



Current Waves

ELECTRICAL CONSULTANTS' ASSOCIATION OF INDIA BANGALORE

VOLUME VII - ISSUE 2

www.elcaindia.com

JAN - MAR 2009



EDITOR'S NOTE

ELCA, apart from many events such as seminars and exhibitions organized and conducted by it, also conducted an Event called MEPEX 2004 (Mechanical, Electrical and Plumbing Exhibition) from 8th to 11th January 2004, at Palace Grounds, Bangalore. Since it was a grand stand for all the participants, there was a demand on us by most of them to conduct a similar event. ELCA thought that it was time to organize and conduct a Mega Event of International scale but limited only to electrical industrial products. Thus a Mega Event, named ELCA Power International - 2009, EPI - 2009 for short, was born. Because of the magnitude of the event it was decided to hand over the management / conduct of the event to an event managing firm, of course under the supervision of the Organizing Committee from ELCA. The venue for the event was chosen as Bangalore International Exhibition Centre, BIEC, Bangalore. The event will be held from Friday 5th to Monday 8th June 2009. My sincere thanks to the various Sponsors, Exhibitors and the Seminar Speakers for their cooperation and participation.

The launching of EPI - 2009 was held on Friday, 30th January 2009 at The Lalit Ashok, Bangalore. The launch was inaugurated by Shri. K.S.Eshwarappa, Hon'ble Minister for Energy, Government of Karnataka.

EPI - 2009 covers Power, Lighting, New and Renewable Energy and Service provider segments. EPI - 2009 also has seminar sessions on current and interesting topics such as Power quality, Grid connected solar power plants, Wind energy, White LED, Energy conservation, Electric power in road transport, Fire safety and security, Energy management in green buildings etc. About 15000 to 20000 focused visitors are expected during the course of this B2B event.

With deep regret I have to inform you about the sudden demise of our Mr. B.V. Rammohan, Secretary, ELCA and the Vice Chairman Coordination of EPI - 2009, on Monday, 23rd March 2009. Mr. Rammohan, 66, had his own consulting firm by name Rammohan Consultants in Bangalore. Mr. Rammohan, an amicable and friendly personality, was a dedicated Secretary of ELCA, committed Vice Chairman of EPI - 2009, and he worked always towards the welfare of ELCA and its members. A Special General Body Meeting was held on Monday 6th April 2009, at The Chancery Hotel, Bangalore, to condole the demise of Mr. Rammohan. His passing away is a loss to our Association. He is survived by his wife and two sons.

On behalf of Electrical Consultants' Association of India and as the Chairman of the Organizing Committee of EPI - 2009 I cordially invite you all to EPI - 2009.

Looking forward to seeing you in EPI - 2009.

Thank you,

Engr. J.D. Krupakar

Editor

Chairman, Organizing Committee EPI - 2009

SAD DEMISE



2-10-1942 - 23-3-2009

B.V.Rammohan - B.Sc.,B.E.(Ele.)

Rammohan Consultants, Bangalore

Secretary: Electrical Consultants' Association of India (ELCA)

Vice Chairman - Coordination, EPI-2009

POWER QUALITY AND POWER FACTOR CORRECTION WITH SIGNIFICANT ENERGY CONSERVATION IN THE POWER SYSTEM

H.K. Shivaram - Director, Sathish Jois - Director, Jagannath K. S., Design & Development Manager, H.N. Radhakrishna - Design Engineer, Prok Devices Pvt. Ltd., Bangalore.

Introduction:

Since most loads in modern electrical distribution systems are inductive, there is an ongoing interest in improving power factor. The low power factor of inductive loads robs a system of capacity and can adversely affect voltage level. As such, power factor correction through the application of capacitors is widely practiced at all system voltages. As utilities increase penalties for customers for low power factor, system performance will not be the only consideration. The installation of power factor correction capacitors improves system performance and saves money.

Although the methodology for applying capacitors is relatively straight forward; there are a number of influencing factors that must be considered. To ensure that the capacitor installation does not create more problems than it solves, consideration must be given to non-linear loads, utility interaction and system configuration.

Basics:

Electrical energy is consumed by end uses called loads. All alternating current loads are comprised of varying degrees of three components:

- Resistance
- Inductive Reactance
- Capacitive Reactance

Resistance

When electrical energy is consumed in the resistive component, real work is done. Heat is generated or light is emitted. The rate of doing real work is measured in watts. Since a watt is a relatively small quantity, kilo watts (1,000 watts) is most commonly used. The same is true for the other measures. The product of the applied voltage and the current flowing in the resistive circuit is **real power**.

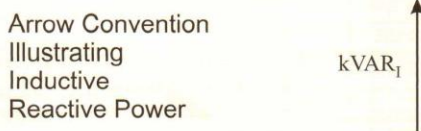
Schematically, real power is represented by an arrow pointing to the right.



Inductive Reactance

When electricity is applied to a pure inductor no real work is done. No heat or light is generated. Current and voltage are applied to the load and their product **reactive power** is measured in kilo-volt-amperes-reactive (kVAR). Examples of inductive loads are transformers, motors and lighting ballasts, etc.

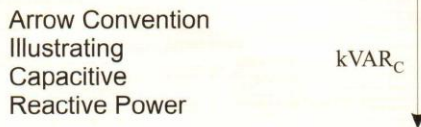
Inductive reactance produces magneto motive forces, enabling machines to operate. Inductive Reactive power is represented by an upwards arrow.



Capacitive Reactance

When electricity is applied to a capacitor, no real work is done.

Current and voltage are applied to the load and their product **reactive power** is measured in kVAR. Capacitive reactive power is represented by a downward arrow.



In summary, two kinds of power exist:

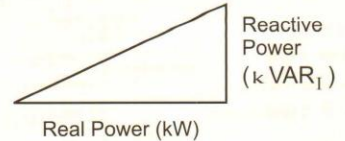
1. Real Power (Resistive Power)
2. Reactive Power
 - Inductive
 - Capacitive

Power Triangle

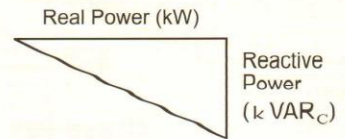
Pure resistance, pure capacitance and pure inductance exist only in theory. All real life loads exhibit varying proportions of these three components. Using arrow conventions and vector addition rules a typical industrial plant's electrical load can be represented by a power triangle. The power

triangle describes the quality of power used.

Power Triangle
Illustrating
Inductive
Reactive Power

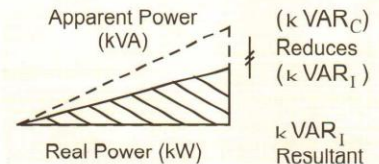


Power Triangle
Illustrating
Capacitive
Reactive Power



Inductive reactive loads are usually greater than capacitive loads. When inductive reactive power is greater it can be reduced by adding capacitive reactive power. The power triangle is adjusted as shown in the figure below

Effect of
Capacitance
in Reducing
Inductive
Load



Apparent Power

Total power is referred to as apparent power. It is the vector sum of real power and reactive power and is measured in kilo-volt-amperes (kVA). The hypotenuse closing the power triangle represents apparent power.

Billed Demand

The maximum rate of electrical consumption or demand charge, measured in kW and the total amount of energy consumed, or energy charge, measured in kWh are calculated each month for billing purposes. The demand charge applies to the peak demand at which energy is taken and the energy charge applies to the quality of the electricity consumed during the billing period. Billed demand is calculated according to the way in which electrical power is used. It is made up of two components:

1. Real Power (Resistive)
2. Reactive Power
 - Inductive
 - Capacitive

Given a fixed maximum rate of real work done (kW) the length of the hypotenuse (kVA) varies Depending upon the amount of reactive power (kVAR). Billed

Organised by



Conducted by



ELCA Power International was launched by Shri. K.S. Eshwarappa, Hon'ble energy minister of Karnataka



The launch function of ELCA Power International happened on 30th January 2009 at the Lalit Ashok, Bangalore. The Hon'ble energy minister of Karnataka Shri. K.S. Eshwarappa inaugurated the biennial event ELCA Power International. The Launch witnessed the support of the Government and the industry towards making the event a success.

Exhibition @ EPI-2009

EPI 2009 is an event on Power, Electrical, Lighting, New and Renewable Energy, Service Providers. We request you to promptly confirm your participation. Below are the commercials for Stall Booking and Advertisement in Exhibition Directory

Item Name	Dimension	Amount in Rs.	Service Tax	Grand Total
			@ 10.3% in Rs.	in Rs.
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Half Page Advt. in Event Directory	135 mm X 185 mm	25000	2575	27575
Quarter Page Advt. in Event Directory	135 mm x 93 mm	12500	1288	13788

- ELCA Power International 2009 would be a grand stand for you to display your products and capabilities.
- The exhibition is conducted in air-conditioned state of the art facility in BIEC and is expected to be attended by over 20,000 business visitors.
- The Exhibition will have special emphasis on creating opportunities for the business visitors to interact with the exhibitors

Seminars @ EPI-2009

The Seminars in ELCA Power Intern leading experts in the field to share inf practices in their domains.

Seminar Topics

- 6 Jun 2009 10:30 to 13:15 - Power**
- ◆ Power Quality - Future Challenges & Capacitors
 - ◆ Enhancement of Efficiency using po Varughese, National Sales Manager, C
- 6 Jun 2009 14:30 to 17:15 New & RENE**
- ◆ Solar Energy - Grid connected solar CEO, Sun Technics Energy Systems Pvt
 - ◆ Wind Energy - Generation and Applic Dr. K. Balaraman, Chief General Mana Ltd.
- 7 Jun 2009 10:30 to 13:15 Electrical**
- ◆ Relay & Switchgear Integration by Mr. S
 - ◆ Electrical Safety and Protection by Dr India Pvt Ltd
- 7 Jun 2009 14:30 to 17:15 Lighting**
- ◆ White LED - The future Lamp
 - ◆ Modern Lighting Techniques by Dr. Ra
- 8 Jun 2009 10:30 to 13:15 Building AU**
- ◆ Design Concept and Energy Managem Bernard Goldstein, Director Marketing
 - ◆ Fire Safety and Security
- 8 Jun 2009 14:30 to 17:15 Application**
- ◆ Energy Efficient techniques in Data Ce by Schneider Electric
 - ◆ Electric power in Road Transportation t

Delegate Registration fee

There will be a total of 6 Seminars between 5

Category
Standard (6 Seminars)
Government Institutes (6 Seminars)
Students (6 Seminars)
Individual Seminar

Visitors: Kindly register at [Kindly refer to <http://elcapowerinternational.com/do>**](http://www.e EPI 2009 Shuttle bus timings</p>
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ation on strengths, opportunities and best

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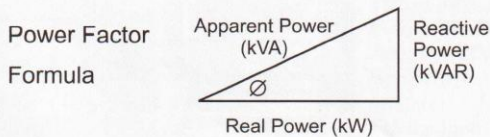
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demand is based on the peak value of 100 per cent of the kW or 90 per cent of the kVA, whichever is larger. Thus the length of the hypotenuse (kVA) influences the demand portion of the electricity bill. As soon as the kVAR component of the load reaches the point where 90 per cent of the kVA is larger than the total kW, the electrical billing demand charge increases for the same amount of work done although only the power absorbed in the resistive component of a load does real work. The principle of supplying power at cost dictates that reactive power components must also be billed.

Power factor

The relationship between resistive and reactive load components is called **Power Factor**. It is a numerical way of expressing the proportions of real power (kW) and apparent power (kVA)



Formula

$$\text{Power Factor} = \frac{\text{kW}}{\text{kVA}}$$

If kW and kVA are known, the kVAR, a quantity necessary for billing purposes, can be calculated using the Pythagorean Theorem

$$\text{kVA}^2 = \text{kW}^2 + \text{kVAR}^2$$

$$\text{kVAR}^2 = \text{kVA}^2 - \text{kW}^2$$

$$\text{kVAR} = \sqrt{\text{kVA}^2 - \text{kW}^2}$$

Poor Power factor

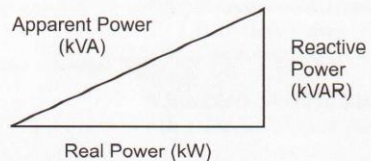
Poor power factor increases billed demand. In an electrical circuit with poor power factor a large portion

of the current does no useful work and is not registered at the energy (kWh) meter. In order for the utility to maintain the equipment necessary to compensate for the increased reactive power (kVAR), billed demand is increased accordingly. Although reactive power (kVAR) does no useful work, it is necessary to make machinery operate. Most utilities allow a percentage of reactive power to be billed at no additional charge, though this has been phased out over recent years. Poor power factor results in higher than necessary kVAR use and increases electricity costs. Power factor billing charges are levied if the power factor is below 90 per cent. This is sometimes referred to as Power Factor Penalty.

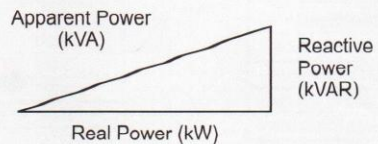
The power triangles shown below demonstrate increased billed demand with poor power factor.

Poor Power Factor vs Good Power Factor

Poor Power Factor (70%)



Good Power Factor (90%)



To be continued in the next issue, VOL-VII Issue 3

MOVING?

IN CASE YOU ARE PLANNING TO MOVE PLEASE SEND US YOUR NEW ADDRESS AS SOON AS YOU MOVE TO THE NEW LOCATION, SO THAT OUR 'CURRENT WAVES' FOLLOWS YOU.

PLEASE INTIMATE THE EDITOR
THANK YOU!

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POTPOURRI PAGE

A little girl was talking to her teacher about whales. The teacher said it was physically impossible for a whale to swallow a human because even though it was a very large mammal its throat was very small.

The little girl stated that Jonah was swallowed by a whale. Irritated, the teacher reiterated that a whale could not swallow a human, it was physically impossible. The little girl said, "When I get to heaven I will ask Jonah".

The teacher asked, "What if Jonah went to hell?"

The little girl replied, "Then you ask him".

*

Here is the tip for a happy married life.

Trust me, you gonna be happy for ever if you practice this...Its my guarantee...I followed this and have been very happy all these years....

Once X asked Y, "What is the secret behind your happy married life?"

Y said, "You should share responsibilities with due love and respect to each other. Then absolutely there will be no problems."

X asked, "Can you explain?"

Y said, "In my house, I take decisions on bigger issues where as my wife decides on smaller issues. We do not interfere in each other's decisions."

Still not convinced, X asked Y "Give me some examples"

Y said, "Smaller issues like which car we should buy, how much amount to save, when to visit home town, which Sofa, air conditioner, refrigerator to buy, monthly expenses, whether to keep a maid or not etc. are decided by my wife. I just agree to it"

X asked, "Then what is your role?"

Y said, "My decisions are only for very big issues. Like whether America should attack Iran, whether Britain should lift sanction over Zimbabwe, whether to widen African economy, whether Sachin Tendulkar should retire etc. Do you know one thing, my wife NEVER objects to any of these".

Cheers!!

*

Long live Bachelors

A very man should get married some time; after all, happiness is not the only thing in life!

Bachelors should be heavily taxed. It is not fair that some men should be happier than others.
--Oscar Wilde

Don't marry for money; you can borrow it cheaper.
--Scottish Proverb

Men have a better time than women; for one thing, they marry later; for another thing, they die earlier.

--H. L. Mencken

When a newly married couple smiles, everyone knows why.

When a ten-year married couple smiles, everyone wonders why.

When a man opens the door of his car for his wife, you can be sure of one thing: either the car is new or the wife.

We always hold hands. If I let go, she shops.

My wife was in beauty saloon for two hours. That was only for the estimate.

Anagrammist :

One who composes anagrams and when asked for the four points of the compass is likely to reply - thorn, shout, seat, and stew.

Camry, a car from Toyota is an anagram of my car.

Elantra, a car from Hyundai is an anagram of a rental

Clint Eastwood = Old West Action

A telephone girl = Repeating "Hello"

Astronomers = Moon starers / No more stars

Statue of Liberty = Built to Stay Free

New York Times = Monkeys write / Monkey writes

Debit card = Bad Credit

Secret of success

Sir, "What is the secret of your success?" a reporter asked a bank President.

"Two words."

"And, Sir, what are they?"

"Right decisions."

"And how do you make right decisions?"

"One word."

"And, sir, What is that?"

"Experience."

"And how do you get Experience?"

"Two words"

"And, Sir, what are they?"

"Wrong decisions."

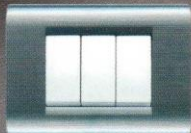
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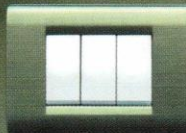
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