Energy Consumption Picture

Issue

The electric power bill for this facility was $1.4 Million USD. Senior Management considered that the facility should be more effective in its use of power, and approved power usage reduction as a Six-Sigma project. A reduction target of $125,000 USD was established.

Breakthrough Strategy

Measure   Other than very basic utility metering on the incoming supply, no system existed for any detailed analysis of consumption patterns or sources. In addition, when power was consumed above a level set (Peak) by the utility company (5500KVA), additional costs were incurred. Drawings for the power distribution system were updated together with a process map of consumption. A monitoring system was then installed on all key points in the system.

Analyze   A Pareto and Regression Analysis was done of collected data. This showed that one work section alone contributed to 70% of the Variation in the facilities' power consumption while a second contribute to the largest total. A time series study of the first work section showed uneven demand across the three production shifts. Hypothesis tests were conducted that showed with better than 92% confidence that changing production schedules and labour start-ups within this work section could make a statistically significant change in the peak power consumption. Opportunities were identified in the second work area related to radiant heating on a painting line.

Improve   A Designed Experiment was conducted on the radiant heating portions of the painting line in the second work section which indicated a significant number of the heaters could be turned off. Changes were made to the production schedule and labour start-ups to reduce the daily variation in power consumption in the first section.

Control   A Control Plan was established and an FMEA Published

Results   Peak power demand and charges were significantly down

Savings $82,000 USD plus an additional $48,000 per year after the installation of additional power factor correction equipment