

Eaton Resuscitates Large Pharmaceutical Company's Systems



Customer

One of the largest pharmaceutical manufacturers in the Midwest

Markets Served

Pharmaceutical manufacturing

With the Cutler-Hammer AUTOVAR 600 power factor correction systems, utility company penalties for poor power efficiency were eliminated entirely.

Background

Pharmaceutical's utility bills under the weather

Recently, one of the Midwest's largest pharmaceutical manufacturers found its power efficiency suffering considerably. While three of its seven utility service feeds were lightly loaded, power factor corrected and essentially ailment-free, the remaining four service entrances were diagnosed with poor power utilization under heavy loads. The problem feeds were experiencing a 2000-amp draw with only a 0.75 power factor.

Challenge

Often, examining a utility bill is the first and easiest step to determining if opportunities for improvement exist. In the case of the pharmaceutical company, doing so signified an opportunity to gain system utilization while also saving money.

It's no secret that many utility companies charge penalties to their commercial, industrial and institutional customers based on poor power utilization. Because utility companies must incorporate larger transformers and cables to be able to supply the maximum amount of power customers might require during a peak demand — as opposed to actual usage levels — the cost to maintain this infrastructure can lead to power factor penalties. In most cases, this power can be better used to support additional new customers or lessen the load on the utility, which subsequently reduces temperatures on transformers, alleviates stress on cables, and reduces the amount of CO₂ emissions released into the environment.

Burdened by 25 percent wasted power, the pharmaceutical company was facing utility penalties of more than \$1500

per month for *each* service entrance, which translated to more than \$70,000 per year. In today's strict budgetary environment, especially in the area of facility maintenance, any savings generated can be turned into new working funds to continue improvements in other areas. As such, the pharmaceutical company quickly sought a remedy from Eaton for its power utilization problems.

Solution

The Eaton prescription

Installing power factor correction units allows customers to generate the reactive power needed to improve power utilization, thus eliminating the need to source it from the utility. The challenge for the pharmaceutical company was clear: Eaton needed to provide a solution that would elevate the company's power

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factor by at least 15 percent — to above 0.9 — in order to avoid future utility penalties. After reviewing the plant load and utility bills, the Eaton team determined that 900 kVAR of reactive power was required at each service entrance to correct the power factor and improve the company's overall system effectiveness.

Eaton supplied four Cutler-Hammer AUTOVAR 600 units at 900 kVAR each. Specifically designed for power factor correction purposes, the units were fed from circuit breakers in each main incoming switch-gear lineup. Because they are intended for large loads that vary in production throughout the work cycle, each AUTOVAR 600 unit features a power factor controller that monitors the customer's load, then adds reactive power as needed to meet the programmed target.

Results

A rapid recovery

For the pharmaceutical company, Eaton's solution was a resounding success, improving power factor at each of the four service entrances to between 0.94 and 0.97.

With the installation of the four AUTOVAR 600 units, the power factor penalties charged by the utility company were eliminated completely. Even more, the Cutler-Hammer solution represented an excellent return on investment, paying for itself within 13 months. The savings of more than \$70,000 a year can now be much better utilized by the pharmaceutical company for additional electrical and facility improvements.

The rewards of implementing the AUTOVAR 600 units extended beyond the elimination of the substantial utility penalties. Another benefit was a significant reduction in substation loadings, which

resulted in a drop from 2000 amps to just 1500 amps at each service entrance. This 25 percent reduction in current draw was achieved with the new system's ability to help manage substation capacity for improved overall power utilization, reduced heat, and diminished stress on cables and transformers. Because heat and stress both lead to premature cable failure, unnecessary current draw can create a downward spiral — not a minor concern considering that the cost to replace a substation could total more than \$300,000.

Another major benefit provided by the AUTOVAR 600 is a significant boost in voltage, which enables the system to maintain stability for improved overall system lifespan and significantly increased power utilization. All voltage drops as it passes through the power line from the utility to the customer, then drops further once inside the customer's system. Power factor correction units enable the overall system to draw less current and stabilize voltage, thus safeguarding the facility and protecting motors and other processes that could be damaged in undervoltage conditions. In this case, the customer measured a 15V increase on their substations (3% improvement)!

With the help of Eaton and the Cutler-Hammer AUTOVAR 600, this large pharmaceutical manufacturer received a quick remedy for its power ailments. As a result, the company can now focus on delivering solutions that could potentially save lives, rather than needlessly designating significant funds toward steep utility penalties.

Investment Summary

Our sales and engineering professionals have the expertise to correctly apply Power Factor

Correction Capacitor Banks. Without doing this, precious financial resources will be lost. Additionally, the proliferation of harmonic generating drives, soft starters, and other nonlinear loads further complicates the problem. Installation of these products may require that the entire system be evaluated to avoid damage and additional costs.

Eaton also offers:

- Asset optimization
- Knowledge management
- Integrated project solutions
- Power systems engineering solutions
- Power systems modernization
- New equipment services
- Field services

Eaton Offers a Complete Line of Power Factor Correction Solutions

- Low and medium voltage fixed PFC systems — available from 1 to 400 kvar for motor and small facility loads.
- Low and medium voltage switched PFC systems — available in almost any configuration for industrial and varying loads.
- Passive harmonic filter versions — available for low and medium voltage products for the growing numbers of high harmonic applications.
- Active harmonic filters — available where IEEE519 must be met.
- Transient-free static switches — available to correct fast-acting applications such as spot-welding loads.

For further information, please visit our Web site at: www.powerfactorsolutions.eaton.com/tools

With ROI achieved in less than 13 months, the AUTOVAR 600 solution ensured rapid results for this large Midwest pharmaceutical company.