Battery Electricity Storage for Quality Power

Batteries ensure continuous power to keep pollution control equipment working

Battery electricity storage is now proving its worth at one west coast facility. A 3.5-megawatt valve-regulated lead-acid (VRLA) battery system installed at a lead recycling plant in California provides one hour of energy storage for both peak-shaving and uninterruptible power.

The system, using a low-maintenance VRLA battery, was developed through the Energy Storage Systems (ESS) program at Sandia National Labora-tories, GNB Technologies, and General Electric. It incorporates improvements in battery materials, manufacturing processes, and quality control.

Through an investigation managed by Sandia National Laboratories, GNB Technologies analyzed a variety of lead electrode compositions and developed manufacturing techniques to increase the

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Highlights

- ***Commercial benefits include uninterruptible power and peak shaving to decrease electricity demand charges. The system can store off-peak power to dispatch during the periods of greatest demand.***
- ***DOE provided technical and financial support for development of the valve-regulated lead-acid (VRLA) battery. The battery is now a commercially available technology with sales of more than $10 million per year.***
- ***The uninterruptible power supply ensures that the environmental controls continue to operate during power outages, minimizing pollution and the plant's costs resulting from nonattainment violations.***
- ***The plant now has the capability to run at full capacity for a short time during a power outage, enabling plant managers to contact the utility to determine the expected duration of power outage and giving them operational options.***

GNB Technologies

This foreground room, lined by the power-conditioning system and controls, leads to a room containing banks of batteries capable of providing 3.5 megawatts at the GNB lead-recycling plant in Vernon, California.

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This is the first battery energy storage system designed to provide both peak-shaving and uninterruptible power for a reliable electricity supply.

density of the active materials in the positive and negative electrodes of the VRLA batteries. This development helped the VRLA batteries achieve a 15% greater energy output compared to lead-acid batteries of the same size. GNB also developed an improved rubber formulation for sealing the vent valves while achieving high resistance to the battery's acid environment. Sandia National Laboratories tested the batteries to verify their performance characteristics.

The partnership between GNB Technologies and General Electric was an outgrowth of the ESS program's initiative to form industry teams to develop "off-the-shelf," turnkey battery storage systems.

The GNB Lead Reclamation Facility processes more than 10,000 used lead-acid batteries per day and reclaims 97% of the lead. Even brief interruptions in power supply created problems as they caused plant pollution-control equipment to fail and emit lead particulates, resulting in high penalties for nonattainment.

The battery energy storage system was designed to ensure constant operation of pollution control equipment. But it also provides peak-shaving capability for the plant during peak demand periods, can carry critical loads so the plant can continue operation during brief power outages, and enables GNB to sell power back to the electric utility.

Project Partners

U.S. Department of Energy

General Electric Company

GNB Technologies

Sandia National Laboratories

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