Battery Storage Project
at Fort Hunter Liggett, CA

"The Army is focused on five goals: reducing energy consumption, increasing energy efficiency across platforms and facilities, increasing our use of renewable and alternative energy; assuring access to sufficient energy supplies today and in the future, and reducing adverse impacts on the environment"

Katherine Hammack, Assist. Secretary of the Army for Installations, Energy and Environment (www.army.mil/article/60310/)

Project Background

Fort Hunter Liggett, one of the pilot sites of the DOD net zero energy initiative, has installed two 1 MW solar Photo Voltaic (PV) systems with a third being planned in 2014.

While these PV units, which operate in net-metering mode, have helped reduce FHL's dependence on PG&E, the interconnect agreement limits the maximum power exported to 1 MW. This means curtailing the PV output. Also, the PV system, given its inherent variability, cannot reduce the demand peak charges, as demand does not always coincide with peak PV output. Further, PV can operate only when connected to the grid, rendering PV inoperable during a power outage.

To address the above shortcomings and to maximize the returns on its renewable investment, FHL is currently implementing an Energy Storage System. This system is designed to demonstrate functionalities such as energy shifting, demand charge management and islanded operation with significant PV output.

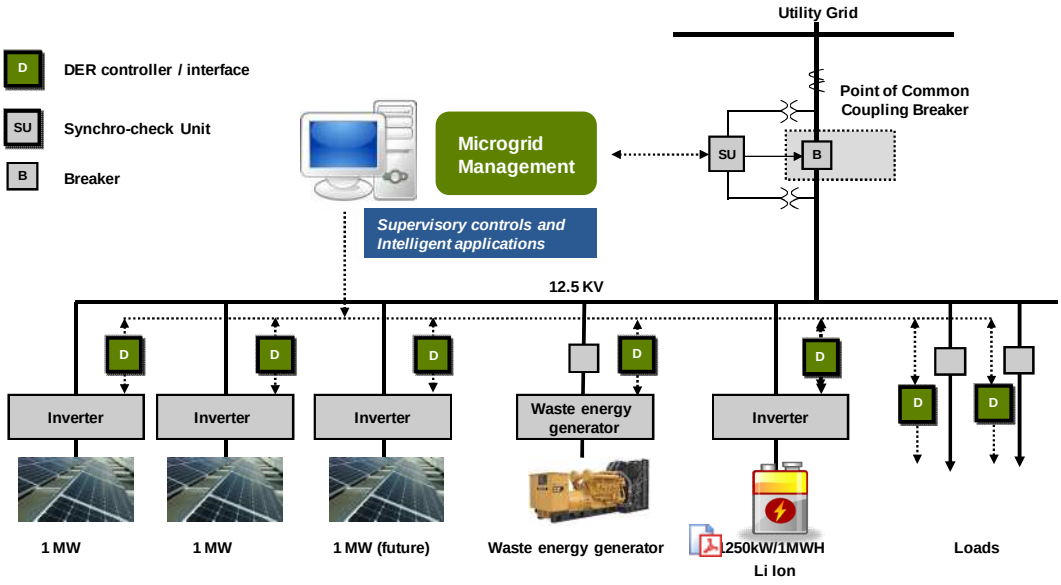
Project Scope and Deliverables

Tri-Technic, as the prime contractor for the project, is responsible for the design, engineering, procurement, delivery, installation and commissioning of the entire system. Key components come from established suppliers - SAFT for the batteries, Siemens for the inverters, and LBNL for the Microgrid control system.

The Lithium Ion Battery Energy Storage System from SAFT is rated for 1 MWh of energy with 1.25 MW of discharge power. It is a fully assembled unit comprising two containers, each rated for 500 KWh. It uses SAFT's VL41M medium power cell, a large-format Lithium Ion Nickel Cobalt Aluminum (NCA) cell, that is the building block of the Synerion 24M module.

Battery units are connected to the grid through two 630 kW Clean Power Converters from Siemens. These inverters decouple the generating sources from the grid ensuring that the energy sources can always be kept operating at the optimum level. The built-in droop control functionality helps maintain power balance during islanded operation.

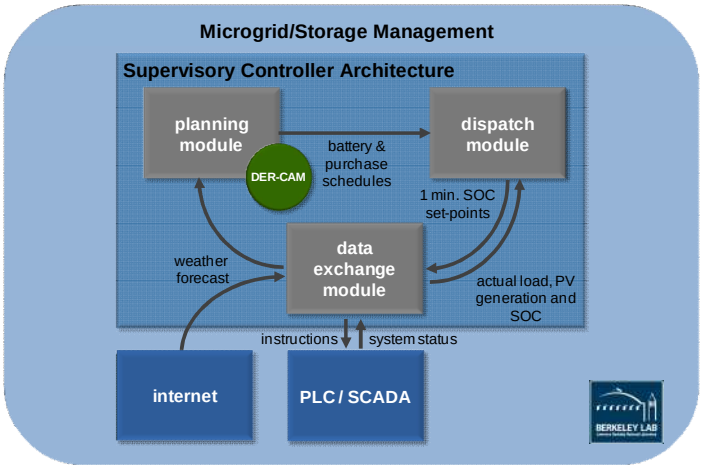
The project requires a high-level supervisory controller to plan, schedule and control the PV Storage resource. This is intended to be handled by utilizing the LBNL-developed Distributed Energy Resources Customer Adoption Model (DER-CAM). DER-CAM will employ forecasters that are constructed for this project using site-specific data effectively predicting day-ahead building load and available generation from PV. A real-time control algorithm ensures an efficient balance of supply and demand.

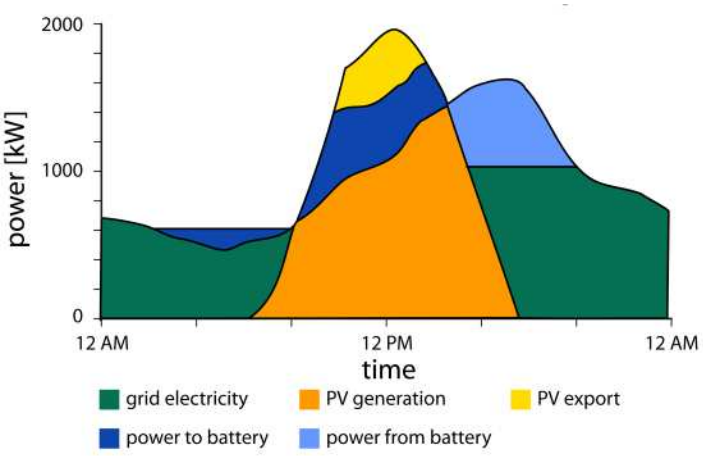


Storage to Microgrids - planned extension

"The battery storage project is vitally important for our energy security and microgrid strategy, because it is one of the dispatch strategies we will use to isolate our grid from the utility provider"

Todd Dirmeyer, Energy Manager Fort Hunter Liggett, CA





Enabling Smart Grids

Smart grids of the future will have to look at management of centralized and distributed intermittent sources of renewable energy such as wind and solar power. They will need mechanisms to maximize their use while limiting any impact from their intermittent availability.

The answer to this lies in storage systems. Such systems also enable islanded operation of renewable energy-based microgrids, which is key to achieving energy security. Storage systems and microgrids allow consumers to become producers and export their excess power, enable multidirectional power flow from many different sources and facilitate the integration of real-time pricing and load management data.

Tri-Technic has long been at the forefront of smart grid development and is currently involved in numerous projects in the transformation of existing power networks to smarter networks.

"The grid energy storage unit functions like a big battery, storing electricity generated by Fort Hunter Liggett's solar power field when power generation is higher than demand. The stored energy can be used later, when the solar panels are not generating power."

Jerry Iacopini, Sacramento District Project Manager.

"DOD/DOE maintains high energy goals to reduce energy consumption, create energy independence and save money. The application being designed and built at FHL is a robust system that will benefit the base by allowing them to better utilize energy from the renewable energy systems and also save money by peak shaving and reducing the demand charges. The BESS will improve energy security and is one of the key components needed to eventually implement a microgrid."

Lars Lisell, Engineer, National Renewable Energy Lab.

- **ARRA funded project fulfilling "Buy America" requirements**
- **Commercial scale behind the meter battery storage project**
- **Li Ion battery technology designed for 20 year battery life**
- **Applications include energy shifting, peak load shaving and energy arbitrage**
- **System designed to support islanded Microgrid operation with significant PV penetration**

Power Vs. Energy

Storage Application Spectrum

Power Intensive:
Frequency Regulation; Network Stability

Energy Intensive:
Peak Load Shaving; Load Shifting

Tri-Technic, Inc.
Corporate Office: 185 S. Fairview Ln.
Sonora, Ca. 95370 USA
Phone: +1 (209) 599-6000
Fax: +1 (209) 694-8248
Web Site www.tri-technic.com

Contact: Michaelyn Sanders
+1 (209) 599-6000 x114
info@tri-technic.com