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Jim Pierce

From: Jim Pierce
Sent: Thursday, June 26, 2003 11:29 AM
To: Randy Moravec
Cc: Mike Murphy; Jerry Davis
Subject: RE: TXU Energy's Power Factor Correction Program

Randy:I talked with Chris Rowley of TXU today (214-875-8164) about the above. TXU will be focusing on their large power users first, those over 1,000 Kw. They have over 4,000 users of 1,000 Kw or more. It will take 1-1/2 to 2 years to change out meters and begin billing those customers, maybe more. Our usage at Celestial is 646 Kw which puts us way down the list. TXU will give First Choice advance notice of when they will be ready to change out our meters and begin charging us for power factor. That is when we should have a study done to see what our power factor is. We can use TXU for that. They will give us a proposal, and cost, to do the study. If the cost is reasonable, we get the study done and see what their recommendations are. If not, we can get Joe Katrola (our electrical consultant) to do the study and offer recommendations. I would revisit this with First Choice in early 2005.

Jim Pierce, P.E.
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P.O. Box 9010
Addison, TX 75001-9010
972-450-2879

-----Original Message-----
From: Randy Moravec
Sent: Monday, June 23, 2003 4:22 PM
To: Jim Pierce
Cc: Mike Murphy
Subject:

Jim,

Please find attached a PowerPoint file relating to power factors and their impact to the Town's electric bills. I am most concerned the affect these will have on our water and wastewater pumps. It is requested you review this issue with the appropriate engineers and determine whether there is some corrective action that can be taken to reduce the load. THANKS!!!

Randy

POWER FACTOR CORRECTION

Webinar Forum Presented to:

TXU Energy Large Commercial and Industrial Customers

Presenter: ***Chris Rowley, P.E.***
Phone: 214- 875-8164
email: chris.rowley@txu.com

Please Dial 1-800-214-0745 passcode 720469 for the audio portion of this event.

What is Power Factor

TXU Energy

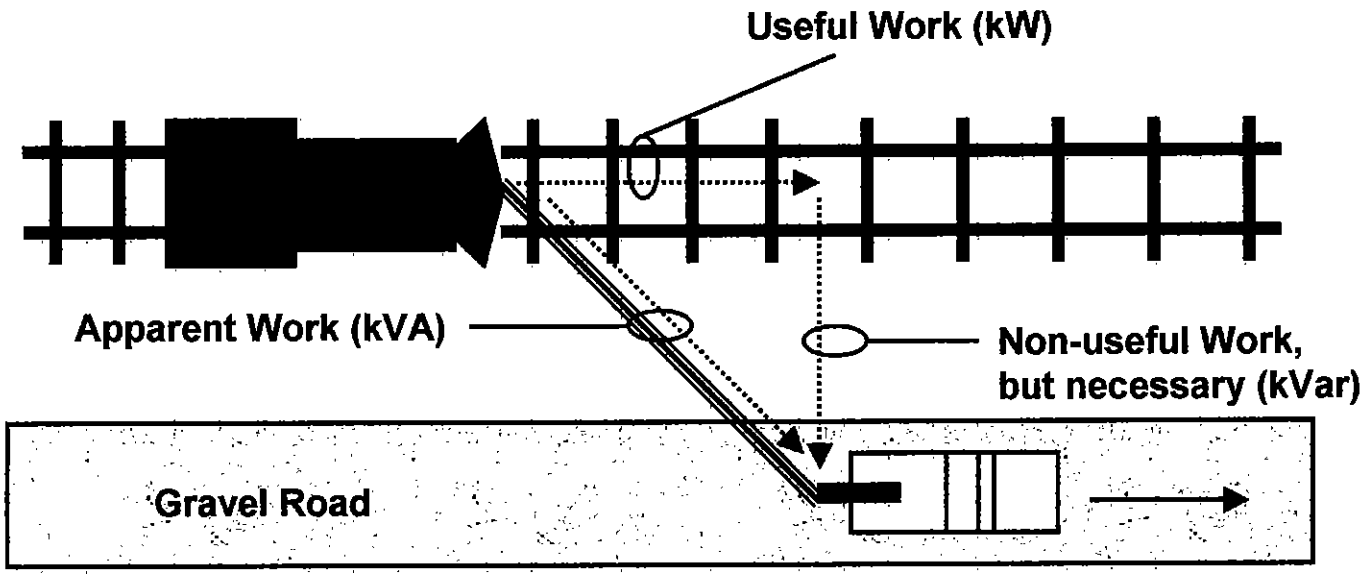
Power Factor is the ratio of Real Power to Apparent Power. Ideal power factor is 1.0 (or 100%), but typically between 70% and 90%.

- **Apparent Power (kVA) is the total power consumed.**
- **Real Power (kW) is the power that performs actual work.**
- **Reactive power (kVar) is the power that provides the magnetic flux necessary for the operation of various loads such as motors, chillers, and fluorescent lights.**

What is Power Factor?

TXU Energy

It's like a tow truck pulling a train engine.



Power Factor Correction

TXU Energy

Example

Assume that a certain industrial plant contains various types of electrical loads and draws 4,000 kW of real power at a power factor of 80%.

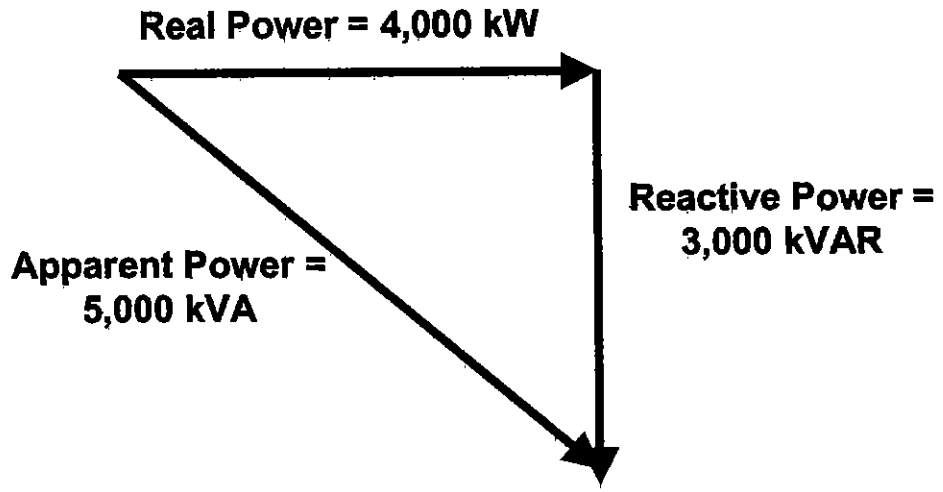
Power Factor = kW / kVA

$$kVA = \sqrt{kW^2 + kVar^2}$$

$$kVar = \sqrt{kVA^2 - kW^2}$$

$$kW = \sqrt{kVA^2 - kVar^2}$$

kVA = Amps x volts



Power Factor = kW / kVA
= 80%
kVA = 4,000 kW / .8
= 5,000 kVA

Why is Power Factor Important?

TXU Energy

- **Electric Generators must generate both the active and reactive power required by its users. Since reactive power is non-useful, it wastes resources and capacity to have to produce it.**

- **Transmission and Distribution Service Providers (TDSPs) must build their power lines to carry both the active and reactive current (amps.) Lower power factors reduce the capacity of the power lines to carry active, useful current. This results in over-sizing wire, transformers, and other equipment.**

Why is Power Factor Important?

TXU Energy

- In the regulated electric environment, TXU Electric installed capacitor banks on their power lines and in their substations to raise the power factor to close to 100%.
  - This eliminated wasted generation and improved the capacity on the power lines.
- In the deregulated electric environment, TXU Energy is responsible for its own generation and Oncor is only responsible for building, maintaining, and operating its transmission and distribution system.
- The new regulatory environment pushes power factor correction from the bundled utility to the customer.
- Oncor will soon be charging a power factor adjustment.

What Happens Now?

TXU Energy

- Affects only Transmission and Distribution Service Provider (TDSP) charges - not the negotiated energy rates
- Affects only commercial and industrial customers
- New regulatory pressures pushing TDSPs, such as Oncor, to influence customers to raise their power factor levels
- Begins in Summer 2003 and will be implemented over the next 3 years
- Largest customers will be affected first
- Oncor plans to replace the meters for all customer accounts of 1,000 kW or larger by the first quarter of 2004
- Possible increase of TDSP charges by as much as 35%

What is a Power Factor Adjustment?

TXU Energy

If the Power Factor of Retail Customer's load is found to be less than 95% lagging as measured at Retail Customer's Meter, Company may require Retail Customer to arrange for the installation of appropriate equipment on Retail Customer's side of the Meter necessary to maintain a Power Factor of not less than 95% lagging as measured at Retail Customer's Meter, or, at Retail Customer's option, to reimburse Company for installing the necessary equipment on Company's Delivery System. Until the proper equipment has been installed to correct the Power Factor problem, the Billing Demand associated with Retail Customer's use of Delivery Service, as calculated in the appropriate Rate Schedule in Section 6.1, RATE SCHEDULES, may be adjusted according to the following formula:

Adjusted Billing Demand = (Billing Demand x .95)/Power Factor"

How will this Affect Customers?

TXU Energy

For Example:

Assume that a certain customer site has a power factor of .85 (85%). In Oncor's territory, the power factor for this facility will trigger penalties as follows:

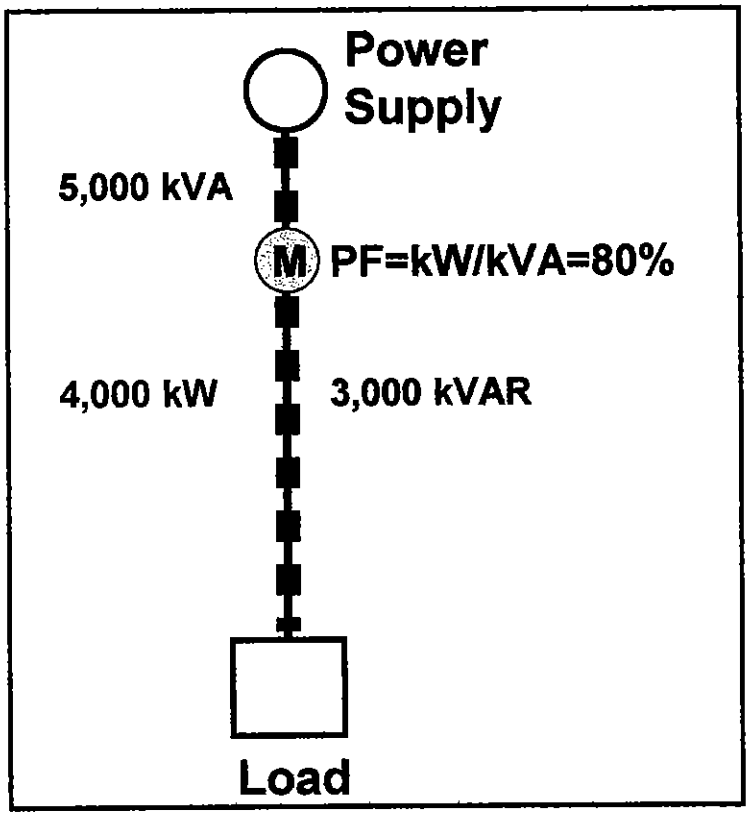
Billing Month	Ratchet kW	Power Factor Adjustment (kW)	TDSP Charges	Adjusted TDSP Charges	Difference
Jan	731	817	$ 3,784	$ 4,198	$ 414
Feb	731	817	$ 3,797	$ 4,212	$ 415
Mar	786	878	$ 3,797	$ 4,212	$ 415
Apr	831	929	$ 4,140	$ 4,590	$ 450
May	874	977	$ 4,267	$ 4,733	$ 466
Jun	875	978	$ 4,279	$ 4,745	$ 466
Jul	914	1,022	$ 4,418	$ 4,899	$ 481
Aug	897	1,003	$ 4,383	$ 4,858	$ 475
Sep	875	978	$ 4,307	$ 4,773	$ 466
Oct	830	928	$ 4,122	$ 4,572	$ 450
Nov	731	817	$ 3,823	$ 4,238	$ 415
Dec	731	817	$ 3,772	$ 4,187	$ 415
Totals	**914***	**1022***	**$ 48,889**	**54,217**	**$ 5,328**

*** Max kW**

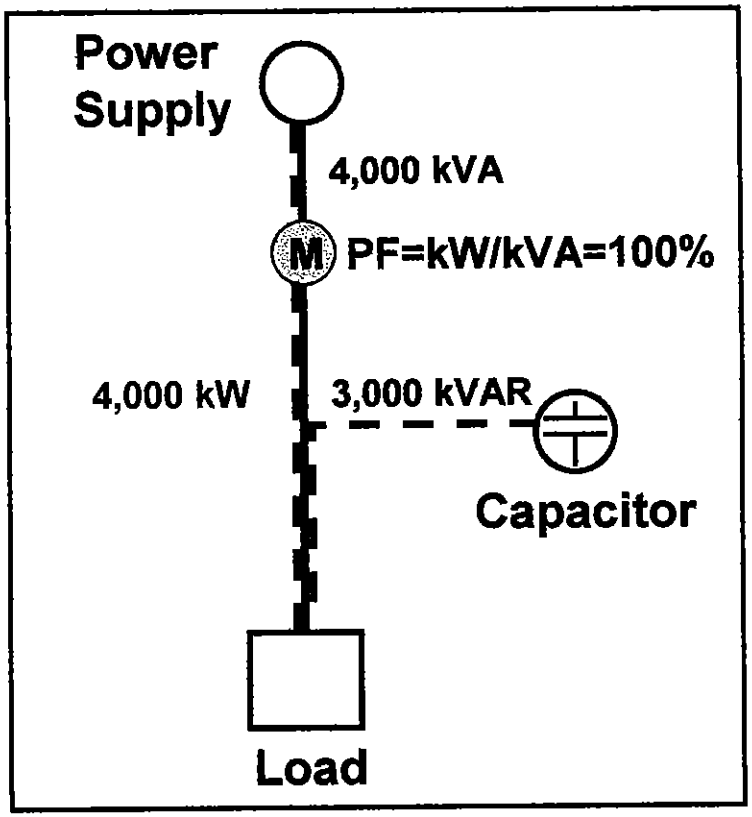
How Do You Raise Your Power Factor?

TXU Energy

How Do You Raise Your Power Factor?



Before Correction



After Correction

Webinar Forum

Power Factor Correction

TXU Energy

Typical Simple Paybacks:

As a rule of thumb, the installed budgetary cost to correct the power factor is approximately $40 - $140 per kVar for a secondary electric rate and $35 - $75 per kVar for a primary electric rate. Using these costs and the existing approved Oncor TDSP rates, the simple payback periods to correct the power factor to 95% are approximately:

Existing Power Factor	Secondary	Primary
60%	2.5 years	2.0 years
70%	3.0 years	2.5 years
80%	4.0 years	3.0 years
90%	5.0 years	4.0 years

What To Do Next?

TXU Energy

No cookie cutter solution exists to correct the power factor at every location. Each customer site is distinct and should be treated as such. The wrong application can result in failed equipment and other significant problems.

What To Do Next?

TXU Energy

TXU Energy's Power Factor Correction Program can assist you in managing the process:

1. **We monitor the power at your site to determine power factor levels, harmonics, and usage.**
2. **We gather all other relevant data necessary to design a proper system.**
3. **We submit an RFP to 3 established PF Correction companies with which TXU has developed partnerships.**
4. **We review proposals and make recommendations to our customers.**

Notice will be given to 1st choice Elec provided

Focusing on 1000 KW implementation next 3 yrs

5510 Celestial 646 KW

late next year earlier following

will set up a web site

Webinar Forum

Questions?

TXU Energy

This session will be archived for 90 days. To review, please contact Eric Wortmann at the following email address:

Eric.wortmann@txu.com

Thank You For Your Business!!!