the leisure review
an independent view for the leisure industry

The bottom line: coping with carbon reduction

Jeremy Dodge explains why facility managers looking for energy efficiency are becoming familiar with terms such as CRC and VOP.

It may be just three letters but CRC is set to have a massive impact on the thousands of leisure and sports providers throughout the UK. Their energy use thrown into sharp focus as the government strives to deliver on its carbon reduction targets. The Carbon Reduction Commitment Energy Efficiency Scheme, to give it its full title, applies to any organisation, including public sector bodies, that used more than 6,000Mwh of half-hourly metered electricity in 2008. That equates to annual power bills of approximately £500,000 or more.
Registration opened for the scheme in April and some 5,000 of the UK's largest companies, manufacturers, local authorities, hotel groups and retailers have received their 'welcome packs'; they must register by September or face potentially hefty fines.


Power bills of £500,000 or more a year: it's easily done

Registration is just the beginning. The stated aim of the CRC is to reduce the level of carbon emissions currently produced by the larger 'low energy-intensive' organisations by approximately 1.2 million tonnes of CO2 per year by 2020. As a climate change bill commitment, the scheme is aiming for a 60% reduction in CO2 emissions by 2050. It plans to achieve this by incentivising organisations to reduce their carbon footprint year-on-year. Those that perform well stand to receive cash bonuses while those with poor environmental performance will be financially penalised.

As with any new government scheme, there will be confusion and a settling in period but for those organisations falling within CRC's remit there is little choice but to comply and take immediate steps to implement a robust energy management schedule. Some exemptions are permitted, for example the holding of a large climate change agreement. But what constitutes an organisation and how does this apply to local authorities and other leisure providers with multiple sites? In company terms an organisation is the "highest UK parent". A good example is supermarkets – lots of individual sites but all coming under the umbrella of one company. The total energy consumption of each site (disregarding transport) counts towards the overall consumption of the company or organisation. This same thinking is applied to public authorities and leisure providers, so although each of their individual sites may not qualify in isolation, when totalled the overall consumption hits the CRC qualification bar.

"Quite simply there is no escaping the Carbon Reduction Commitment Energy Efficiency Scheme if your organisation qualifies for inclusion and failure to embrace the scheme could prove costly."

Quite simply there is no escaping CRC if your organisation qualifies for inclusion and failure to embrace the scheme could prove costly. Next year participating organisations will be required to buy 'carbon allowances' from the government to offset their CO2 emissions. Each tonne of CO2 will cost £12 during the first three years of CRC, estimated to be 6-10% of energy bills. Purchasing these allowances could leave a significant dent in business finances if they are not accounted for. However, for those that embrace the challenge to reduce power usage, there are potentially lucrative benefits. Achieving a reduction in usage will deliver a positive double whammy: not only will fuel bills fall (or at least be controlled if power prices rise) but your business will gain a better place in the all-important CRC league table. And that is important. Why? A fundamental of CRC is that all the revenue raised from the sale of carbon allowances will be 'recycled' or paid back to participants annually as a financial incentive to continue reducing emissions. These payments will be based on an organisation's position within the league table. The table will list every company participating in CRC, with each position carrying a different bonus or penalty rate; those at the top receive the highest bonuses and those at the bottom the maximum penalty. So doing nothing could prove more costly than taking action. Top achievers can expect not only to spend less on carbon allowances but also to receive a larger slice of the recycling payments. Organisations struggling to make change and coming lower down the table will face financial penalties.

CRC is complex and this article only gives a basic overview of the scheme. No doubt many will employ specialist energy management consultants to guide them through the process. The government has stated that some

20% of participants will be audited annually to ensure their figures are correct, so getting it right will be imperative. Year-on-year reduction of power bills is going to prove a challenge for all involved, particularly as the years tick by. There are endless methods for cutting bills, from the simple action of encouraging staff to switch off equipment and lights to self-generation of power through wind turbines, combined heat and power or photovoltaics. However, perhaps one of the more straight-forward, cost-effective and results-driven actions is the installation of a voltage power optimisation system, which could deliver a massive 20% or more saving. Such a system micro-manages the power supply to a whole site, reducing the amount of electricity used by floodlights, swimming pools, sports halls, etc.

Voltage optimisation, one of the fastest-growing energy saving techniques, is an established and proven science dedicated to matching power demands to the needs of electrical equipment. In the UK power is supplied at around 240V, significantly higher than electrical equipment requires, meaning that users pay for wasted power (energy delivered above optimum voltage dissipates as heat and vibration). Over-voltage also forces electrical equipment to run towards the top end of its tolerance, causing shorter equipment life and higher maintenance costs. Voltage power optimisation systems are installed in series with mains electricity and 'step down' the power to the lower end of the voltage band (typically to between 216V and 220V) but still within regulatory limits. In so doing reduce fuel bills and help prolong the life of equipment. In addition, these systems can also refine power quality and suppress power spikes or surges.

However, when considering investing in voltage power optimisation (VPO) it is imperative to understand exactly how each of the systems available work and to fully research the market, asking searching questions of manufacturers and requesting proof of fuel bill savings for individual projects. If possible, get in touch with end users of the systems you are considering and ask about the installation and commissioning process, and how much their electricity bills have been reduced by in real terms. Identifying the differences between systems is hugely important given the major strides that have been made in improving the performance of VPO units. Why specify or install 'standard' or older technology when the 'next generation' is available with enhanced technology that truly optimises a power supply rather than merely reducing it? The new breed of VPO systems have taken all the best features of the more established but older technology and added significant features to enhance performance. They can deliver between 17% and 25% savings on electricity bills, cutting costs and reducing carbon emissions. Compare that with older style VPO that, in practice, delivers between 8% and 12% savings. New generation systems are also being manufactured in the UK, allowing clients to work closely with manufacturers in order to achieve the perfect bespoke VPO solution rather than a 'one size fits all' approach.

So what's the secret behind this new technology? Quite simply, intelligent operation and logic-controlled, multi-level auto-transformers rather than standard step transformers. Power supplied from the mains, and power being drawn by the facility, are both monitored and better matched by the hi-tech VPO unit. The system will also even out peaks and troughs as mains supply fluctuates and switch to stand-by if mains supply dips too low or a 'brown out' occurs. This is an important point. Standard systems can continue working during a supply dip, automatically lowering the voltage further to a point where the building or facility can no longer operate. The better systems work around a supply reduction ratio of 1:0.92 (standard units work around 1:0.945). Further savings are achieved by reducing harmonic distortion, balancing the phases and reducing the power factor to lower maximum demand. They should also rotate transformers in order to prevent overheating and ideally incorporate self-coolers. If the system detects no power demand it switches off until demand returns and then steps in accordingly.

Compare this with standard optimisers that simply reduce incoming power levels to cut energy bills. At times they can draw more power than a building requires and may switch off during a brown out, interrupting the power supply. In addition, poor surveying or limitations in equipment design can result in fixed-ratio equipment being applied to a lower voltage incoming supply, reducing the outgoing supply to unacceptable levels.

VPO has the potential to underpin all energy efficiency programmes and is a relatively straight-forward way to deliver savings to meet the demands of CRC. Interest-free Carbon Trust loans are available to cover the cost of the investment, with payback generally within three years, after which savings made on power bills go straight on to a company's bottom line.

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