



Power Factor Charge Q & A

Some commercial and industrial customers of CRMU have their demand charge adjusted on their power factor.

What is power factor?

Power factor is the ratio of working power or energy (kilowatts or kW) to apparent or total power (kilovolt-amperes or kVA) delivered by the CRMU. It measures how effectively total delivered power is being used. A high power factor signals effective utilization of electrical power, while a low power factor indicates poor utilization of electrical power. However, this is not to be confused with energy efficiency or conservation which applies only to energy or kW. Improving the efficiency of electrical equipment reduces energy consumption but does not improve the power factor.

What causes a low power factor?

The main contributors to low power factor are motors operated at less than full load. This often occurs in cycle processes such as saws, conveyors, compressors, grinders, etc. – where motor must be sized for the heaviest loads. HVAC fans often have a low power factor due to running at reduced load.

What is a power factor charge?

The power factor charge is an adjustment to the demand charge if the customer's power factor is less than 0.95 or 95%. This fee is charged to electricity users to recover CRMU's costs for maintaining a good power factor on our distribution system.

How is the power factor charge shown on my bill?

The average "Power Factor" and "Adjusted Demand" for that billing period is shown on the customer's bill. The Demand charge shown on the bill includes the adjustment due to low power factor.

How is power factor measured? Is there a special meter for measuring power factor?

Power factor is calculated from measured quantities using a meter capable of measuring both kilowatt hours (kWh) and kilovolt-amperes-reactive-hours (kVARh).

How does CRMU select which customers get charged for power factor?

Customers who consistently have a demand that is greater than 50 kW and have a power factor that is less than 0.95 or 95% will have their demand adjusted based on power factor.

How is a customer's monthly power factor determined?

As stated in CRMU's power factor adjustment rate schedule, the power factor is calculated using the total monthly kWh and total monthly kVARh. The demand is increased by one percentage point for each one hundredth (.01) the average power factor is less than 0.95.

The formula is as follows:

Average Power Factor = $\frac{\text{KWH}}{\sqrt{(\text{Kilowatt-Hours}^2 + \text{Reactive Kilovolt Ampere Hours}^2)}}$

Adjusted Demand = $\text{KW Demand} * ((.95 - \text{PFavg}) + 1)$

What can I do to limit my power factor charge?

One method to improve your power factor is by adding power factor correction capacitors to your plant distribution system. When apparent power (KVA) is greater than working power (kW), the utility must supply the excess reactive current plus the working current. Power capacitors act as reactive current generators. By providing the reactive current, they reduce the total amount of current your system must draw from the utility.

Another method is to install equipment with good power factor versus a poor power factor – for example, adding an adjustable speed drive to a lightly or variably loaded induction motor. Whenever specifying new equipment, the power factor of the equipment should be considered. While initial costs might be higher, it is often more economical in the long run to purchase equipment with a higher power factor.