

DOE-OE FY14 Electrical Energy Storage Demonstration Projects



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August, 2014



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SAND Document 5329384

Acknowledgements

Dr. Imre Gyuk and DOE's Office of Electricity
for support and funding of the Energy Storage
Demonstration Project.

Electrical Energy Storage (EES) Demonstration, Analysis & Evaluation



Presentation Outline

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 - Commissioning
 - Safety & Reliability
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EES Demonstrations Project Overview



■ Problem Statement

- To **encourage investment** in **EES**, it is important to have **safe**, **reliable**, and **cost effective** systems that perform as specified.

EES Demonstrations Project Overview



■ Approach

- Work with DoD, States, Utilities, ES Industry, Universities and Consumers.
 - Provide **third party independent analysis and evaluation** for cells and systems
 - Component and system safety and reliability
 - System operational performance and **optimization**
 - Partner with industry in developing **grid-tied field** projects to monitor and analyze new and existing ES technologies in differing applications
 - Technical **consulting, cost and optimization modeling**
 - Develop Industry accepted testing **protocols** and **procedures**
 - Develop **Commissioning** processes and provide commissioning **support**
 - **Monitor operational data, analyze, evaluate** and **disseminate** significant findings
 - Act as ES information clearinghouse for industry
 - Develop ES projects with State Energy departments and the ES industry
 - Provide Technical consulting to state energy offices and ES Industry
 - Provide limited funding support for technology innovation

DOE-OE EES Demonstration Projects



Legend:

- State
- DoD
- Academia
- Commercial End User
- Industry
- New or Proposed state

Summary of EES Demo Projects



FIELD DEMONSTRATIONS

<u>Location</u>	<u>Name</u>	<u>Technology</u>	<u>Environment/Application</u>	<u>Principal Investigators</u>
Massachusetts	Fort Devens Base Camp Integration Lab (BCIL)	2-4 Vendors & Varied Technologies 30-75kW 0.5-1hr	Military Nanogrid – Forward Operating Base	Ben Schenkman David Rose
California	SunPower ES Installation	125kW 4hr Zinc Bromide	Commercial PV energy shifting Microgrid support	Matt Galland Ben Schenkman
California	University of California San Diego (UCSD) Energy Storage Initiative	2.5 MW 2hr	University campus microgrid with renewables	Bill Torre Ben Schenkman

Summary of EES Demo Projects



STATE INITIATIVES

<u>Location</u>	<u>Name</u>	<u>Technology</u>	<u>Environment/Application</u>	<u>Principal Investigators</u>
Vermont	Green Mountain Power	2MW with 1MWh Li-ion, and 2.4MWh Lead Acid	Utility/renewables	TBD
Alaska	Kodiak	Flywheel	Utility/Grid	Ben Schenkman
Connecticut	Connecticut Deep	Multiple	Microgrid resiliency	Dan Borneo
Massachusetts	CEC	TBD	Grid Resiliency	TBD
New Jersey	TBD	TBD	TBD	TBD
Oregon	Oregon Dept. of Energy	TBD	Utility resiliency	Dan Borneo
Washington St.	Peugeot Sound Energy	1 MW 2 hr Zinc Bromine Flow battery		Ben Schenkman
California	CEC/CPUC		1.3 GW initiative	Dan Borneo Ray Byrne
New York		TBD	Grid Resiliency	TBD
New Mexico	NM Department of Energy and conservation	TBD	TBD	TBD

Summary of EES Demo Projects



OPTIMIZATION/ INDUSTRY SUPPORT				
<u>Location</u>	<u>Name</u>	<u>Technology/ Set-up</u>	<u>Environment/ Application</u>	<u>Principal Investigators</u>
South Carolina	Duke Rankin site	FIAMM Sodium Nickel Chloride	Utility	David Schoenwald
California	Enervault	Iron Chrome Flow	Renewable support	Dan Borneo
New Hampshire	SustainX	ICAES	Industrial manufacturing facility grid	Summer Ferreira
Pennsylvania	Aquion Energy	Aqueous Sodium	Industrial manufacturing facility microgrid	Summer Ferreira
Massachusetts	Helix	Flywheel	Frequency Response	Jaci Hernandez
Georgia	GS Yuasa	LA/Ruggedized ES mobile unit Li-ion Testing	Microgrid/Commercial Safety Testing	Ben Schenkman David Rose
Texas	Texas Tech	1 MW 1hr Li-ion	Grid/Stabilization and arbitrage	Ben Schenkman
Hawaii	Hawaiian Electric Company		Utility Renewable Support	Dan Borneo Ray Byrne



Image by Kevin Armstrong

Vermont State

- **Project Scope** –Install 2MW 3.4MWh ES system to support Renewables.
- **Goal** – Demonstrate ES in renewable application to foster further projects in the NE..
- **FY14 Status** – Contracts issued, permits in place and construction started.
- **Path Forward** – Construction and perform commissioning Q3 FY15.



For more information, visit the website at:
www.sandia.gov/batterytesting

The 2015 Winter Call for proposals is open.

Application Deadline: January 15, 2015.

Notifications will be sent out February 2015.

The 4th Proposal Call is 2015:
January 16, 2015 - July 15, 2015.

The database is always open for [FAST-Track Proposals](#).

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Advanced Energy Storage Device Testing
Reliable independent evaluation of energy storage solutions.



Energy Storage Demonstrations

Path Forward



- **Provide support to industry in the development, design, modeling installation, and commissioning of ES projects.**
- Provide **operational analysis and evaluation** of ES systems installations and contribute to industry standards
- **Support vendor, utility, state, academia, military and consumer understanding** of the role of ES in an effective **resilient grid**
 - Clean Energy States Alliance (CESA) webinar series
 - State Energy Department partnerships
 - Partnerships with others
 - DNV-GL, NY BEST, Universities, Manufacturers, Developers, Regulators, etc.
- Continue to use **independent analysis and evaluation** of ESS to **validate** the use of energy storage to support the **commercialization** of new technologies
 - Cell and system performance
 - Safety and Reliability
 - Operational Optimization
 - Innovative Technology Development

EES Emerging Technology Demonstrations Concluding Remarks



- The ES industry still wants/needs demonstrations to prove and improve existing technologies and **move new products to commercialization**.
- As energy storage technologies and controls continue to advance, we continue to **learn** and to **help** those in the Electric Storage industry, as well utilities and academia **overcome technical and implementation challenges**.
- DOE/Sandia offers support in the following areas:
 - **Technical Design** – Specification, Design criteria, modeling, data acquisition systems
 - **Independent third party validation** - **Cell to System** performance, verification, monitoring, analysis, evaluation and reporting
 - **Safety** – Testing, analysis and evaluation
 - **Commissioning** - Program development and project support

DOE/Sandia is recognized as a Technology **information clearinghouse** for vendors, users, and industry in the area of Energy Storage Technologies.

Thank You Questions?

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