Photo Credit: Terry Barner/Missouri S&T

Missouri University of Science and Technology (Missouri S&T)

Consortium Launches Study of Lead Battery Solar Microgrids in Homes

Missouri S&T EcoVillage Project

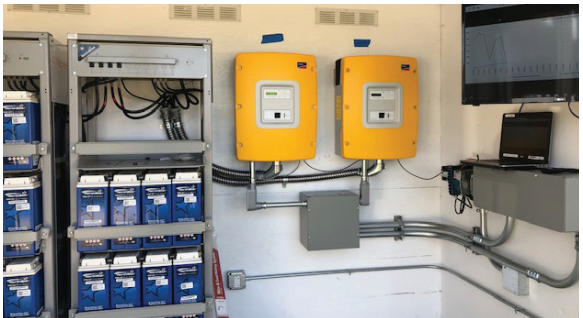
The Advanced Lead Acid Battery Consortium (ALABC) has joined other members of the Missouri S&T Microgrid Industrial Consortium to provide resources for the construction of advanced lead battery microgrids at the Missouri S&T EcoVillage. Two on-campus high-tech homes will act as "living laboratories" for studying renewable energy sources – and storage – for communities of the future. The project's duration is 2018 – 2021.

Goal

The demonstration microgrids will allow research on the performance of advanced lead batteries in a small solar-based microgrid and in the economic aspects of sharing energy at the local/ neighborhood level.

Background

The Missouri S&T EcoVillage is a small neighborhood comprised of solar homes designed by S&T students for competition at the U.S. Department of Energy's Solar Decathlon. The microgrids will initially power the 2013 and 2015 solar homes. The university plans to expand EcoVillage into a "community of tomorrow," with a total of six solar houses that will help advance renewable energy microgrid research, sustainable infrastructure, and human technology interaction. The site will provide the capability for hands-on training in renewable energy and microgrid technologies.



"This project will enrich the learning experiences of S&T students, while also deepening the knowledge of many stakeholders with the real-world application of a grid-tied residential system with solar power generation and energy storage."

Grant Grunewald, Engineering Support Manager, EnerSys

Participant Contributions

*Based in Missouri

- **Missouri S&T* –** Provided two solar homes used as living laboratories and a microgrid management system that allows power sharing between homes.
- **ALABC and The Doe Run Company* –** Provided support for design and installation of batteries and development of the microgrid system.
- **NorthStar* and EnerSys* –** Provided each home with its own AC-coupled advanced lead battery back-up system.
- **McClure Engineering* –** Microgrid design
- **Meyer Electric* –** Project construction

Technical Specifications

Each house has an AC combiner and critical load distribution load center panel board. AC-coupled advanced lead battery back-up system consists of:

- 7 strings in parallel = 48V, 28 Cells, 67.5 kWh
- Battery racks and cabling from batteries to inverter
- Unique charge algorithms on how to control the batteries

Installations local to each house installed on existing 240/120V 2-pole single-phase utility feed include:

- Shed with poured-concrete pad
- Each shed has a glass front for public viewing of interactive screens that provide live power plant data
- 2 Sunny Island 6kW inverters per house at 12kW
- Sunny Island inverters were installed downstream of the main panel via 2 single-pole 50A CBs (one for each single 6kW Sunny Island)
- 2-pole sub panel 100A based on 12kW max load from Sunny Island inverters and PV arrays
- Rewiring of critical loads to be fed from the new sub-panel

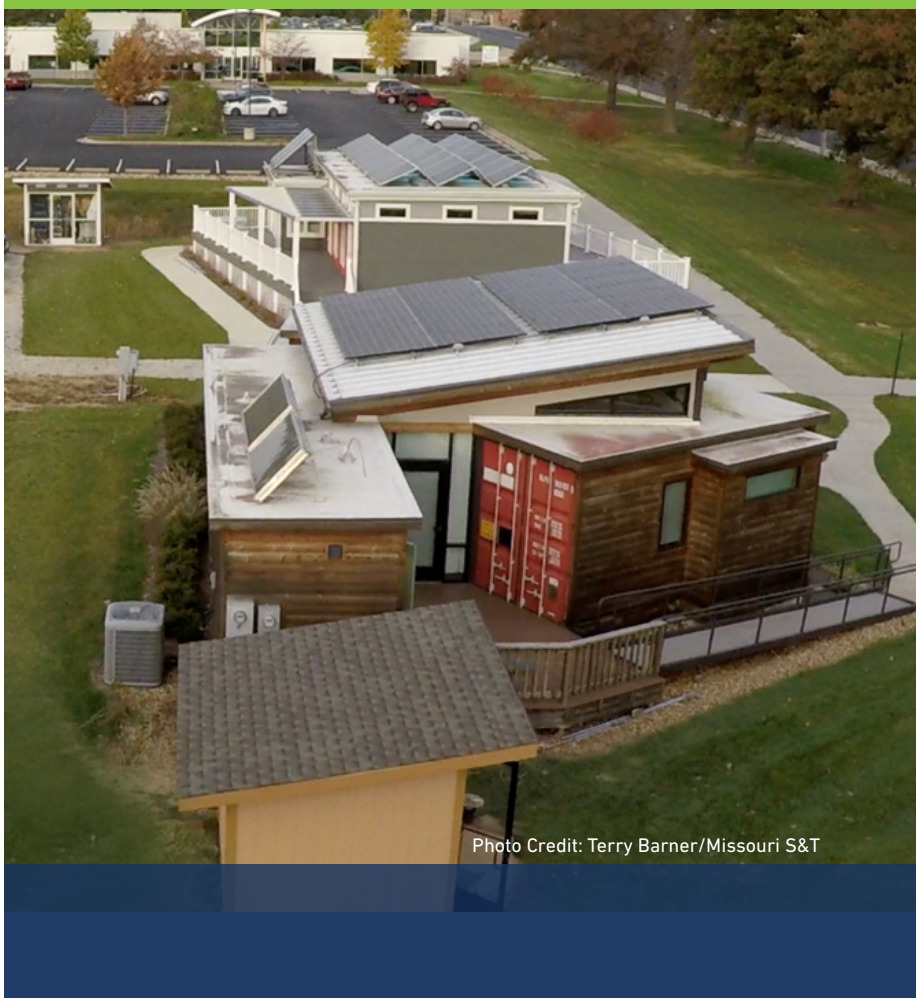


Photo Credit: Terry Barner/Missouri S&T

“ This project provides the opportunity to demonstrate the performance capability and long-term durability of advanced lead batteries as a critical component in the adaptation of renewable energy sources, such as wind and solar.”

Dr. Frank Fleming, Co-Founder, NorthStar

CONTACT **Dr. Alistair Davidson**
Director Products and Sustainability
Davidson@ila-lead.org
alabc.org