

Centiel's Li-ion Solution has Arrived

The potential introduction of Lithium ion (Li-ion) batteries for UPS systems has been much debated in recent times. However, the fact is that advances in technology have now reached the point where Li-ion is a safe and commercially viable option, to protect the power for critical installations. Ahead of Data Centre World London, CENTIEL's design team; who were originally at the forefront of the industry to develop the first three-phase transformerless UPS and now the fourth generation of the technology, has announced the launch of our Li-ion UPS solution. In this article, we aim to address some of the misconceptions surrounding Li-ion and by putting the record straight, explaining why Li-ion may well be the battery technology of the future for many years to come.

CENTIEL's Li-ion solution is already being installed by our most forward-thinking clients, who are looking to capitalise on the advantages that Li-ion has over lead-acid batteries, namely: smaller, lighter, high power density, have a longer life and operate at higher temperatures.

We anticipate that a significant industry changeover to Li-ion will most likely be over the next five years, but unlike CENTIEL's technology, not all UPS systems on the market are compatible. Not all systems are Li-ion ready, but they need to be.



Cost

One of the main drawbacks of switching to Li-ion up until now has been the cost. However, prices are being increasingly driven down by the automotive industry and have reduced significantly over the past ten years. Increasingly we are being asked to provide comparative quotes for Lead Acid versus Li-ion batteries for UPS installations. Depending on the project, we are generally finding the initial CAPEX cost of buying Li-ion compared with Lead Acid batteries works out at around twice as expensive. However, Li-ion lasts twice as long and so considerations relating to total cost of ownership (TCO) have now started outweighing concerns about the initial investment.

Fire Risk

Li-ion batteries had their origins in the early 70s. Continued growth and development has been driven by laptops, then mobile phones because we all want our electronics to be smaller, cheaper, more powerful and operate for longer periods. These days, progression is such, Li-ion is being used to power our electric cars. There are some publicised stories about the fire risk of Li-ion technology over the years. However, any technology which is not managed correctly is potentially hazardous. If the proper procedures are not followed it is dangerous to drive a vehicle, fly a plane or even just cross the road!

Li-ion batteries are more sensitive to how they are charged and discharged and therefore need to be linked to a monitoring and control device. CENTIEL's Li-ion battery monitoring system collects and reports data in real time. This system provides early warning alarms ahead of any issues and automatically shuts down faulty cells if necessary. With Lead Acid, you may only know there is a battery problem when you need to use it and if it doesn't work then it's too late!

In addition, the more modern Li-ion batteries have been developed with a 'belt and braces' approach and can include numerous further safety features such as: steel containers, internal separators that melt at high temperatures to shutdown conductivity, current collects from opposite end of its pack ensuring there are no hotspots at high current density areas, and improvements to cathode material which is more stable during overcharge.

Every battery including Lead-acid batteries are a potential hazard but managed correctly, Li-ion technology has now been developed to be safe to use in Data Centres and other facilities requiring critical power protection.

Size

Li-ion batteries typically require less than half the physical space of the equivalent Lead Acid blocks and less than 25% of the weight. Commonly, above ground-floor installations can require structural strengthening of the building simply to house the required battery systems. Logistically, moving many tonnes of equipment in and out of an upstairs comms room, when batteries need replacing, can also present challenges. For data-centres looking to increase their power density within the same foot print Li-ion promises a practical solution.

Length of Life

One of the main benefits of Li-ion is length of life. Ten-year design life Lead Acid batteries are normally replaced every seven or eight years. With Li-ion this is 13-15 years.

Efficiency

Switching to Li-ion could also improve the overall efficiency of the comms room. This is because a further advantage of Li-ion is that it can work at a higher temperature, therefore requiring less cooling, reducing the amount of overall energy consumed. Most IT systems work at >25°C and the UPS technology itself can work well up to 40°C. By contrast: an industry standard estimate is that for every 10 degrees above 20°C the operating life of a VRLA battery is halved. With growing concerns about reducing the carbon footprints of datacentres, being able to decrease and remove the electricity requirement for cooling could become an increasingly attractive and important consideration.

Roll Out

The up-take and roll-out of Li-ion across the datacentre industry will not happen overnight. Not all systems are Li-ion ready, manufacturers of UPS equipment need to ensure their technology is compatible and can 'talk' to the Li-ion battery monitoring system.

Interestingly, the adoption of Li-ion within UPS systems so far, has been greater in developing countries in Africa and the Middle East, where the main power grid is less reliable than in the UK and frequent power problems are more commonplace. In these instances, the UPS and battery systems are required to be cycled several times per day. This greater adoption is primarily due to the higher cycling life of Li-ion: typically, 2,500 power-up and down cycles compared with around 300 for VRLA technology.

Over time, we believe, there will be an inevitable shift towards Li-ion batteries as further cost reductions driven by developments in the automotive industry, flow through to the standby power sectors. Incorporating Li-ion will inevitably reduce the size and weight of UPS systems overall and the longer useful working life of Li-ion will mean fewer costly replacements. All of which will benefit customers with reductions in both CAPEX and OPEX and make Li-ion batteries a winning solution for UPS applications requiring compact, innovative protection.

In our ever-evolving world, future-proofing systems is one of the greatest challenges faced by system designers. The good news is that CENTIEL's technology is already Li-ion Ready, so existing lead acid battery installations will have the option to upgrade to Li-ion in the future without needing to replace the UPS.

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