



Powerstar Voltage Optimisation Frequently Asked Questions

What is voltage optimisation?

Voltage optimisation is an electrical energy saving technology which is installed in series with the mains electricity supply to give an optimum supply voltage for the site's equipment. Significant monetary and carbon savings can be achieved through voltage optimisation.

How does voltage optimisation achieve savings?

Essentially, voltage optimisation achieves savings by reducing the oversupply of voltage which is typically supplied at an average of 242 volts in the UK to a level more optimal and closer to the design characteristics of the equipment. This results in a reduction in energy consumption and therefore costs.

What average savings can be expected from implementing this technology?

Powerstar achieves average energy consumption savings of between 8% and 10% and has a typical payback period of 2-3 years.

How long does it take to start to make savings?

Savings are made instantaneously upon installation.

What makes Powerstar different from other voltage optimisation systems?

Powerstar is the only voltage optimisation system on the market with a patent on its design. The patented design of the Powerstar system includes a third control winding which creates negative power or 'back EMF' whereby any excess voltage is subtracted and sent in the direction of the supply. This ensures only around a tenth of power is transformed, resulting in reduced voltage and current and enhanced energy savings.

What is the difference between Powerstar LITE and Powerstar MAX and which unit is best for your site?

Powerstar LITE is a fixed voltage optimisation system which reduces the existing incoming voltage by a set amount. It is most suitable for businesses with a high but stable voltage profile.

Powerstar MAX is a variable or 'electronic-dynamic' voltage optimisation system that reduces and stabilises the incoming voltage. It is best suited for those with a high and unstable voltage profile.

What does Powerstar HV MAX provide?

Powerstar HV MAX is a HV/LV solution which combines a super low-loss amorphous core HV/LV transformer with integrated variable voltage optimisation to deliver a solution with enhanced savings to businesses that operate their own HV infrastructure.



Why not 'tap-down' a HV transformer to reduce the voltage?

When voltage is reduced using a tapped-down distribution transformer, the current is increased by the equivalent percentage. This increase in current consequently increases the losses of the transformer, leading to increased site consumption and a more expensive energy bill.

Powerstar's savings on voltage optimisation are 100% guaranteed, how are the savings verified?

Savings analysis is based on the International Performance Measurement and Verification Protocol (IPMVP) and is carried out via the steps below.

1. Compares 28 days pre install kWh data against 28 days post install kWh data
2. Compares 28 days post install kWh data against the same dates a year previous (pre install)
3. Compares 84 days (12 weeks) post install kWh data against the same dates a year previous (pre install)
4. Involves a regression analysis. An accurate model is created based upon pre install kWh consumption data and variables such as temperature
5. A verification providing a snapshot of the savings achieved from the negative power (back EMF) generated through the patented Powerstar design

How does the guarantee work?

If the savings are less than stated in the proposal, Powerstar issues a one-off payment covering the shortfall.

An example of the guarantee is that if a proposal was to state a 10% saving worth £15,000 per annum was to payback in a period of 2.8 years but the actual savings achieved were 8% or £12,000 then there would be a £3,000 shortfall. This £3,000 shortfall is then multiplied by the expected payback period, in this case 2.8, and a one-off payment is given to the client for this amount, £8,300 in this case, to guarantee the return on investment and offer peace of mind.

Does Powerstar have a warranty?

All Powerstar voltage optimisation solutions have an expected lifespan of 50 years and come with a 15 year warranty in the UK. This warranty is one of the longest in the industry and includes parts and labour. Please note it excludes damage due to overloading of the system.

How much does Powerstar cost?

Due to the bespoke nature of Powerstar systems, all costs vary and are dependent on the site characteristics. By providing site information, Powerstar can produce a proposal that indicates the cost and savings achievable.

Can Powerstar voltage optimisation be purchased without capital outlay?

Powerstar can provide a no capital outlay funding option on all of its solutions. Finance options include the zero capital outlay Powerstar as a Service (PaaS) as well as hire purchases, leasing agreements, and rental options.

What type of companies use Powerstar?

Powerstar has been used by thousands of companies from different sectors and landmark sites across the world, including the below:



London City Hall

London City Hall is one of the UK's most prestigious buildings and is home to the Greater London Authority (GLA), it accommodates the Mayor of London, the London Assembly and over 600 permanent GLA employees. Following the installation of Powerstar London City hall has benefited from annual reductions in energy consumption of **13.6%** and significantly reduced carbon emissions and electricity costs.



NHS

NHS is the National Health Service of the UK and Powerstar has been installed into a wide range of NHS managed healthcare facilities including hospitals, clinics, medical centres, acute care facilities, doctors surgeries, care homes and high-security psychiatric hospitals. The installations have provided an average **12.0%** savings in energy consumption across NHS healthcare estates along with reducing costs of maintaining lighting, plant and IT equipment in several of the facilities.



Carlsberg (Photos Photiades Breweries Ltd)

Photos Photiades Breweries Ltd is a dynamic brewery which produces and distributes Carlsberg beer throughout Europe. It also distributes a number of other renowned brands of beers, spirits, wines and beverages to Cyprus and Greece. The brewery is benefiting from annual reductions in energy consumption of **17.0%** with improved efficiencies in equipment at the production facility due to Powerstar.



Sheffield Hallam University

Sheffield Hallam University had previously implemented a number of energy efficiency initiatives at the student union building to tackle high energy consumption and frequent light tube failures.

Following the installation of Powerstar energy consumption has been reduced by **16.0%** per annum. Crucially over an 18 month monitoring period the university also saw a 75% reduction in light bulb failures.



Trelleborg

Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. The company's UK facility was looking to further reduce its carbon emissions and overall energy efficiency having already implemented a number of other solutions such as T5 fluorescent lighting and large inverter drives. Powerstar was able to provide an additional **11.2%** saving on annual energy consumption on top of current reductions.



Emirates Towers

The Emirates Towers are one of the most stunning architectural highlights in the Dubai skyline and facilities include 400 fully furnished rooms and suites and state of the art meeting room and business facilities.

Following installation of Powerstar annual energy consumption savings of **9.2%** have been achieved.