AGR
electrical engineering

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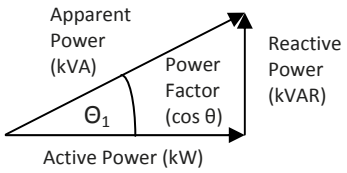
kVA Metering and Power Factor Correction

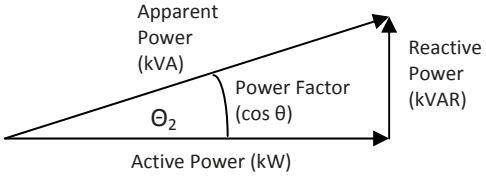
As of the 1st of July 2015, changes have been made to the way in which electricity suppliers are charging for power. Previously, it was only the kW's that were billed with certain network and demand charges being added as once off per bill. Now the metering charges are being calculated against the kVA (Total or Apparent Power) that incorporates both Real Power (kW) and Reactive Power (kVAR).

The reason for this is that the transmission and distribution authorities still need the network infrastructure to cope with the Apparent Power requirements rather than just the Real Power used. This means that the Reactive Power and the Power Factor must be taken into consideration so as to not overload the network.

W	**Watts**	Real Power that is useful or produces actual work eg heat, light or force like pumping water or conveyors moving materials
VAR	**Volt Amp Reactive**	Power that is drawn from the network but does not produces anything, eg electric motor produces the magnetizing flux
VA	**Volt Amp**	A vector summation of Real and Reactive Power
pf	**Power Factor**	Measure of Real vs Reactive Power (Cos Θ)



Unloaded Motor



Loaded Motor

Good Power Factor is usually in the range of 0.9-0.95 pf lagging (current lags voltage). The main cause of high levels of reactive power or low power factor (<0.9 pf) is as above where there are large motors running lightly loaded. Supply Authorities require Power Factor within the 0.9-0.95 range based on the User's Connection Agreement. Note that a leading power factor is not desirable either since this brings voltage issues.

From a recent pf correction project, the assessed power factor was 0.68-0.72 lagging. This was much lower than allowed however this was explained by the plant loads being large induction motors being run lightly loaded compared to motors run at the peak of their efficiency curves. Ie Active Power reduces, Reactive Power is the same but $\Theta_1 > \Theta_2$.

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Power Factor Correction (PFC) equipment was installed at the site to supply the Reactive Power requirements rather than drawing from the network, reducing charges from the Supply Authorities. The PFC equipment requirements were assessed for suitability as well as the payback for the supply and installation.

The review showed the payback period for the equipment was approximately 12 months based on rebates and the differences in the network charges. This included the costs to supply, install and commission the equipment.

The return on investment was fantastic for the Client who was looking at an increase of 15% on the annual power bill. Note that this will continue paying back to the Client especially when power prices are continuing to increase going into the future.

Also, correcting a bad power factor can increase the site's power capacity by 10-20%. So instead of spending money to upgrade equipment, install Power Factor Correction Equipment!

Sadly, the PFC Equipment supply and install rebate process has finished but the savings through better power factor would have still brought the return on investment to within 2 years.

Talk to us regarding costs and returns…

AGR Electrical Engineering (AGR) has been involved in major projects, design, operations and maintenance activities throughout various industries for many years. As well, having an electrical trade background gives a major advantage in the engineering field since a base level and hands on approach to modern and innovative solutions is always undertaken.

Contact us today to see what we can do for your business now and in the future.

Gil Rhodes
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