Incoming supply: what's the problem?

Electrical networks normally supply electricity at a higher voltage than required by most customers. In Australia, statutory supply range is 230V, +10% to -6%, a range of between 253V and 216V. As the electricity has to travel long distances across the grid, it is typically supplied at the high end of the range.

Most connected loads, such as electrical equipment and machinery on a site, is designed to operate most efficiently at 220V to 230V. When supplied with a higher voltage (overvoltage), no performance gains are achieved, rather the excess energy is lost through heat or vibration. Users therefore pay for this wasted energy without gaining any increase in output.

Overvoltage can also put stress on connected machinery, negatively affecting performance, significantly reducing expected rated life and increasing the possibility of equipment failure.

Lastly, the quality and level of the supplied voltage from the network can vary throughout the day depending on fluctuations in demand and supply. Sags, spikes and transients in the supply can cause operational problems and damage to connected equipment.

What is Voltage Optimisation (VO)?

Voltage optimisation aims to reduce electricity usage, power demand and cost by reducing supply voltage received. It can improve power quality by reducing harmonic and transient voltages as well as balancing phase voltages.

A reduction and balancing in electricity supply voltage achieves a saving in energy consumption (kWh) and a reduction in maximum demand (KW & KVA).

Voltage Optimisation is not the same as Power Factor Correction.

When is Voltage Optimisation right for you?

1 Overheating of transformers, switchboards and cabling
2 Nuisance tripping of circuit breakers or control equipment
3 Unstable equipment operation
4 High energy costs

How does voltage optimisation work?

Network providers supply power to customers at a higher nominal value than generally required to operate equipment. They do this to ensure that all customers receive acceptable voltage levels taking into account voltage drop and customer loading on their network. This means that the voltage levels are generally higher than that required to efficiently operate equipment, and can results in over voltage issues such as overheating and malfunctions, as well as increased energy usage and costs.

Voltage optimisation devices are installed in series with the incoming supply and the end user equipment, like motors. They maintain a steady and reduced output voltage, with independent phase control that further protects electrical equipment and prolongs equipment life. Further, the ability to adjust the incoming voltage allows for a reduction in harmonics and transient voltage spikes to ensure a stable and reliable power supply to plant and equipment.

The benefits of voltage optimisation include improved power quality, less equipment maintenance, improved equipment life, and reduced energy consumption. This can provide significant cost savings.

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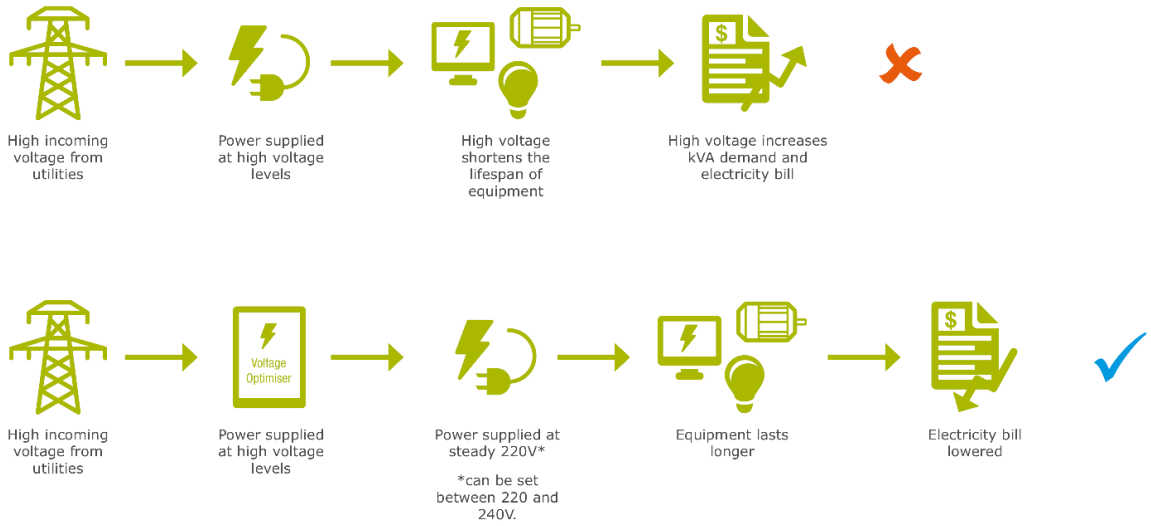

How much can be saved?

Ultimately the level of energy saving achieved will be dictated by a combination of the incoming supply voltage level and the types of electrical equipment in use. The higher the supply voltage, the greater the potential to make energy savings.

However different types of electrical equipment deliver different levels of energy saving for the same reduction in voltage.

Voltage optimisation works best on inductive loads, such as electric motors that are not fully loaded (air conditioning and refrigerators, pumps and fans) and incandescent and magnetically ballasted lighting. Energy savings that can be achieved at sites where the majority of electrical consumption is from this type of equipment can be as much as 10-15%.

Who can save?

Voltage optimisation can benefit facilities with inductive loads such as three-phase induction motors, air conditioning and refrigeration including:

- Commercial, office, retail buildings and supermarkets
- Government and educational facilities
- Manufacturing, processing and warehouse operations