

about. Emissis

Voltage Optimisation

Emissis (Electrical Mechanical & Cooling Limited) are an engineering company who have been in business for over 20 years. We are an expert M&E service provider and independent supplier of critical power and cooling solutions for critical, industrial and commercial operations. Our independent status means that we are always working to find and install the best technology for your specific project and site needs. We pride ourselves on our craftsmanship, technical expertise, compliance knowledge and project delivery. We are always working to keep your site protected, optimised and energy efficient.

Emissis deliver a powerful suite of globally patented, innovative energy reduction solutions that save their clients money by lowering energy bills whilst reducing their carbon emissions. Core technologies include Voltage Optimisation (VO) & Stabilisation, Commercial Energy storage, EV charging and PV + Battery and Coolnomix. Emissis deliver, via our in house engineering team an energy efficient end to end solution from Site Survey - ROI analysis & payback guarantees - Installation - Monitoring and Verification.

In a world, increasingly dominated by rising energy prices and climate change, Emissis are proud to be working alongside some of the leading UK businesses supporting them on their journey towards net zero saving them millions in energy overspend and waste in the process.



Net Zero is coming...

The UK and EU are legally bound to reach net zero by 2050 and several other major economies are doing the same. More businesses than ever before are now having to report on carbon emissions.

Start your net zero journey today and reap the benefits sooner. We deliver a powerful suite of solutions that reduce your carbon emissions, save you money with lower energy bills and generate revenue from being a more flexible energy user with the help of today's leading technology.

We work with:



How does VO work?

The National Grid delivers, on average, 242 volts to all UK users. With voltage optimised, electrical equipment works at optimum cost efficiency at 220 volts. All supply above 220v is waste.

Through Ohm's law, optimising voltage on any supply produces instant kWh savings of up to 19%, which will give an instant reduction in electricity bills and carbon footprint. In addition, and as confirmed by the UK's wiring regulations (BS7671), any electrical equipment required to work at 242v, will suffer a reduced working life by up to 46%.

The Key Benefits:

- **Guaranteed savings**
- **Lower energy consumption**
- **Lower carbon emissions**
- **Protection of appliances**
- **Lower maintenance costs**
- **Higher efficiency**
- **Improves Solar & Generation**
- **Removal of penalties**



What is Voltage Optimisation?



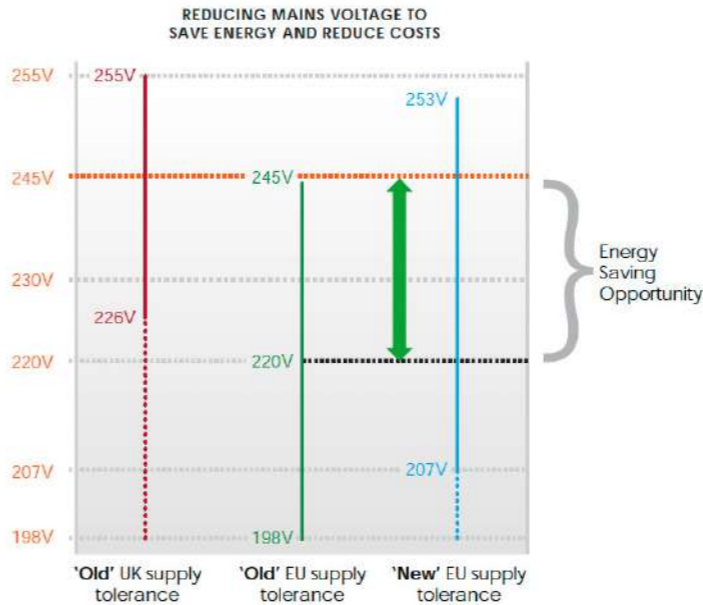
Put simply, Voltage Optimisation is a form of Voltage Management specifically designed for reducing energy consumption. Voltage Optimisation is a term used around voltage management when a desire to reduce energy consumption by up to 20% is managed by adjusting and controlling voltage levels on a user's site.

Voltage optimisation is a transformer based technology, the principal is based around supplying a voltage level more suitable to the actual electrical device in order for it to perform its task more efficiently and in line with limits of European harmonised voltage while basic design is a low loss series connected transformer designed to optimise a whole site or individual loads to target the most optimisable loads.

Reducing Mains Voltage to Save Energy & Reduce Costs

Voltage levels provided by power companies in the UK and other countries are not typically matched to the optimum level for most electrical equipment. Voltage Optimisation is a method of reducing mains voltage to save energy, reduce costs and maximise equipment efficiency.

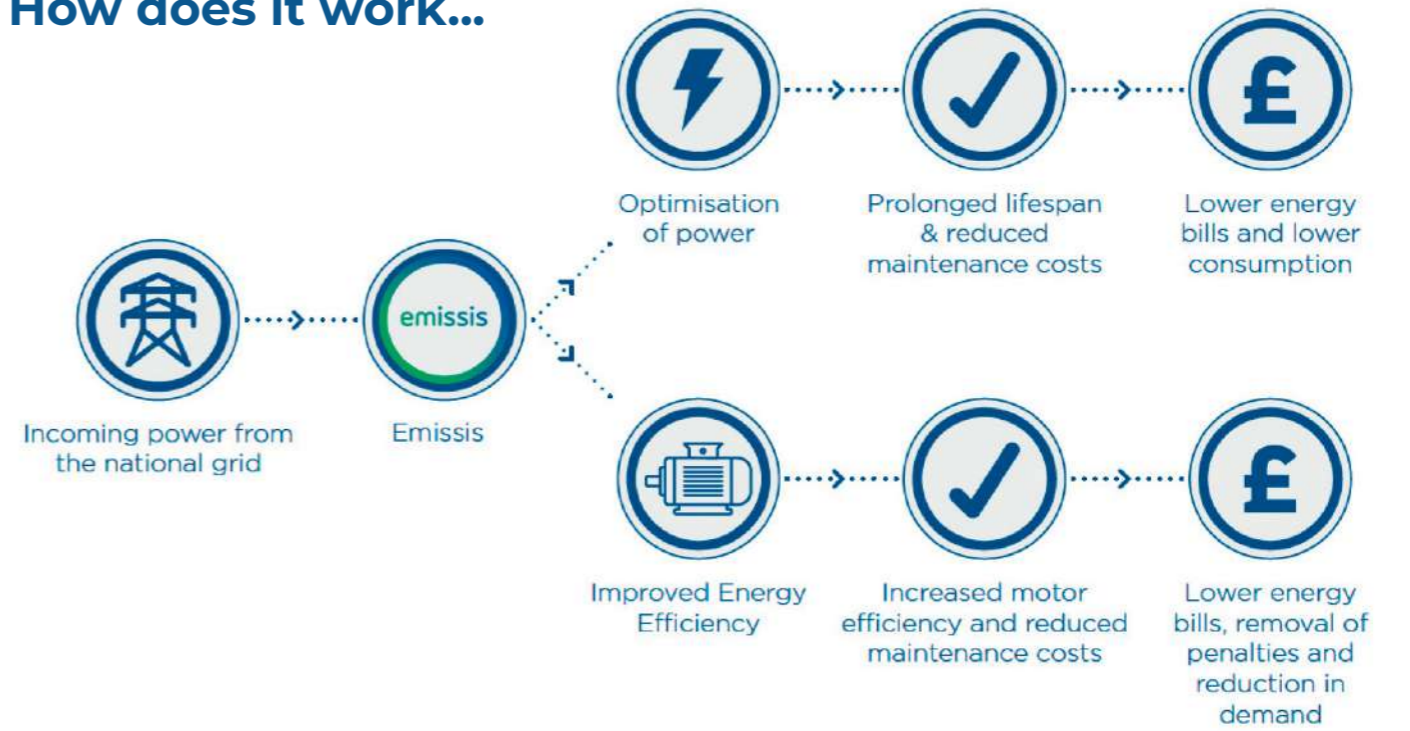
Using Voltage Optimisation with electrical equipment such as refrigeration or air cooling devices, 3-phase motors, high-intensity discharge or fluorescent lighting, will reduce energy consumption and create real financial savings. Voltage Optimisation also increases the service life of electrical equipment by running at the lower voltages that the equipment was designed to run at.



In Europe, generating companies are required to provide customers with a voltage between 207V and 253V. The average voltage across the UK is 245V, but levels can fluctuate significantly throughout the day on each site. Across Europe, the standard voltage has been historically 220V.

As a result, most electrical equipment is designed and specified to operate most effectively and efficiently at 220V. Providing equipment with higher voltages actually reduces efficiency and leads to wasted energy.

How does it work...



Savings & Benefits of Voltage Optimisation

To simplify the market for electrical equipment, the European Union has introduced the Low Voltage Directive (LVD) 2006/95/EC to regulate the operating voltage of electrical equipment to be supplied in Europe. Equipment that meets the standard bears the CE mark and is designed to operate within harmonized voltage levels.

In reality through, nothing has changed, voltage levels on average in the UK remain around 242v (419V) as the costs to reduce voltages at grid level are too inhibitive and unnecessary as we remain within the harmonized voltage limits.

CE mark compliance simply dictates that the device must operate safely between harmonized limits, it does not however state that it must operate efficiently or maintain its design lifespan.



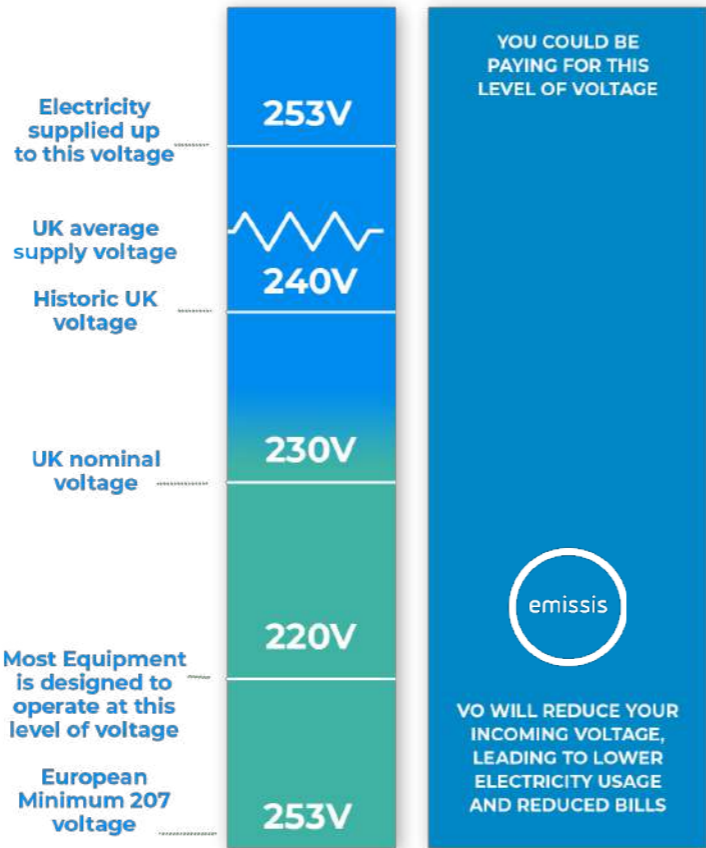
It could be argued that Voltage Optimisation therefore exploits the CE Mark regulations as a lower voltage level is applied to the electrical device and closer to the nominal design voltage of 230V rather than at the UK average voltage of 242V.

Consideration should also be given towards accelerated deterioration of the electrical device at the higher voltage levels, voltage can be described as a pressure, there is therefore an opportunity to regulate the pressure more towards mainland European levels to protect the device and maintain its designed life span while returning a level of energy saving.

Most electrical devices are now manufactured more for the wider European market rather than the unique challenges faced in the UK, a classic example is the operation of LED lighting, higher voltage levels increase the risk of premature failure of the driver circuits while at lower regulated levels, the pressure is reduced and the design lifespan achieved.

Voltage Scale

Electrical appliances operating on operational limits



Where are the savings made?



Savings are mainly achieved around a kw/h reduction as the electrical device operates closer to its fundamental design voltage, the main areas of saving on an electricity bill are detailed below:

- Reduced kw/h consumption
- Dependent on the load dynamics, the savings will come from a kw/h reduction.
- Reduction in Demand
- A small reduction in demand is possible although this is not normally significant enough to reduce Authorised Supply Capacity charges.
- Reactive Power Charges
- Reactive power charges may reduce slightly as demand reduces.
- Reduced Emissions
- Significant reductions in CO2 emissions can be achieved as consumption is normally directly associated with kw/h consumption.
- Reduced Maintenance Costs
- A device operating at a higher pressure than need be to perform the same task will not last as long as a device with a regulated pressure.

Guaranteed Electrical Energy Reduction & Financial Savings

Peace of mind...

- Award winning company since 2002
- Electrical Contractors Association member
- ISO 9001 UKAS AccreditedSafe
- Contractor - Approved
- Innovate (UK Government) funded



Emissis Voltage Optimisation Warranty & Guarantee

All our voltage equipment is supplied with a 15 year manufacturers equipment warranty that confirms (warrants) that the equipment supplied will continue to deliver the voltage reduction guaranteed and will operate efficiently for a minimum of 15 years from date of installation. Our equipment is installed with an expected lifespan of 30 + years subject to a 5 year service plan.

We guarantee that your Voltage Optimiser will continue to deliver the voltage reduction specified in our Energy Savings report. After a full site power survey the finalised savings report will confirm the reduced voltage figure, your sites confirmed load profile together with the percentage of energy consumption that has been disregarded to allow for equipment that delivers little or no energy savings from voltage optimisation.



Don't just take our word for it...



Frankie & Benny's

Energy Manager | The Restaurant Group

We've engaged with Emissis to use their system on over 200 sites delivered over a two year period. We are very happy with the system in the form of the process, technology and the benefits it provides.



NEXT

Energy Manager | NEXT Retail

Emissis did a lot of footwork and provided us with a lot of technical information. The company has a great deal of knowledge and provides bespoke options. Everything the company offers, delivers the savings they say will happen, or more!



DW Fitness First

Energy Manager | Fitness First

It is the combined effect of a range of options that gave us the edge in terms of savings with Emissis. We're delighted with the knowledge, speed of delivery and results that this firm has given us!



Energy Metering.

Intelligent Energy Reduction

Identifying reductions through Online Remote Metering & Monitoring

The Emissis Voltage Optimisation energy reduction system doesn't just reduce energy use and the associated costs, but as it is tailored, flexible and expandable it offers a number of benefits, including:

- Provides complete visibility on energy spend – find out where your money is going
- Completely transparent with customer interface – access your data anytime, anywhere
- Complete turnkey solution to energy reduction – Emissis take care of the data analysis and provide the best solution for your needs. All you need to do is enjoy the savings
- Fully expandable
- Can prolong the working life of key equipment such as motors and transformers
- Reduces both energy spend and carbon footprint
- Performance guaranteed to save at least the cost of solution



voltage optimisation

Protection

Our online Remote Metering & Monitoring Energy Saving and Protection Platform can alert the user to any potential threats of overload or operational problems before they become an issue. By monitoring the effectiveness of renewable energy generation systems, such as solar PV or wind turbines, the system can ensure that they are functioning correctly and delivering the expected performance. It can also control loads remotely, for example to take advantage of peak-shaving and time-based energy tariffs.

The systems are fully expandable and can be made portable, so that they can be used to interrogate or monitor different energy loads around the site, for example from different machines, transformers or generation units.

Added value

As well as saving energy, the Emissis VO Remote Metering & Monitoring solution also adds value to your business through bill validation.

By checking your bill against recorded energy use, we ensure that your bill does not include costly mistakes or incorrect penalties and taxes. Where issues are found, then we apply to your energy supplier for an appropriate energy rebate on your behalf.



Products:

Emissis

Voltage Optimisation Machines

Features
Ultra Low Loss Transformer Technology 99.9% Efficiency
Selectable Voltage Output (-10v, -15v, -20v, -25v)
Minimum 5 years Warrantyvoltage optimiser uk
Very Low Maintenance
Wide Range of Models to Suit All Environments
Permanent Power Ratings
Efficient Toroidal Transformer Design
Overcurrent Protection – MCCB
Integrated Isolation
High Overload Capability
Patented Design
Range 1kVA to 8,000kVA
Natural Ventilation
15 Years Warranty
BSEN60831 (IEC831 & IEC70/70), BSEN60439, BSEN60204
ISO 9001 Quality Assurance

Benefits:
Reduction in Energy Bills
Reduction on Carbon Emissions
Reduction in Whole Site Maintenance Cost
Protection of Appliances

Options:
Power / Energy Metering & Remote Monitoring
Voltage Stabilisation (±0.5% or ±1% Accuracy (options available)
Balanced or Independent Phase Balancing
Under Voltage Protection
By-pass switch
Over Temperature Protection
Harmonic Filtration
Surge & Lighting Protection
Single Phase Options
Environmental – Up to 60 Deg C (extreme options available)



Emissis Compact Voltage Optimisation (Static)

VO size (A)	Part No.	Height (mm)	Width(mm)	Depth (mm)	Other sizes Available
EMC-63	CVO63-3P	700	500	300	No
EMC-100	CVO100-3P	700	500	300	No
EMC-125	CVO125-3P	550	525	400	No
EMC-160	CVO160-3P	625	650	454	No
EMC-200	CVO200-3P	650	625	454	No
EMC-250	CVO250-3P	650	625	454	No
EMC-315	CVO315-3P	650	625	454	No
EMC-400	CVO400-3P	810	770	535	No
EMC-500	CVO500-3P	867	830	650	Yes
EMC-630	CVO630-3P	867	830	650	Yes
EMC-800	CVO800-3P	950	1150	850	Yes
EMC-1000	CVO1000-3P	950	1150	850	Yes
EMC-1250	CVO1250-3P	950	1150	850	Yes
EMC-1600	CVO1600-3P	950	1150	850	Yes
EMC-2250	CVO2250-3P	950	1150	850	Yes

Automatic Voltage Optimisation (T Version)

VO Size KVA	Part No.
EMC-170	EAVMST310AJB170
EMC-250	EAVMST312AJB250
EMC-350	EAVMST314AJB350
EMC-530	EAVMST315AJB530
EMC-700	EAVMST316AJB700

Automatic Voltage Optimisation (Y Version)

VO Size KVA	Part No.
EMC-140	EAVMSY310AJB140
EMC-200	EAVMSY311AJB200
EMC-250	EAVMSY312AJB250
EMC-350	EAVMSY313AJB350
EMC-550	EAVMSY314AJB550
EMC-700	EAVMSY316AJB700
EMC-1000	EAVMSY317AJB1000
EMC-1400	EAVMSY318AJB1400
EMC-1200	EAVMSY319AJB2100
EMC-3200	EAVMSY320AJB3200



Emissis

Voltage Optimisation Case Studies

Retail

next

- Annual savings Achieved: **£5,230.00**
- Co2 savings Achieved: **30 Tonnes of Co2**
- Payback: **2.9 Years**

Benefits:

- Improved Efficiency
- Reduction in energy costs ISO 9001
UKAS AccreditedSafe
- Reduction of reactive power charges



Emissis did a lot of footwork and provided us with a lot of technical information. The company has a great deal of knowledge and provides bespoke options. Everything the company offers, delivers the savings they say will happen, or more!

”

Energy Manager – Next

Restaurant

Frankie & Benny's

- Annual savings Achieved: **£935,240.00**
- Co2 savings Achieved: **5,379 Tonnes of Co2**
- Payback: **1.8 Years**

Benefits:

- Immediate Cost Saving
- Reduction in Co2
- Reduction in Maintenance Costs
- Fast Return on Investment



We've engaged with Emissis to use their system on over 200 sites delivered over a two year period. We are very happy with the system in the form of the process, technology and the benefits it provides.

Energy Manager – The Restaurant Group

Hospital

NHS

- Annual savings Achieved: **£15,066.00**
- Co2 savings Achieved: **61 Tonnes of Co2**
- Payback: **1.8 Years**

Benefits:

- Reduction in Energy Costs
- Improved Efficiency ISO 9001
UKAS Accredited
- Removal of penalty charges



A massive thanks for the tremendous effort put in by your guys on Saturday. We wanted to let you know that we were all really impressed with their work.

”

Energy Manager – NHS

Manufacturer

POLYFLORTM
COVERING THE WORLD

- Annual savings Achieved: **£42,929.00**
- Co2 savings Achieved: **253.27 Tonnes of Co2**
- Payback: **10 Months**

Benefits:

- Improved Utility
- Reduction of 1,496 Amps per phase
- Reduction of 1,076 kVa demand
- Removal of reactive power charges



Thank you for the great work carried out by your engineers. Nothing was too much trouble for them and they checked that everything was safe and in working order.

Energy Manager – Polyflor

Emissis

Voltage Optimisation Case Studies

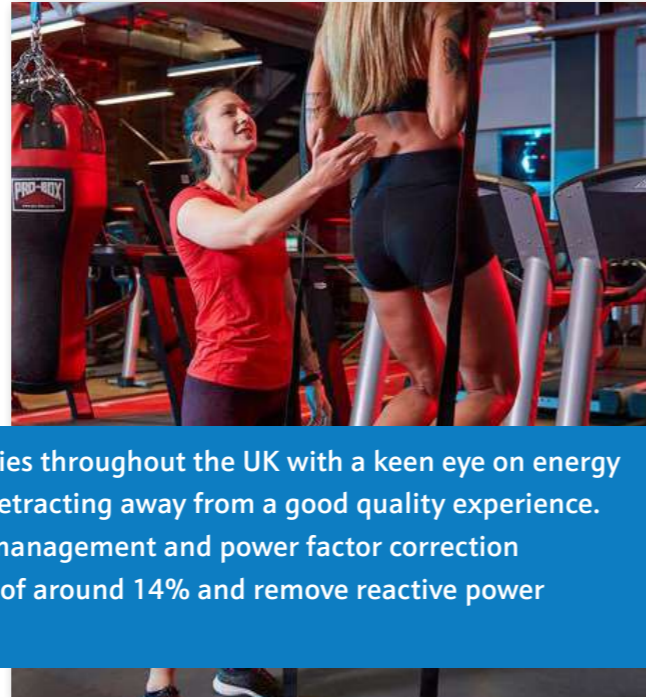
Fitness First, Gym



- Annual savings Achieved: **£11,111.00**
- Co2 savings Achieved: **63.92 Tonnes of Co2**
- Payback: **19.7 Months**

Benefits:

- Removal of Reactive Power Charges
- Reduction of 63 Amps per phase
- Reduction of 45 kVa Demand
- Improved utility



DW Fitness operate fitness centres and hotel facilities throughout the UK with a keen eye on energy spend and a desire to improve efficiency without detracting away from a good quality experience. Emissis identified a requirement for both voltage management and power factor correction technologies combined to return an energy saving of around 14% and remove reactive power penalties for the electricity bills.

J.W.Lees, Pub Chain



- Annual savings Achieved: **£55,215.33**
- Co2 savings Achieved: **81.6 Tonnes of Co2**
- Payback: **2.5 Years**

Benefits:

- Reduction in kw/h
- Protection of assets
- Immediate Cost Saving
- Reduction in Co2
- Reduction in Maintenance costs



JW Lees are a pub chain and brewery, which manages 35 of its own pubs, inns and hotels and has a further 115 inns and pubs that are let out to independent licensees in the UK. They were looking at ways to reduce their carbon liability and cut down on operating costs. Emissis engaged with JW Lees conducted site surveys to assess the suitability of voltage optimisation and other possible solutions that could be offered.

Laboratory

- Annual Savings: **£24,095.00**
- Co2 savings Achieved: **109.4 Tonnes of Co2**
- Payback: **2.2 Years**

Benefits:

- Removal of Reactive Power Charges
- Reduction of 320 Amps per phase
- Reduction of 230 kVa Demand
- Improved utility

AstraZeneca PLC are a multinational pharmaceutical company with operations in over 100 countries and are renowned for the discovery and development of innovative new medicines. Alderley Park is the lead centre for cancer research and employs around 2,900 people, including some of the world's most skilled and experienced science professionals.



London Office

- Annual savings Achieved: **£8,711.00**
- Co2 savings Achieved: **35 Tonnes of Co2**
- Payback: **2.2 Years**

Benefits:

- Reductions in energy costs
- Improved efficiency
- Removal of Reactive Power Charges

77 Fulham Palace Road is a 3 acres site, with four self-contained office buildings totalling 193,313 sq ft (17,959 sq m). The properties were originally constructed in 1989 and are serviced by a number of main electrical supplies for tenants and landlord situated mainly in the basement car park.



Voltage Optimisation Case Studies

Marketing Agency



- Annual savings Achieved: **£10,224.00**
- Co2 savings Achieved: **41.41 Tonnes of Co2**
- Payback: **18 Months**

Benefits:

- Reductions in energy costs
- Improved efficiency
- Removal of Reactive Power Charges



The APS Group are specialists in Marketing Operations Management and help their clients plan, produce and deliver marketing communications in a more streamlined way with measurable results. Their manufacturing site in Stockport operates a number of high value high speed printing presses utilising state of the art technology to manufacture efficiently and responsibly.

Dairy Farm



- Annual savings Achieved: **£13,405.33**
- Co2 savings Achieved: **33 Tonnes of Co2**
- Payback: **1.8 Years**

Benefits:

- Reduction in kw/h
- Protection of assets
- Immediate Cost Saving
- Reduction in Co2
- Reduction in Maintenance costs



Bates Farms and Dairy have been providing fresh milk & dairy products for over 80 years. Bates are a family business that operate all over the UK. They were looking to reduce their carbon liability and cut down on operating costs. Emissis engaged with Bates dairies and conducted a site survey to assess the suitability of Voltage Optimisation and other possible solutions that can meet what Bates were looking for.

Manufacturer



- Annual savings Achieved: **£8622.00**
- Co2 savings Achieved: **35 Tonnes of Co2**
- Payback: **15 Months**

Benefits:

- Reductions in energy costs
- Improved efficiency
- Removal of Reactive Power Charges



Britvic plc is one of the largest manufacturers of soft drinks in the UK with brands like J20, Robinsons, Canada Dry, R. White's Lemonade, Tango, Irn Bru and Tizer. The company had invested in a new bottling plant and plastic moulding machine for operation within one of their existing facilities and needed to limit both the environmental and financial impact of the new plant on the infrastructure.

Council Building



- Annual savings Achieved: **£4402.00**
- Co2 savings Achieved: **18 Tonnes of Co2**
- Payback: **1.9 Years**

Benefits:

- Reductions in energy costs
- Improved efficiency
- Removal of Reactive Power Charges



The Civic Centre is a municipal building has been supporting the people of Wigan for many years and is just one of a number of buildings managed by Wigan Councils FM partners. Our services were retained as a long standing client to investigate the benefits of implementing an energy saving system. The project was designed to deliver maximum long term savings and a speedy return on investment with minimal disruption to activities.

HMRC Announce 130% Tax Relief on any VO Capital Equipment Purchase



HM Revenue
& Customs

Policy paper

New temporary tax reliefs on qualifying capital asset investments from 1 April 2021

Published 3 March 2021

Who is likely to be affected

Companies within the charge to Corporation Tax who invest in plant and machinery on or after 1 April 2021.

General description of the measure

This measure will temporarily introduce increased reliefs for expenditure on plant and machinery.

For qualifying expenditures incurred from 1 April 2021 up to and including 31 March 2023, companies can claim in the period of investment:

- a super-deduction providing allowances of 130% on most new plant and machinery investments that ordinarily qualify for 18% main rate writing down allowances
- a first year allowance of 50% on most new plant and machinery investments that ordinarily qualify for 6% special rate writing down allowances

The measure also temporarily amends the rules covering expenditure incurred on plant and machinery used partly in a ring fence trade in the oil and gas sector.

Policy objective

This measure is designed to stimulate business investment. It does so by increasing the incentive to invest in plant and machinery by offering higher rates of relief than were previously available.

Background to the measure

Capital allowances allow businesses to write off the costs of tangible capital assets, such as plant or machinery, against their taxable income. They take the place of commercial depreciation, which is not an allowable tax deduction.

First-year allowances allow enhanced rates of relief for certain plant and machinery investments, providing claims are made in the period the expenditure is incurred. The super-deduction is an enhanced first-year allowance providing an allowance exceeding the cost of the asset.

Any investment or expenditure on new Emissis Voltage Optimisation (VO) Equipment, from April 1st 2021 up to March 31st 2023, will qualify for the new 130% tax relief rate. This measure effectively reduces the tax adjusted cost of capital for millions of companies, large and small, investing in qualifying VO plant & machinery.

As an example, any Emissis client spending 100k on new VO plant & machinery will be able to claim tax relief of £24,750 against the capital investment.

Voltage Optimisation Site Survey

To determine the impact Voltage Optimisation could have on your energy consumption, a detailed survey should be carried out to understand the dynamics of the load and to determine how much of the electrical equipment is voltage dependent and what proportion of the total energy consumption that represents.

The survey also includes detailed load monitoring for a period of time suitable to ensure all load types and processes are recorded in order to evaluate voltage levels, phase balance, demand levels and volt drop throughout the site.

If most of a sites electrical consumption is made up of voltage dependent loads, savings are likely to be high, savings on voltage independent loads are likely to be poor although benefits still exist as operating equipment close to its fundamental design voltage may maintain the life expectancy in line with the manufactures expectations.

System features should also be considered and based on the return of investment, the dynamics of the load, site conditions in respect of voltage fluctuation and the level of functionality required.

Bypass features should be considered to disconnect the Voltage Optimisation system from the supply in order to perform maintenance procedures for example. A bypass switch can be installed to electrically disconnecting and isolate the Voltage Optimiser from the electrical circuit and reconnect the electrical supply. The site load is therefore diverted through the bypass mechanism and the Voltage Optimiser isolated in the bypass state.

Voltage Optimisation Installation

Installation is in series with the main supply and therefore it is vitally important to ensure the correct level of due diligence is carried out in the form of a detailed survey.

It is also recommended that a suitably rated protective device is integrated into the optimiser, this is especially critical if the optimizer has been rated for the size of demand and not the capabilities of the existing supply ie matched to the maximum demand (plus an approximate 30% overload) rather than the current rating of the main supply. A voltage optimiser could also be installed on sub supplies or individual loads to target the most optimisable loads. If you would like to learn more about VO get in touch and we can book a call to discuss your requirements, and answer any questions you may have.

