Electrical Demand Load Shedding Success Story

MAVERICK executed an Energy Management System for a large food and beverage manufacturer to cut costs and support green initiatives.

Objective

The customer's utility company calculated monthly demand charges based on the peak demand during each month. An Energy Management System (EMS) was installed to automatically manage the electrical loads of the plant to reduce this monthly kilowatt demand (kWd) charge. MAVERICK leveraged experience with many different platforms including Rockwell Automation® FTView®, PLC-5® and ControlLogix®.

Results

MAVERICK delivered an EMS system to provide the customer substantial cost savings and to align with the customer's commitment to environmental sustainability and green manufacturing processes.

Solution

DEMAND CHARGE: The demand charge is based on the highest average electrical use during any 15-minute interval of a given billing month. The interval must occur between 10:00 am and 10:00 pm Monday through Friday, so EMS will only be active during these days and hours. Since this charge can be as much as 30% of the electric bill, it is the main target of this project.

Kilowatt demand peaks occur about 0.03% of the time each month. The EMS attempts to reduce these peaks by turning off equipment which otherwise contribute to these peaks.

At the start of each 15-minute interval, a supervisory control system monitors five utility meters and displays instantaneous power usage for the plant. Every minute, the kWh consumption rate is used to extrapolate the projected demand or the kWd at the end of a given interval. The EMS program compares the projected demand to the demand limit and activates the load shed program if the projected demand exceeds the demand limit.

Equipment throughout the plant is assigned a shed level number according to process sensitivity to a shutdown:

- Low process sensitivity equipment is assigned a low shed level number (1 to 4) and is shut down first if the master logic needs to reduce demand.
- Further flexibility has been provided by creating shed level groups (A thru D). These groups within shed levels 1 to 4 rotate in a queue sequence. This alteration prevents the same equipment from experiencing repeated shutdowns.
- High process sensitivity equipment considered critical to the facility is assigned a high shed level number (6 thru 10) and will only be shut down in extreme cases when the EMS logic needs to reduce demand.

During the first five minutes of a 15-minute interval, no shed levels will change. In the last ten minutes, the load shed levels will fluctuate as required.

The load shed level does not increase until the projected demand exceeds the demand limit. The shed level does not decrease until the projected demand drops below the demand limit.

Overall, the EMS system provides load shedding flexibility and minimizes the burden on the operating departments who allow curtailment of their equipment or systems.

The MAVERICK Difference

MAVERICK's close relationship with the customer and knowledge of operations uniquely qualified its team of engineers to analyze specific systems where plant loads could be managed. The project was completed on time, on budget and without any major scheduled outages.

MAVERICK® TECHNOLOGIES

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