

# Case Study

AGGREGATE & QUARRY ASSOCIATION OF NZ

## Power factor correction

Energy is one of the largest costs in the aggregate and quarrying sector. The Aggregate and Quarry Association's Best Practice Energy Programme has been set up to assist operators with practical ways to reduce energy costs and improve process efficiency. This and further Case Studies have been produced to detail practical solutions in specific areas of operation.

Power factor is a measure of how effectively the electrical equipment on your site converts electrical current into power.

Poor power factor can lead to lower than normal voltages on your site and cause unreliable equipment performance.

Most electricity network companies now charge their large commercial and industrial customers when power factor falls below the industry standard of 0.95 lag. When the network company also charges for kVA demand the lower

your power factor, the higher the kVA demand and therefore the higher the network charge.

There is further information about energy efficiency on the AQA website [www.aqa.org.nz](http://www.aqa.org.nz).



AQA CASE STUDY

Poor power factor performance can be quite simply addressed and delivers several benefits:

- reduced peak demand and reactive energy charges
- higher and better quality voltage regulation
- lower transmission and distribution losses in your electrical system
- increased transformer capacity to serve your actual working power requirements
- can eliminate the need for costly electricity network upgrades
- reduced threat of operational downtime caused by overloading your electrical assets.

Where power factor is consistently below 0.95 lag, most industrial sites invest in power factor correction equipment that uses automatically controlled capacitor banks. Each system is designed to suit the needs of individual sites.

There are differences in the way electricity network companies charge for reactive power in each area. You need to understand these charges before deciding on the most appropriate power factor correction solution. It is recommended that sites take expert advice before purchasing a system.

## Recommendations

Get a quote for installing power factor correction equipment on your site. Compare the cost against your network charges for reactive power and peak demand to assess payback on the equipment. An energy consultant could also do this for you.

Contact your energy supplier to ask if they can provide advice on, and monitoring of, your power factor correction systems.

Undertake annual inspections of power factor correction systems, or contract a specialist to provide this service every year.

If peak demand charges in your area are high, install a simple alarm system to ensure that you are made aware of system failures.

## Unnoticed power factor correction failure costs dearly

A New Zealand quarry site had very good power factor correction in place. However, over several months during 2008, the power factor correction system was not functioning properly and power factor was often between 0.7 and

## New power factor correction units save \$14,462 per annum

A North Island quarry recently found that its average power factor level was 0.91 lag. The industrial standard is 0.95 lag. This meant the site was charged \$12,293 in reactive energy penalties over the year by their electricity network company plus unnecessary peak kVA demand charges of \$2,170.

An investigation found the site's power factor correction unit was undersized and not in full working order. Installing a new power factor correction unit and replacing a faulty bank in the existing unit cost \$28,640. The unit will pay for itself in two years.

0.8 lag. This went unnoticed by the site and cost an unnecessary \$5,032 in peak demand charges.

Energy specialists, Energy NZ Ltd, recommended installing a warning signal light configured to the fault output relay, at a cost of just \$600.

## **AQA Best Practice Energy Programme**

The Aggregate and Quarry Association is the national trade organisation representing over 80 companies, that between them produce 85% of the aggregates and allied raw materials used in New Zealand.

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