its sustainability goals by providing energy savings of nearly 50 percent on the chop strand mat line fans, with a return on investment in less than one year. Reducing the fan speeds also contributes additional advantages, such as longer motor life, increased safety and reduced use of natural gas by the oven burners.

The four PowerFlex drives help Owens Corning achieve its total annual energy savings of 465 megawatt-hours, or approximately $36,000 per year. Payback on the investment in drives was approximately 10 months, based on three 12-hour shift schedules or 6,570 hours per year.
Solutions for Energy Management

Energy Assessment Services
Energy reduction starts with a plan. After an analysis of your facility’s usage of water, air, gas, electricity and steam, a plan can be created to help not only reduce, but also help control your energy costs. The scope of an assessment, and your energy plan, depends on your sustainability goals and facility.

Power Monitors
A full line of power monitoring hardware combined with existing controllers, I/O, motor control centers and drives for unique and exclusive energy management functionality.

Power and Energy Management Solutions
Solutions including monitoring, management and load shedding tailored to fit specific process requirements while helping reduce overall peak energy costs.

Intelligent Motor Control Solutions
Leading-edge motor control and protection devices combined with advanced diagnostics and networking deliver precise motor torque and speed control that helps motors run more efficiently.

Energy-Efficient Variable-Frequency Drives
Solutions designed to help match the speed of the motor-driven equipment to the process requirement to help reduce power usage.

Energy Management Software
Performance and visibility software offers web-based reporting, trending and dashboarding capabilities using data aggregated from multiple sources to manage cost, quality and resources more effectively.

Model Predictive Control
Modular software platform models multiple variables interacting during a process and integrates with existing automation hardware to control the process optimally.
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Challenge: Balance market dynamics with operational efficiencies

According to the Alternative Energy Foundation, the world ethanol market is projected to reach 27.7 billion gallons by 2012, driven by policies encouraging or requiring the use of ethanol in gasoline and the implementation of increasingly stringent emissions standards. Dry grind ethanol production also produces distillers dried grains with soluble (DDGS) and wet distillers grains with soluble (WDGS), which are in demand as livestock feed.

The rapidly growing markets for ethanol, DDGS and WDGS mean that manufacturers face great pressure to maximize production while controlling costs. Even the smallest variables in the complex production process can impact yield, time to market, operating costs and profit margin, so ethanol producers must constantly balance market dynamics with operational efficiencies.

Goal: Maximize production capacity and efficiency

Soon after it began operations, the forward-thinking team at East Kansas Agri-Energy began looking for ways to maximize production capacity and efficiency at its dry mill. Specifically, the team wanted to increase dryer capacity, decrease energy costs, increase DDGS moisture (and yield), and increase ethanol production through more stable beer column operation.

Solution: Pavilion Technologies optimizes dryer performance

The team turned to Pavilion Technologies, now a Rockwell Automation company, to provide a model predictive control (MPC) solution that would help drive operational performance to desired business objectives while maintaining regulatory compliance.

Pavilion Technologies implemented its MPC solution designed specifically for the ethanol industry to optimize dryer performance by predicting and controlling moisture. The solution utilizes a multivariable, nonlinear controller that is used to generate and execute dynamic optimization and control. Its continuous process control is able to maximize East Kansas Agri-Energy's dryer production 24/7 to yield the highest possible returns with the plant's current equipment configuration.

The controller is designed to shift the drying load from dryer to evaporator. It is also customized to reduce heat losses of the thermal oxidizer hotbox temperature, resulting in a decreased need for natural gas. It controls the thermal oxidizer's process steam header pressure and the syrup evaporator (including syrup solids and steam consumption) in the beer column to manage and stabilize beer-column separation with the residual evaporator steam.

Pavilion Technologies also customized the East Kansas Agri-Energy MPC solution to allow for higher average DDGS moisture, which increases DDGS yield.

As a result of implementing Pavilion Technology's Ethanol Solution, East Kansas Agri-Energy increased production and throughput by 12 percent while significantly reducing its energy usage, resulting in a 9.9 percent increase in energy efficiency.

East Kansas Agri-Energy realized these significant benefits with minimal additional investment in plant equipment. The team estimates that the total value of the MPC installation is more than $2.5 million per year based on industry average marginal values and cost of natural gas. The impressive project results demonstrate the significant amount of capacity hidden in production processes, readily available with the right process control solution.

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