

# Transforming power management

Dr Alex Mardapittas, CEO of smart energy solutions provider Powerstar, discusses how undertaking power management with smart distribution transformers can result in energy savings and greater insights across process and manufacturing environments.

**W**ith energy prices continuing to rise, the sting of which is being felt strongest by high energy users, businesses across the UK are exploring how they can refine their power management efforts to reduce electricity consumption and costs. This optimisation of energy use takes on greater importance when set against the backdrop of Industry 4.0, the next phase in the digitisation of the manufacturing sector, which is introducing increasing amounts of technology and automated processes.

While many assets have modernised to deliver insights into how effectively, or efficiently, they are performing in this new era, critical energy infrastructure assets, like distribution transformers, have only recently begun this transition to become connected through the advent of smart transformers.

As many large process and manufacturing businesses own and operate their own high voltage infrastructure, upgrading ageing transformers with smart transformers can offer significant benefits, particularly when coupled with voltage management.

## Core differences

A key advantage that upgrading ageing transformers provides over traditional transformers is the heightened efficiencies. This is no surprise given the rate of technology change, and the long lifespan of transformers, which can be up to 50 years. While older transformers were designed with environmental standards in mind, quality measures have advanced, meaning today's transformers are required to meet higher standards to be viewed as efficient technology.

Smart distribution transformers, such as Powerstar SO-LO, utilise amorphous alloy as the core material which is more efficient

than traditional transformer core materials such as cold rolled grain oriented (CRGO) silicon steel laminations. The super low loss properties of the core are due to its flexible internal structure which means that it can switch magnetisation and demagnetisation at a faster rate than CRGO, resulting in up to 75% lower core losses compared to CRGO transformers.

## A smart approach

Despite their nature as critical electrical infrastructure, with distribution transformers often being energised continuously, traditional transformers have been left offline not connected to smart systems, leaving them behind as other energy assets modernise. Therefore, the remote monitoring capabilities present in smart transformers makes viewing performance and operational information far more accessible to businesses as it can be done from anywhere with a secure internet connection.

The remote monitoring allows for any potential issues to be identified and dealt with before the impact is felt, through either internal performance assessments or an automated warning system. Additionally, through the insights, a comprehensive energy profile of the site can be developed, and further potential optimisations can be identified.

## A complete solution

While upgrading a distribution transformer to a smart transformer can generate roughly 1-3% savings on a site's electrical consumption, efforts can be heightened by deploying it alongside other smart energy technologies such as voltage optimisation (VO) technology.

To optimise the voltage supplied to the level required for on-site electrical equipment and appliances, VO regulates, cleans and conditions the incoming power supply.



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CEO of Powerstar

As electricity is often supplied as a voltage higher than necessary, VO substantially reduces wasted energy, excessive levels of carbon emissions, and inflated electricity bills. Power quality issues, including increased wear and reduced lifespan of electrical equipment, can also be avoided.

The result when incoming voltage is optimised to a level closer to the design characteristics of on-site electrical equipment is consumption savings of around 8-12%, which will equate to significant savings on electricity costs and carbon emissions.

By considering a complete solution, energy intensive environments will benefit hugely from reductions in electricity consumption, and consequently electricity costs across the business by implementing smart energy technologies, while enabling greater insights into site-wide energy use for heightened understanding and management.

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