

Sandia National Laboratories Energy Industry Acceptance - Storage Projects

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DOE-OE Peer Review

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Program Sponsor: DOE/OE Stationary Energy
Storage Program - Dr. Imre Gyuk



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Six Sandia Thrust Areas to Meet Grid Challenges



U.S. DEPARTMENT OF
ENERGY



Sandia
National
Laboratories

- **Materials and Systems Development**
 - Leading the **development** of next-generation technologies
 - Improving current **technology** (flow batteries, flywheels, etc.)
- **Power Electronics**
 - **Developing** and testing new wide-bandgap power-electronic devices
- **Component and systems analysis and safety**
 - Analysis from battery cells through MW size ES systems
 - ES system testing protocols
 - ES system safety R&D
- ***Industry Acceptance (IA)***
 - ***ES System Field deployments and commissioning***
 - ***State-Initiated Demonstrations***
 - ***Technical support***
- **Grid Analytics and Policy**
 - Providing **assessments** of the impact of storage placement
- **Outreach** - Leading publications and meetings to **help** educate the Grid Energy community

Nanoscopic



Macroscopic

MISSION STATEMENT: Encourage investment in Energy Storage through field deployments by insuring systems are safe, reliable, and cost effective.

APPROACH: - Work with national and international entities that include the DOD, State Energy offices, Other National Labs**, Utilities, project developers, installers, integrators, Universities and Consumers to:

- Conduct grid and system Analysis
- Develop Energy Storage Projects
- Support State and International renewable/resiliency/Energy Storage initiatives
- Develop public information programs concerning energy storage

** Partnering relationship with sister Labs – PNNL, ORNL, NREL

SNL Industry Acceptance – ES Projects Team Capabilities

- Grid analysis & modeling
 - ES applications, sizing, technologies
 - Using commercial and Sandia developed analysis tools (PYOMO, PLEXOS,PSLF)
- Project Development and Implementation
 - Request for Information and Proposals (RFI & RFP)
 - Project designs and specifications
 - Data Acquisition Systems (DAS) design and implementation
 - Technical support during the construction of ESS'
 - ESS commissioning/testing plan development and implementation.
 - Start-up, commissioning and testing support.
- System Analysis
 - Remote monitoring and data acquisition
 - Analysis of operational test data
 - System optimization algorithms.
- Policy, regulatory and state support through CESA resources
 - Webinars, Papers, Presentations

SNL Industry Acceptance



Team/Partners

▪ Sandia Team

- Jaci Hernandez
- Ben Schenkman
- Ray Byrne
- Ana-Marie Beare
- Jaci Hernandez
- Sharon Ruiz
- David Rosewater
- David Schoenwald
- Don Bender
- Lee Rashkin
- Cesar Silva-Munroy
- Mike Baca
- Frank Maldonado
- Summer Ferreira

▪ Clean Energy States Alliance

- Todd Olinsky-Paul

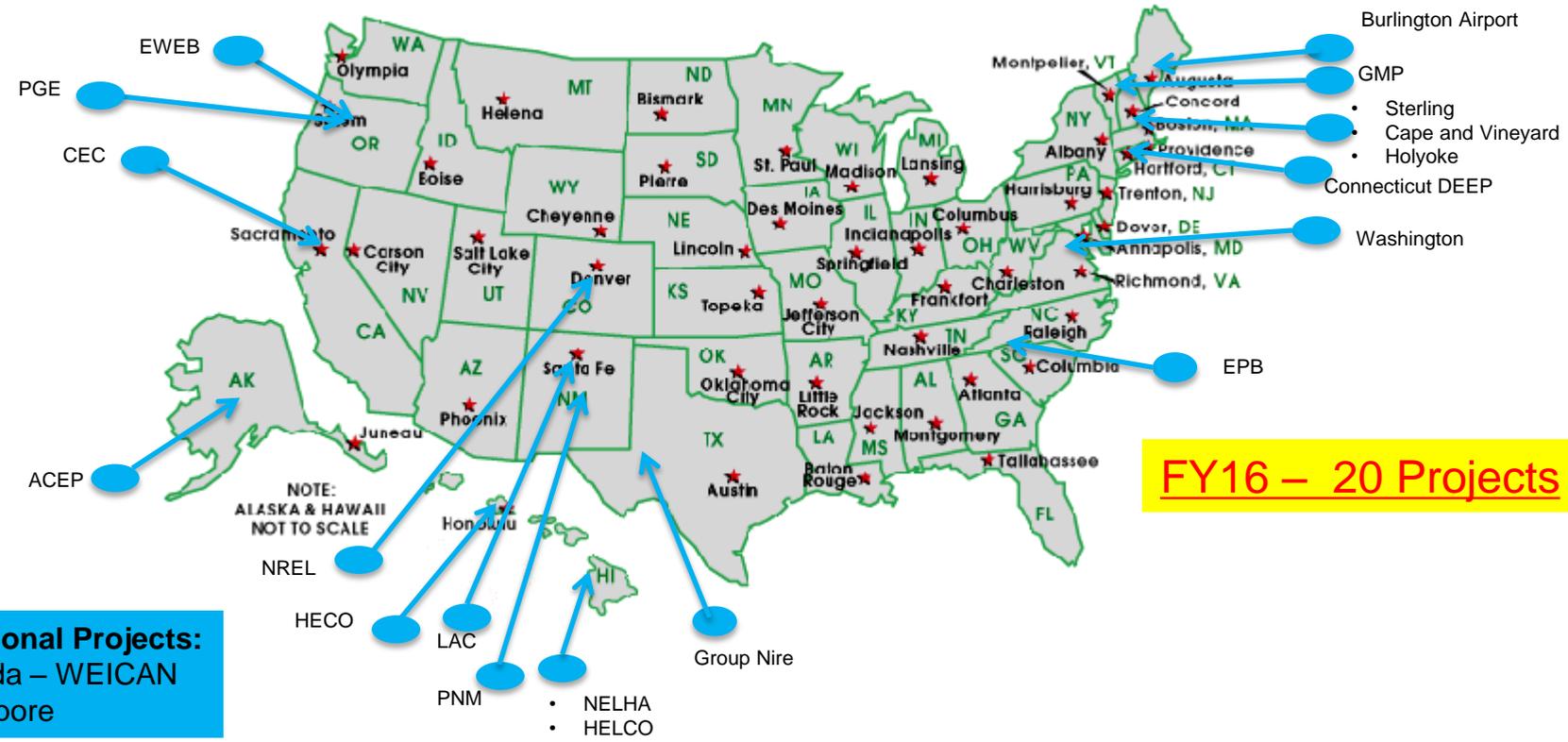
▪ OE Lab Partners

- PNNL - Vince Sprenkle
- PNNL - Patrick Balducci
- ORNL - Michael Starke

▪ Partners:

- Elizabeth Endler (Shell)
- Ben Gully (DNV-GL)
- Rick Fioravanti (ICF)
- Matt Lazarewicz (HELIX)
- Chuck Spooner (Stanley Consulting)
- Jeff Hires (Pursuit Engr.)
- Mark Harral (Group Nire)
- HECO and HELCO Team
- Laurence Sombardier (NELHA)
- Jeremy Lewis (EMNRD)
- Diane Broad (Oregon DOE)
- Josh Castonguay (GMP)
- Marc Mueller-Stoffels (UoA)
- Los Alamos County DPU
- UniEnergy Technology
- East Penn/ECOULT
- GS Yuasa
- Energy Market Authority of Singapore (EMA)
- Wind Energy Institute of Canada (WEICAN)
- NREL

SNL Industry Acceptance - ES Projects 2016



FY16 – 20 Projects

Stock Image source: <http://www.devarticles.com/c/a/Web-Services/Cooking-With-Web-Services-PHP-and-GD/3/>

SNL Industry Acceptance – ES Projects & Partners 2016

State Projects (CESA):

- Alaska – Cordova Electric Co-Op
- Connecticut DEEP
- Massachusetts DOER/CEC – Sterling Power, Cape and Vineyard, Holyoke, Northhampton (PNNL)
- Oregon Dept. of Energy/EWEB
- Vermont – GMP, Burlington Airport
- New Mexico – EMNRD, PNM, LAC

California/Hawaii:

- California CEC
- HECO
- HELCO
- NELHA

Other Projects:

- DCICON (DoD)
- Group Nire, TX
- Los Alamos County

International support:

- Singapore
- WEICan (Canada)

Industry Support

- GS Yuasa
- Helix
- Primus Power
- UET
- Transpower
- East Penn/ECOULT
- Aquion Energy

GMLC Project Lead:

ES Demonstration -
Validation & Optimization.
Lab Partners: PNNL, ORNL

SNL IA – FY16 Project Highlights

States:

- Oregon – Contract to EWEB to provide support ES installation (ODOE solicitation)
 - *Total project cost: \$1,086,225*
 - *DOE contribution: \$250,000*
- Alaska – Contract with ACEP to partner on study for the use of ES at Cordova Electric Hydro plant
 - *Total project cost: \$395,000 (estimate)*
 - *DOE contribution: \$150,000*
- Massachusetts – Sterling Municipal Light District
 - *Total project cost: \$2 - 2.5 Million - DOE contribution: \$250,00*
 - *RFP issued and award in place for a 1MW/2hr Li-ion ESS*
- Hawaii
 - HECO ES vendor selection
 - Remote connection to NELHA's Data acquisition system in place
 - Initiation of New ES project at NELHA – Partners include HELCO, UET, NELHA, Ulupono

SNL IA – FY16 Project Highlights

States:

- California –
 - Met with Camp Pendleton to discuss the use of energy storage on their grid
 - Ongoing technical support to the California Energy Commission (CEC)
 - Conducted review of POWAY flywheel failure for the CEC
- Vermont
 - Initiating project with Burlington airport to do develop microgrid including ES
 - Completed GMP project
 - *Total project cost: \$12 Million*
 - *DOE contribution: \$250,000*
- Conducted 10 webinars on ES topics through ESTAP program
- Grid Modernization Lab Call (GMLC) (In partnership with PNNL, and ORNL)
 - Placed contract for 100KW 4 hr. UET Flow battery to be installed at Energy Power Board of Chattanooga Tennessee
 - Started analysis of Portland Gas and Electric's 5MW ESS.
 - Finished preliminary analysis ES of Los Alamos Dept. of Public Utilities' 1.8MW/8.3MWh ESS

Other:

- Issued Energy Storage Procurement Guidance Document (**SAND2016-85440**)

- Continue Projects at NELHA, Burlington Airport, Sterling Municipal Light District
 - Contacts for DPE funding support
 - Design
 - DAS
- Complete Projects at EWEB, and EPB
- Continue Analysis work at ACEP, WECAN, EMA
- Develop ES commissioning document
 - Guidance for development and implementation of an ES commissioning and testing plan
- Initiate ES training document
- Support Mass CEC/DOER in their ES project solicitation

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Program Manager: Dr. Imre Gyuk

Thanks

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