

Grid-Saver™ Provides Flexible, Low-Cost Option for Stationary Energy Storage

November 2014

Fact Sheet

The Issue

There is increasing awareness of the need for deployment of utility-scale fast energy storage systems to help stabilize the electric power grid. This need becomes more acute as states such as California and Hawaii install large amounts of wind and solar power, which are intermittent sources of energy that can create large and sudden changes in grid voltage and frequency which can disrupt power delivery to ratepayers.

Grid stabilization has traditionally relied on maintaining spinning reserves at “peaker plants” which can ramp up or down to meet changes in demand. However, these plants are expensive and inefficient. Alternative energy storage systems are often large and require massive permanent support infrastructure, and some systems using batteries and flywheels have raised safety concerns. This points to an increasingly urgent need for safe, flexible, affordable energy storage solutions that can provide large amounts of power within very short intervals.

Project Description

In response to these needs, TransPower carried out the three-year Grid-Saver™ proof-of-concept demonstration project, completed in November 2014. With funding from the California Energy Commission and test support provided by Sandia National Laboratory, this project resulted in development and demonstration of a safe, modular battery energy storage system capable of

addressing a wide range of stationary electricity storage needs at a lower cost than competing alternatives. Pictured below is a 1 megawatt (MW) battery system capable of storing more than 600 kilowatt-hours (kWh) of electricity, which was built during the Grid-Saver™ project and successfully tested for several months at Sandia.



1 MW prototype Grid-Saver™ energy storage system.
Source: TransPower.

The Grid-Saver™ system has the following features:

- Large format lithium-ion batteries offering high energy density, large safety margins, and lower costs than competing advanced battery chemistries.
- An advanced battery management system to help maximize battery life and minimize system maintenance costs.

- Advanced inverters featuring proprietary technologies to reduce the size and cost of power electronics.
- Modular approach to grouping batteries and inverters, enabling assembly of systems capable of meeting a wide range of power and stored energy requirements.
- Central controls and communications protocols that facilitate both demand response applications on the customer's side of the meter, and grid-scale applications on the utility's side of the meter.

Two prototype energy storage systems were built and tested during the Grid-Saver™ project, a 500 kW prototype system installed and tested in a 20-foot trailer in 2013, and the 1 MW system that was tested by Sandia throughout the second half of 2014. This testing validated the readiness of Grid-Saver™ systems to be deployed commercially to meet urgent energy storage requirements.

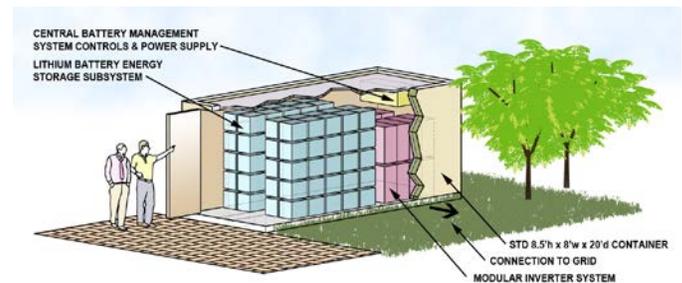
With its modular design, Grid-Saver™ systems of different sizes can be assembled quickly, and smaller scale systems can be integrated into standard containers for rapid deployment or temporary applications.

Anticipated Benefits for California

By making battery energy storage systems easier and more cost-effective to use for a wide variety of stationary applications, Grid-Saver™ will help meet the California Public Utility Commission's mandate for deployment of 1,325 MW of new energy storage capacity in California by 2020. Since this requirement is driven in large part by the State's 33 percent renewables penetration scenario, Grid-Saver™ will help enable the integration of renewable resources into California's electrical grid. Grid-Saver™ can benefit California ratepayers by improving the efficiency of the grid in various ways, including:

- Reducing reliance on "peaker" plants, which are inefficient and reduce turbine life.
- Improving grid stability, reducing the likelihood of costly power outages.
- Enabling commercial customers to avoid costly demand charges.

Grid-Saver™ support for renewables integration and displacement of peaker plants also offers the broader public benefit of reducing emissions of greenhouse gases and criteria pollutants.



Artist's concept of commercial Grid-Saver™ system installed into a 20-foot long container.
Source: TransPower.

Project Specifics

Contract Number: 500-10-058

Contractor: Transportation Power, Inc.

City/County: Poway/San Diego

Application: Statewide, Nationwide

California Energy Commission funding: \$2,000,000

Co-funding: \$623,199 from TransPower, (cash and in-kind)

\$190,814 from EPC Power Corp. (in-kind)

Term: December 2011 to December 2014

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