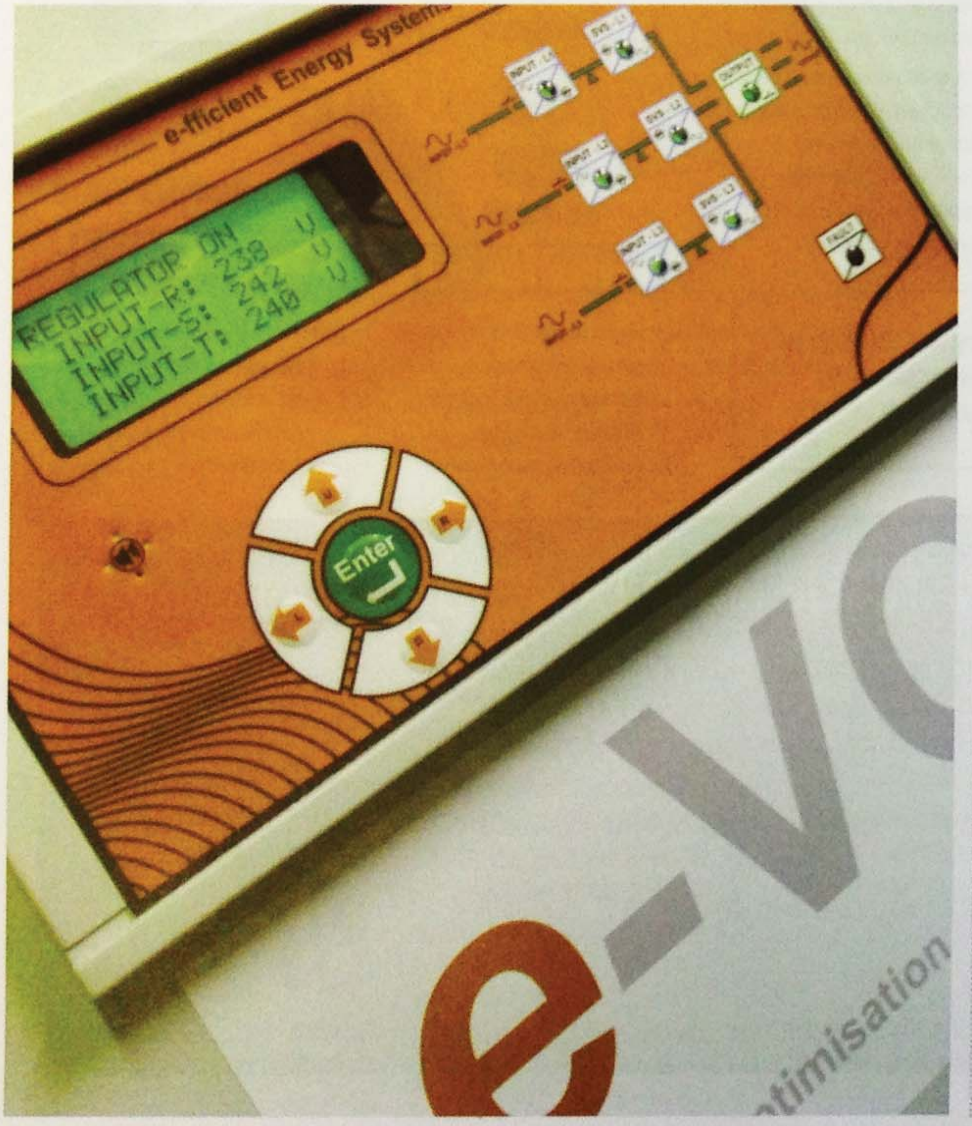
VOLTAGE MANAGEMENT – THERE IS A BETTER WAY

Though the principles of voltage management have been understood for many years, there has been a growing realisation that the basic voltage optimisation 'step down' transformer systems just do not offer the continuity of supply or the most effective way for companies to maximise their electricity savings. These fixed ratio transformer voltage optimisation systems have been sold as the solution to all ills but the reality is that these have now been superseded, and this 'old' technology just does not offer the flexibility of newer systems incorporating intelligent voltage optimisation and regulation .These are proving that technically they are a much better solution, and they deliver what they say on the tin – the old days of businesses being over promised and under delivered has ended with the introduction of this advance in 'intelligent' systems. Technically they are very different. Craig Needham, managing director of e-fficient Energy, explains



Too much focus has been applied to the hard sell of voltage optimisation products using guaranteed savings as the driver rather than whether the product specification and technology employed is appropriate to the needs of the user. The result is that in many cases the products supplied have failed to deliver the 'promised' savings and the client has been left unhappy with the system, and the opportunity to maximise energy savings has been missed.

One of the key components in all voltage management systems are the transformers which help reduce and optimise the incoming voltage. Critical is whether the system has single or multiple tappings.

A single tapped point on a transformer - also known as a fixed ratio or step-down transformer will only provide a set amount of voltage reduction with no control or real voltage management. These are typically set to save 4%, 6% or 8% – reducing the incoming voltage by this fixed ratio. Simple in design they can deliver fixed savings but little else.

More advanced voltage management systems incorporate multiple tapped points on the transformer – enabling the output voltage to be more closely controlled as the mains voltage fluctuates. This is known as voltage regulation and when combined with optimisation you get a much more superior product and solution.

The greater the number of tap settings the more control the voltage management system

has over delivering an optimised and regulated voltage. This extra control increases the opportunity to reduce electricity usage and the most advanced systems enable the user to regulate the voltage to the most appropriate level for the electrical equipment on their site. Typically this is set at 220V.

The majority of systems in the UK use a variation of this principle to reduce the over voltage being supplied by the National Grid. But the UK also suffers from under voltage at times and true voltage regulation is achieved when the mains voltage is controlled not just when there is 'over voltage' but also in 'under voltage' scenarios. This is known as 'buck and boost' voltage regulation - true voltage management.

Buck and boost voltage regulation incorporates 2 associated transformers per phase. A Buck transformer for voltage reduction and regulation and a Boost transformer for boost voltage regulation.

The simple reality that increasing fluctuations in the incoming supply voltages limits the ability of basic fixed ratio voltage optimisation units to maximise savings is all too apparent, but when these fluctuations result in dipping voltages these can lead to the system either delivering too low a voltage – resulting in serious on site problems – or switching to bypass and offering no savings at all.

The new buck and boost intelligent technology addresses these performance and reliability issues – guaranteeing a consistent output voltage and ensuring the user a continuity of supply.

e-fficient Energy Systems – a technological leader in the field of voltage management – has recently introduced its latest intelligent systems utilising their eVO+R voltage optimisation plus Regulation technology which addresses the many shortfalls of the old fixed transformer voltage optimisation equipment.

These systems not only allow the opportunity to maximise their electricity savings, but with buck and boost technology if the incoming supply voltage drops too low their system uniquely boosts the voltage back up to the desired voltage – ensuring continuity of supply.

Additional features which are rarely available on other systems, include the flexibility to fine tune on site (to maximise savings) and the ability to stabilise each phase independently improving the overall power quality, reducing harmonics, extending the life expectancy of the electrical equipment on site and reducing maintenance costs.

CARBON TRUST AND HOW VOLTAGE MANAGEMENT WORKS

These advances in voltage management technology come at a time when the concept of voltage management itself has just been given a strong vote of confidence by the Carbon Trust.

The Carbon Trust helpfully published late last year its clear explanation of the benefits of voltage management, how it works, and proscribed a methodology on how site surveys should be conducted. This has developed a minimum standard for the industry and has really helped potential customers understand what voltage management is all about and how it is, or is not, applicable to their needs.

Crucial as the Carbon Trust's process is, there is also a stark warning as to what does and doesn't constitute as voltage management technology. Additionally the methodology is not just a case of plugging in a simple voltage logger, and using kWh data. Without the prospective supplier physically attending site the potential savings are just guess work but the likelihood will be that the solution proposed will not reflect the load profile of your equipment with potentially dangerous results.

The simple reality is that voltage management (VM) whether in its simplest form voltage optimisation (VO) or in its more effective and technologically more advanced format voltage optimisation plus regulation (VO+R), does not deliver savings across all types of electrical equipment.

Voltage management works because most incoming UK voltages are not at the 230V we expect, but fluctuate across a range between 216V and 253V, and vary during the day too.

To determine whether it will work for a particular application, a detailed site survey needs to be conducted including a week long evaluation of the voltage and load Profile in order to determine the correct system size requirement and an honest appraisal of the potential for savings.

This site survey must include a unit by unit evaluation of all the equipment on site as savings are only available from those types of electrical equipment that are voltage dependent – and not on those that are voltage independent. Examples of voltage dependent devices would be incandescent lamps; T8 & T12 type fluorescent lamps, many motors and air conditioning units.

Voltage dependent devices consume power proportional to the supply voltage – the higher the voltage the higher the power consumption – and if you reduce the voltage you'll use less electricity. A 1% decrease in supply voltage will cause a 2% reduction in power demand - saving you money.

Voltage independent devices however, are designed to consume energy regardless of the supply voltage and with these savings are not possible. i.e. T5 and LED lighting, ICT equipment and VSD's.

Determining what these savings could be for a business requires this comprehensive site survey and evaluation of the mains voltage and load profile. It is only by doing this a proposed solution will confidently be considered 'fit for purpose'.

e-fficient Energy Systems has adopted a truly honest approach following this methodology recommended by the Carbon Trust, and will tell you if voltage management is or isn't right for you. Utilising its eVO+R voltage optimisation plus regulation technology you can be assured that the approach and technology provides the correct solution. Their refreshing approach is being welcomed by many companies who have been concerned by the over promises and under delivery they've seen over the past few years.

To find out whether voltage management can help you reduce your electricity usage and carbon footprint e-fficient Energy has recently launched a free site survey scheme to encourage companies to see if it will work for them.