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an EnerSys company

Florida Solar Energy Center

SOLAR + STORAGE CASE STUDY

SYSTEM SPECIFICATIONS	
Location	101 Emergency School Shelters, Florida
System Power	10kW per system
Components	• (2) FX inverter/chargers • (2) FLEXmax charge controllers
Power Sources	PV array and backup battery bank
Energy Savings	~$1,500 USD/year

OVERVIEW

The Florida Solar Energy Center (FSEC) was founded in 1975 by Florida's state legislature to serve as the state's energy research institute. The center's main responsibilities are to conduct research, test and certify solar energy systems and develop educational programs. The State of Florida funded the SunSmart Emergency Shelter Program (E-Shelter) with help from the American Recovery and Reinvestment Act (ARRA). Criteria for the grant included providing backup power to schools designated as emergency shelters in high-risk locations for disasters such as hurricanes.

Previously, the SunSmart Program provided one or two kilowatt (kW) solar demonstration systems. Currently, 10kW PV systems support emergency shelters and provide educational opportunities for science, technology and mathematics curriculums in elementary, middle and senior high schools, as well as vocational schools and universities. Systems commissioned as part of this program allow students to develop critical thinking skills, analyze data and compare findings with other schools throughout Florida.

The SunSmart Program began in 2003 primarily as an educational program for demonstration projects at schools. This federally funded E-Shelter program requires that installed solar equipment meet specific criteria, such as being manufactured in the United States and having three-phase operation to balance the different energy flows from the photovoltaic (PV) array, the utility and the batteries.

These systems require the ability to sell electricity back to the utility during normal operation and provide critical backup power during an outage, disconnecting from the grid for safety reasons. To continue to operate during outages, this grid/hybrid design features battery backup for emergency power.

CHALLENGE

- Provide uninterrupted power in the event of an outage or emergency
- Harness solar energy to provide cost savings and subsidize electricity for schools
- Function as an educational tool through reporting scientific data for analysis by students

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SOLUTION

Participating schools received OutBack's FLEXware control units with 3600W of OutBack FX Series inverter/chargers and FLEXmax charge controllers. These systems were custom-designed to meet federal specifications of the shelters. Both phases of the project, funded by the U.S. Department of Energy ARRA and local utilities, use OutBack Power equipment for emergency power and education for a total of 101 school shelters in Florida.

This PV system design allows the participating schools to sell excess electricity to the utility company during normal operation. Presently, the PV systems are ground-mounted so students can conduct experiments and learn how these systems operate in a real-life application during normal operating conditions, as well as during disasters. In the event of utility outages, which frequently accompany hurricanes in the region, the solar powered backup equipment provides emergency lighting, radios and charging for cell phones, computers and medical equipment. Any emergency response organization can access the emergency power from the PV system and the benefits extend to the 100 to 500 people who seek shelter in each site during a disaster.

OUTCOME

- Uninterrupted power is supplied to essential electric loads during an emergency
- Solar energy system functions as a learning platform, feeding data into the science, technology and math education curriculum for students
- Solar energy-equipped schools can save up to $1,500 per year on energy bills
- Emergency power provided by the systems helps E-Shelter volunteers access online communications during disasters for instructions and deployment in the field

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