

Achieving Energy Efficiency for ExxonMobil

Results

- 10% average reduction in annual electrical energy consumption
- Savings of \$3,050 per store, totaling more than \$1.5 million across a 500-store enterprise
- Average savings of 40,000 kWh per year per store
- Improved product quality, shelf life and safety
- Improved working and shopping environment
- Reduced maintenance cost
- Increased equipment life

Emerson technologies and services

- The E2 Facility Management System from Computer Process Controls
- Installation and alarm monitoring from Emerson Retail Services

Application

The project was rolled out in phases over the course of two years. ExxonMobil asked Emerson Climate Technologies to install a control system that would give it a simple pay back of two to three years. It wanted to be able to communicate remotely with its stores. In addition, ExxonMobil wanted to log data collected from the operation of HVACR equipment within each store. In the first phase of the project, Emerson Climate Technologies conducted a pilot program with 15 stores in Texas. ExxonMobil then moved forward with installation in 100 stores across the country. During the second phase of the project, installation occurred in another 400 stores.

Customer

ExxonMobil is one of the world's leading gas-station and convenience-store chains, operating more than 15,000 corporate and 20,000 franchise locations globally.



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– Harry Janke, service engineering advisor of ExxonMobil Fuels Marketing

Challenge

ExxonMobil did not have a way to control maintenance or energy costs across the retail enterprise. It needed to gain control over a very large network of stores. There are approximately 1,100 corporate ExxonMobil locations across the country, but the company had no way to monitor or control the equipment in any of these locations. ExxonMobil turned to Emerson Climate Technologies for help in controlling its in-store equipment and lowering its annual energy bills.

Solution

Emerson Climate Technologies initially installed the Einstein CX in 15 stores in Houston, Texas. After eight months, the customer was experiencing the reduced energy and maintenance costs that are inherent to the Einstein's operation. As a result of improved operations, ExxonMobil requested that Emerson install the second-generation E2 CX Facility Management System units in an additional 500 stores. The E2 CX is a system designed to control in-store HVAC units, indoor and outdoor lighting, refrigeration systems and glass-door heaters.

The E2 controls indoor air quality by running the HVAC system based on the ambient temperature inside and outside of the store, rather than a common set point, allowing the E2 to intelligently control the store environment. In many cases, including most ExxonMobil locations, the store design is such that the refrigeration equipment is placed on one side of the store, while all of the cooking equipment is placed on the other side of the store. This design results in one half of the store being very cold while the other half of the store is very warm, requiring the heating and cooling systems to run at the same time.

The E2 is able to identify this problem and adjust the set point in order to save energy during these times. In doing so, Emerson Climate Technologies was able to help ExxonMobil maintain ideal comfort levels while still reducing energy levels. ExxonMobil was able to provide a consistent shopping and working environment for its customers and employees.

Emerson Climate Technologies also installed Anti-Sweat Door Heater controllers in the glass doors of the walk-in coolers and freezers. The E2 calculates the dew point of the store using a humidity sensor inside the store and outside the coolers, in order to determine at what temperature moisture will form on the cooler doors. This allows the E2 to pulse the door heaters based on the store's dew point. By reducing the run time of the door heaters, ExxonMobil was able to achieve upwards of 45 percent reduction in the amount of energy used by the door heaters while maintaining clear glass.

As a result of these enhancements ExxonMobil experienced significant improvements in its food quality and product shelf life. By maintaining proper temperature levels, automatically adjusting the temperature setback during low-demand periods and implementing glass-door heaters, Emerson Climate Technologies was able to reduce the total energy used by the refrigeration systems by as much as 30 percent.

Emerson also helped ExxonMobil address its outdoor lighting. The company installed a light-level sensor to control the outdoor lighting based on true light levels, which is much more accurate than the previous photo-cell or time-clock technology that had been installed in some locations. As a result, the E2 was able to turn on individual outdoor lighting fixtures based on actual light levels. Emerson Climate Technologies has been able to lower ExxonMobil's peak demand at each location.

Additionally, there were approximately 80 stores that did not have any lighting control whatsoever before the installation of the E2. Emerson Climate Technologies found that the E2 has saved an average of two hours of runtime per day at these locations. With true light level control, the exterior lighting runtime has been reduced by one hour per store when averaged across the total project.

Emerson's Retail Services has aided ExxonMobil maintenance personnel in quickly and accurately identifying system failures. Through a remote monitoring system, Emerson is able to pinpoint the stores that are not operating efficiently and make adjustments to the store environment as necessary. The E2's remote user interface supports historical data evaluation and analysis, making equipment troubleshooting easy and accurate.

With the installation of the E2, ExxonMobil can now communicate with any store across its entire enterprise at any time. The equipment at each location is now running more efficiently, resulting in approximate savings of \$1,000 per year per site in maintenance and equipment life. Several stores are starting to take advantage of Emerson's active monitoring service, which monitors the conditions of the equipment in each store for energy efficiency, equipment failure and preventative maintenance.

"ExxonMobil has been very pleased with the results that Emerson Climate Technologies helped us obtain," said Harry Janke, service engineering advisor of ExxonMobil Fuels Marketing. "We could not have asked for a better experience. We have been able to get a detailed view of our energy usage and achieve efficiency levels that we would not have thought possible; and at our current savings rate, we're seeing an average payback period of less than two years on the E2."

As a result of its experience with Emerson Climate Technologies, ExxonMobil has called upon Emerson's expertise to help lay the groundwork for future new-store designs. Because of Emerson Climate Technologies' experience and long-standing relationships with HVAC and refrigeration original equipment manufacturers (OEMs), future stores will become even more efficient and reliable, resulting in millions of dollars in maintenance and energy savings over the course of several years. Emerson Climate Technologies is also positioned to roll out installation of the E2 in approximately 800 to 1,100 stores in the U.S. and up to 9,000 locations worldwide.