Advanced energy storage technologies offer economic and energy-efficient back-up power options

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Technical Insights advanced energy storage technologies analysis

Back-up power users such as manufacturers and utility providers are reluctant to move to advanced energy storage technologies from traditional lead-acid batteries. **Unfamiliarity with new technologies and higher initial costs hold them back in spite of the significant advantages** – including greater reliability and efficiency – that the emerging technologies can offer in the long run.

Nevertheless, with the rapid increase in the use of notebook computers, cell phones, and other small, portable wireless devices, advanced energy storage options, especially lithium technologies, are taking over in the small devices markets that can afford them.

High costs of production affect the application of technologies such as lithium-ion and sodium-sulfur batteries for the multi-kW markets. In spite of offering high power and energy density and efficiency, they have not yet been widely adopted in larger markets such as remote power and utility support.

"But, environmental issues are now coming into play in the selection of advanced energy storage technologies," notes Technical Insights Analyst Miriam Nagel. "Environmentally friendly technologies such as flywheels and ultracapacitors – also called supercapacitors – may soon get a lot

more consideration in the energy storage markets."

Ultracapacitors have close to 100 percent efficiency and can be recycled up to 500,000 times. The introduction of standard battery-sized ultracapacitors is a move that has the potential to significantly improve market acceptance of ultracapacitors in a variety of applications, including hybrid electric vehicles (HEVs).

Until now, the biggest hindrance to ultracapacitor mass adoption has been the high costs of integrating them into designs. However, the standard sizing offers an economic power delivery device for seamless and rapid integration into a variety of applications. These ultracapacitors can be produced at half the cost of the earlier version and the savings are likely to be passed on to original equipment manufacturers. One environmental issue is disposing batteries that use toxic materials such as lead and cadmium. The European Commission's recent Battery Directive provides stringent measures for the collection and recycling of all types of batteries, particularly nickel cadmium.

"Some environmental issues can be resolved in applications such as backup for remote power and renewable energy sources like wind and solar by using flywheels or redox flow batteries as an alternative to traditional lead-acid batteries. They offer more energy storage without the environmental problems created by the lead-acid technology," notes Nagel.

No single technology suits all applications in the energy storage market. Applications call for devices ranging in size from button batteries, to 1300-ton battery modules used for grid stabilization.

"Of the ten advanced energy storage technologies, eight have applications in storage for electric power utilities at some level of development, aiming to provide reliable, economic, and energy-efficient

power back-up options," concludes Nagel.

Advanced Energy Storage Technologies, part of the Energy Vertical Subscription Service, underscores new and influential developments in the power back-up industry. While the principal focus of the research is on technological advances, it also identifies key companies and developers, and provides estimates of timelines for commercialization of the technology. Executive summaries and interviews are available to the press.

Source: Technical Insights