

# DOE-OE FY14 Electrical Energy Storage Demonstration Projects

Daniel Borneo, P.E.  
Sandia National Laboratories

Singapore NRF

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Demonstration Project.

# Electrical Energy Storage (EES) Demonstration, Analysis & Evaluation



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## Presentation Outline

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  - Commissioning
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- **Concluding Remarks**

# EES Demonstrations Project Overview



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- 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



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## ■ 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



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Legend: ● State ● DoD ● Academia ● Commercial End User  
● Industry ○ New or Proposed state

# Summary of EES Demo Projects



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## FIELD DEMONSTRATIONS

<u>Location</u>	<u>Name</u>	<u>Technology</u>	<u>Environment/Application</u>	<u>Principal Investigators</u>
<b>Massachusetts</b>	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
<b>California</b>	SunPower ES Installation	125kW 4hr Zinc Bromide	Commercial PV energy shifting Microgrid support	Matt Galland Ben Schenkman
<b>California</b>	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



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## STATE INITIATIVES

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



# Summary of EES Demo Projects



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## OPTIMIZATION/ INDUSTRY SUPPORT

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

# *Clean Energy States Alliance (CESA)*

## Vermont Energy Storage Project



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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.

# Safety & Reliability Resource In Development: Battery Evaluation Website



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For more information, visit the website at:  
[www.sandia.gov/batterytesting](http://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 4<sup>th</sup> Proposal Call is 2015:  
January 16, 2015 - July 15, 2015.

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

Contact: Summer Ferreira  
[srferre@sandia.gov](mailto:srferre@sandia.gov)  
or David Rosewater  
[dmrose@sandia.gov](mailto:dmrose@sandia.gov)



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



# Energy Storage Demonstrations



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## *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



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- 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?

Principal Investigator Contact Information:

**Dan Borneo - [drborneo@sandia.gov](mailto:drborneo@sandia.gov)**