A simple idea that is **transforming power management**

The rapid growth in renewable energy is widely seen as good news for the planet but it may not be such good news for your plant.

"The powerPerfector is effectively a giant universal adaptor for your whole energy supply, delivering a precise voltage and cleaning up unwanted power quality issues."

That is the warning from Nick Phillips, Sales Manager of Intelligent Energy Saving Company (iESCo), who works with a range of organisations nationwide to improve their energy efficiency.

The problem, says Nick, is that renewable technologies introduce a wide range of power voltages to the Grid and the resulting inconsistencies caused by spikes and sudden reductions in supply create wastage and pose problems to businesses connected to the National Grid.

Nick, who is based in Canterbury, said: "Two thirds of all new global power generation in 2016 was produced by renewable sources, which is a great indicator that renewables are fast becoming the cheapest form of energy in many parts of the world.

"This is a great achievement and a real reason to feel positive about how the world is adapting to the requirement of a low carbon economy. However, the rapid uptake in renewables has caused a headache for the National Grid, who must now balance multiple forms of generation in real time. It is a problem around the world as well."

Another problem, he says, is a historic one; many people are still unaware that the UK voltage of 240V is too high for most equipment – they just switch on the power and think no more about it – but over-voltage leads to energy wastage and reduced equipment lifespan and it is the UK consumer who pays for those losses.

"As an example, there is no greater torque from a motor when running it at 240V. It remains operational but the higher voltage will lead to a saturated magnetic core, leading to heat loss and wasted energy. LED drivers are particularly sensitive to over-voltage which reduces their life considerably.

"It has been difficult for the Grid to turn down the voltage due to the way our Grid was designed. Voltage levels are a bit like water pressure from your garden hose; the pressure drops over distance, so if you turn down the voltage at the point of generation, the voltage at the farthest point of the network may fall below the minimum permissible voltage level of 207V.

"The voltage remains high to keep the network operational so there is a gap between the optimum voltage for equipment and the voltage that is provided. Now add into that the inconsistent supply from renewable energies and you have a problem."

What was needed to tackle both problems was a device that can equalise voltage, which is why iESCo developed powerPerfector technologies, which act as an adaptor to level out power output and reduce wastage.

iESCo's powerPerfector iQ, which is based on technology created in Japan in the 1990s, bridges the gap between the raw power from the networks and the ideal level for a building's equipment, allowing for a much smoother regulation.

Nick said that a one-off installation generates an average 8% reduction in energy bills and allows considerable extensions to the lifespan of electrical equipment.

He said: "The powerPerfector is effectively a giant universal adaptor for your whole energy supply, delivering a precise voltage and cleaning up unwanted power quality issues."

Many Kent organisations already have powerPerfector units installed, including Dover Castle, Canterbury City Council, Kent City Council and Canterbury College.

The technology has also been widely rolled out to supermarket chains, hotel chains and half of all UK Local Authorities.

Nick, who has worked with green technology for nine years, said: "The powerPerfector iQ is an evolution in voltage management. It is the fastest and most accurate form of voltage control available with response times of under 0.5 seconds and the ability to boost voltages by up to 15.%.

"The technology is something that has never been available to buildings anywhere in the world before.

"iESCo can provide a stable voltage output on all three phases within 0.1V of the desired level. This ability greatly boosts the opportunity for energy savings and provides much needed protection from the growing voltage volatility caused by the boom in renewables.

"The technology is so effective that the National Grid have been investigating its potential for assisting with wider grid stability.

"The powerPerfector iQ recently passed an RFQ from the National Grid who were looking for equipment that could help them to balance network power. The astonishing thing about our inclusion in such schemes is that we are the only people who can turn power up and down without actually turning anything on or off.

"iESCo have effectively invented a volume control for your building's power supply."

The company is also talking to UK Power Networks, which owns and maintains more than 180,000 kilometres of electricity circuits and nearly 120,000 transformers, which they use to distribute electricity to customers across an area of almost 29,000 square kilometres.

Nick sees major international applications, too, and the company is talking to companies in countries including India, Malaysia and South Africa where the key problem is providing a reliable power supply.

He said: "It is not just the UK and other 240V grid systems that have the opportunity for savings via the powerPerfector iQ; the opportunity for us is very much global.

"The rise of renewables is causing Grid operators headaches all around the world. The live balancing of multiple power sources leads to the widespread increase in voltage levels.

"Switching between these sources causes frequent transient spikes which cause nuisance tripping at best and equipment damage at worst.

"The demand for this sort of technology is growing. It is a simple concept delivered by complex technology.

"There is also great potential internationally for our technology. For example, we were recently invited by the Carbon Trust to present our technology to a delegation of Manufacturers in New Dehli. There was great interest because motors are constantly being refurbished due to damaging transient power spikes from the Grid.

"A huge amount of R+D has gone into making this product possible so we are extremely pleased that the iQ is delivering such great results."

"Our 100th installation was at the Poppy Fields Pub in Maidstone. We continue to use this technology as a standard fitting into all our new builds."

Andy Kershaw
Head of Group Facilities & Taverns Projects
Marstons Inns

"In addition to the energy savings, we have noticed a marked improvement in the longevity of our lighting. The powerPerfector project at our Eastbourne site was selected for a global EHS excellence award within the company. Nick and the IESCO team have been knowledgeable and professional throughout. We are now looking into further projects with IESCO."

Gary Reynolds
Senior Facilities Engineer
Technical Operations Europe
TEVA Pharmaceuticals Industries Ltd.

"Whitbread have installed powerPerfector technology into 125 buildings over the last 18 months. We are happy with the results and continue to work closely with the IESCO team."

Matt Dolan
Energy Manager
Premier Inn & Restaurants UK
Whitbread