

# The issues that really concern UPS users – and how suppliers are providing the answers

*UPS systems have become essential components of data centres' power protection policies, but what do their users need from them most? A recent survey conducted by Uninterruptible Power Supplies Ltd investigated this. By reviewing the results, and comparing with available UPS technology and vendor support, we can gain useful pointers on how to choose a UPS vendor and configuration best suited to today's environmental, business and technical pressures.*

Computer hardware has evolved from a useful productivity aid to an online ICT resource essential to most organisations' survival. The role of Uninterruptible Power Supplies (UPSs) has accordingly become critical in protecting this resource from the threat of mains power disturbances and blackouts. Yet even while UPSs assume this increased responsibility, their users need them to do so more reliably, more efficiently, more cost effectively and more flexibly and than ever before. Uninterruptible Power Supplies Ltd recently conducted a survey to investigate exactly which power issues concern data centre operators the most, and how they expect their UPS suppliers to respond. A look at the survey results and respondents' priorities, as well as how UPS technologies and suppliers are providing the answers, offers pointers for achieving future-proofed UPS configurations best suited to today's business and technical pressures.

Reliability is absolutely key because while loads have rapidly grown and become more critical, electrical mains power has become – and is seen to be – less reliable, and worse is expected in the years to come. Over 75% of the survey respondents reported that their UPS system was called upon to protect critical equipment during a power outage within the last 12 months, while 78% believe the situation will worsen over the next ten years. There is good reason for this belief, as 19 GW of generating capacity will be lost by 2018 as coal, oil and nuclear power stations close. Timely replacement of this with power sources compliant with 'green' legislation will be 'challenging' according to the Department of Energy and Climate Change. This could lead to power rationing or blackouts.

Rising energy costs are also of major concern to 80% of recipients as they feel the dual impact of escalating demand and higher per-unit costs. Reduction of carbon footprint is also a growing priority, mainly driven by legislation such as the CRC Energy Efficiency Scheme which will damage the finances and the reputations of organisations not implementing adequate green policies. The survey shows that currently 63% regard cost reduction as their driver to reduce power consumption, while 27% are driven by carbon footprint reduction. Users' purchases of capital equipment are affected, with 82% of respondents regarding energy efficiency as a key buying consideration. This includes UPSs, as nearly 54% report that modern UPS systems, designed and manufactured with environmental considerations at their core, have significantly improved power consumption and cooling issues within their organisation.

Transformerless technology lies at the heart of modern UPS design. Its immediate impact is to improve energy efficiency by around 5% across the UPS's whole load span. This substantially

reduces energy and cooling costs. Transformerless UPSs also present a higher and more stable input power factor, which reduces input current and sometimes electricity costs.

Transformerless implementations bring many other benefits through their reduced size and weight. A 120 kVA UPS, for example can be implemented as a 370 Kg unit with a 0.53 m<sup>2</sup> footprint instead of an installation with a 1.32 m<sup>2</sup> footprint weighing 1,200 Kg. This has enormous implications for power protection, because UPS systems can become sets of rack-mounting modules operating in parallel rather than monolithic floor standing units. Such configurations improve reliability through improved resilience to failure and improved availability.

Resilience to failure arises because these rack mounting modules can easily be built into an N+1, or even N+N, redundant configuration. For example a 100 kVA load could be supported by a modular UPS comprising six 20 kVA modules. The UPS can fully support the critical load even if one module fails: In this way, the UPS is resilient to failure. The modular design also increases UPS availability because a faulty module can be quickly replaced, typically within about half an hour, compared with the six hours typically needed for component level diagnosis and repair. Modules can also be 'hot swapped', without needing to divert the critical load onto raw mains. Availability is defined by the relationship between Mean Time Between Failures (MTBF) and Mean Time To Repair (MTTR), so reducing MTTR increases the UPS's availability. Transformerless systems also improve battery reliability through using a DC – DC battery charger which eliminates AC ripple – a prime cause of premature battery failure.

Although these hardware improvements are welcome, users believe the overall reliability of their UPS resource is governed by the quality of the UPS supplier's total package rather than just that of the hardware. Over 90% of the survey's respondents believe that maintenance and emergency call out services are as important as the hardware itself to their business. In fact service quality becomes a factor even before the UPS hardware is selected. Vendors should be competent to advise on and offer UPS configurations efficiently matched to users' needs rather than just selling catalogue stock products. Clearly, the UPS capacity must be adequately rated for its task, including redundancy provision. However because modular system capacity can easily be incremented if the load grows, oversizing is unnecessary and will incur capital and operating cost penalties.

After installation, users should arrange a support package comprising both scheduled maintenance and assured emergency response. Scheduled maintenance will minimize the need for emergency callouts by spotting deteriorating components for replacement before failure. As a complete power protection installation often extends to a UPS, batteries and generator, it makes sense to use a single supplier who understands all of these, how they interact with one another and accordingly how to provide an integrated power support strategy. International standards exist to define different aspects of service quality, and it is useful to ask if prospective UPS suppliers are certified for these. BSI EN ISO 9001:2008 covers quality management, ISO 14001 covers environmental management and OHSAS 18001 is for health & safety management. These certifications not only indicate service quality; they also demonstrate that

the supplier can manage the UPS user's environmental and health & safety obligations during the equipment's operational life and eventual disposal.