Power Factor Correction: Avoid the Hidden Surcharge

Changing the Charge

Most power companies include demand charges in their rate structures for all non-residential customers. A demand charge is based on the maximum amount of electricity consumed during peak periods. The demand charge is billed even when consumption is below peak.

The demand charge can be measured in various units. Commonly used units are kVA demand, kW demand, and kW demand with a Power Factor (PF) penalty below a specified value. Power Factor measures how effectively power is being used. Because the utility charges for this electrical power even though it's not being utilized by the facility, a low Power Factor can be costly.

kVAR represents the energy required by inductive loads to generate magnetic fields, such as in motors and transformers, and accounts for a portion of the system losses. kVARs consume capacity but do not provide useful work. Power companies charge a PF penalty or surcharge to recoup kVAR losses. Making a one-time payment through the application of PF capacitors on the load side of the billing meter negates this monthly surcharge.

Eaton's Integrated Project Solution

- Power Factor Study or Mini-Power Factor Study
- Load Flow Study
- Related Harmonic Audit/Study
- Power Quality Survey/Study
- Turnkey Field Installation, Start-Up and Commissioning of Equipment.

All of the above result in an Engineered Solution and/or an Integrated Project Solution.

Return on Investment

The ROI is dependent on the load characteristics, utility rate structure and possible complicating factors, such as the presence of harmonics and the scope of the installation. A typical payback can be realized in less than two years, and in many cases, a one-year or less payback is possible.

When increased system capacity is sufficient to accommodate load, immediate payback will occur by eliminating the need for a larger service transformer.

A Case Study in Savings

A commercial building in Pittsburgh, PA had a low Power Factor and was penalized $1,932 per month by the utility. A $12,000 Power Factor Correction Capacitor Bank, expertly installed by Eaton, corrected the Power Factor to 0.95 and eliminated the penalty, resulting in a payback period of approximately six (6) months.

Facility Profile

- 1500 kVA transformer
- 1146 kW demand
- PF range = 0.86 to 0.88 PF

Utility Charges

- $12/kW demand charge (kWD)
- Penalty below 0.95 PF
- PF penalty multiplier = 1.14 (PFM)
- 1307 kW (billed) – 1146 kW (actual) = 161 kW (penalty)

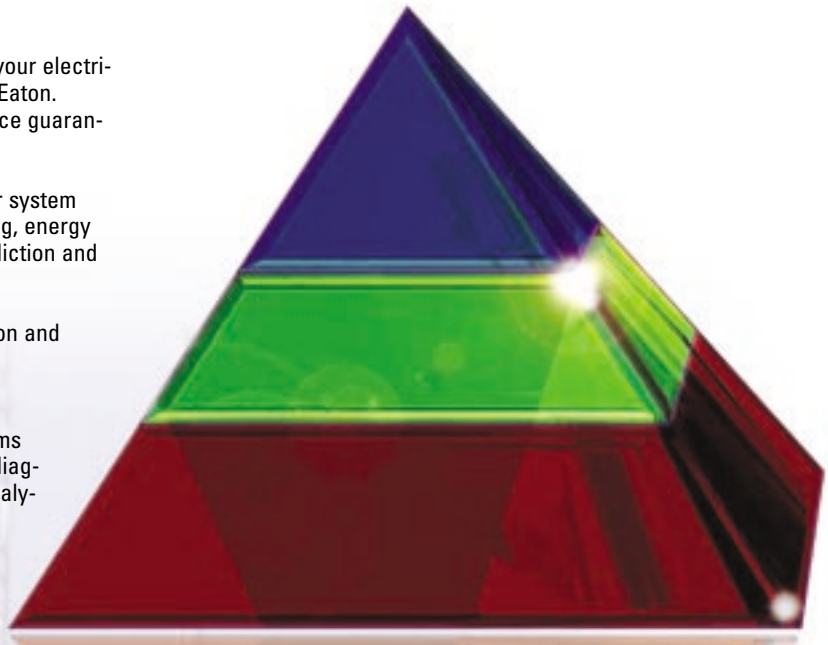
ROI Calculations

- Billing kW based on PFM x kWD = 1.14 x 1146 kW = 1307 kW
- Penalty based on cost of 161 kWD = $12 x 161 kW = $1932 / month
- Simple payback period = $12,000/$1932 = 6.2 months

Integrated Solution Summary

Our 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.

- **Asset Optimization:** Outsource the responsibility for your electrical distribution system and associated equipment to Eaton. Offerings involve shared cost savings and performance guarantees for greater focus on your core business.
- **Knowledge Management:** Collect and transform your system data to useful knowledge, allow for proactive planning, energy management, optimized decision making, failure prediction and ultimately, cost savings.
- **Integrated Project Solutions:** Procurement, installation and commissioning of power systems equipment; a total turnkey approach.
- **Power Systems Engineering Solutions:** Power systems automation, design engineering, training, predictive diagnostics, power quality and power systems studies/analysis to decrease costs and increase productivity.
- **Power Systems Modernization:** Keep your system operating at peak efficiency, reliability and safety through equipment life extension and upgrade solutions utilizing new technologies.
- **New Equipment Services:** Installation, testing, and commissioning of virtually any electrical equipment.
- **Field Services:** Power system and equipment service, maintenance programs, testing, upgrades and Aftermarket solutions; 24/7 emergency service; crisis response.



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