



Peer Review and Update Meeting 2013 — U.S. Department of Energy
Energy Storage Systems Program (ESS)

San Diego Marriot Marquis and Marina 333 West Harbor Dr San Diego, CA 92101

www.sandia.gov/ess

Thursday, October 24

7:00 am Registration (all day) & Complimentary Breakfast

8:30 am – [Welcome](#): Georgianne Huff, SNL

8:35	Welcome and DOE Perspective	Dr. Imre Gyuk — US Department of Energy / Office of Electricity Delivery & Energy Reliability
8:50	DOE / OE Program Overview	Dr. Imre Gyuk — US Department of Energy / Office of Electricity Delivery & Energy Reliability
9:05	DOE / ARPA-E Program Overview	Dr. Mark Johnson/Dr. John Lemmon — US Department of Energy / Advanced Research Projects Agency-ENERGY
9:15	DOE/ARRA Program Overview	Ron Staubly — US Department of Energy / American Recovery and Reinvestment Act
9:25	DOE / OE / SNL Program Overview	Sean J. Hearne — Sandia National Laboratories
9:35	DOE / OE / PNNL Program Overview	Vincent Sprenkle — Pacific Northwest National Laboratory

9:45am – 10:15 am BREAK

10:20 am – [Session PR2 Chair](#): Cy Fujimoto

TIME	PROJECT	SPEAKER
10:20	Novel Nitride Materials for Advanced Power Electronics Grown by "Bulk GaN" Method	Karen Waldrip — Sandia National Laboratories
10:35	Nanofillers for Improved Flywheel Materials	Tim Boyle, Tim Lambert - Sandia National Laboratories
10:50	High Performance Particle Composites for Magnetic Bearings in Energy Storage Flywheels	Jim Martin - Sandia National Laboratories
11:05	Nitrogen/Oxygen Battery - A Transformational Architecture for Large Scale Energy Storage	Frank Delnick – Sandia National Laboratories
11:20	Advanced Membranes for VRFB: A Collaboration with SNL, PNNL, and ORNL	Cy Fujimoto - Sandia National Laboratories
11:35	Sodium-based Battery Development	Dave Ingersoll - Sandia National Laboratories

12:00 pm – 1:00 pm LUNCH (On Your Own)

1:00 pm – [Session PR3 Chair](#): Dan Borneo

TIME	PROJECT	SPEAKER
1:00	Overview of Demonstration and Testing	Dan Borneo — Sandia National Laboratories
1:15	Cell Testing	Summer Ferreira — Sandia National Laboratories
1:30	Sunpower	Matt Galland — SunPower Corp
1:45	CESA ESTP, Connecticut DEEP	Todd Olinsky-Paul — Clean Energy Group
2:00	Texas Tech Reese Wind Site	Ben Karlson — Sandia National Laboratories
2:15	ARRA PV Plus Storage for Simultaneous Voltage Smoothing and Peak Shifting	Steve Willard — PNM
2:30	NV Energy	Jim Ellison — Sandia National Laboratories

2:45 pm – 3:00 pm

BREAK

3:00-5:00

Poster Session PR4

[Session PR4 Chair:](#)

PROJECT	SPEAKER
CAES Geo Performance	Mario Martinez – <i>Sandia National Laboratories</i>
Application of Redox Non-Innocent Ligands to Non-Aqueous Flow Battery Electrolytes	Mitchell Anstey - <i>Sandia National Laboratories</i>
ZBB	Tony Siebert — <i>ZBB</i>
Ruggedized Portable Power for Microgrids	Jeff Hires — <i>GS Battery</i>
Mesa del Sol Optimization	Jay Johnson — <i>Sandia National Laboratories</i>
Helix LLC Three-Phase Project Overview	Matt Lazarewicz — <i>Helix LLC</i>
Duke Energy Optimization	Dave Schoenwald — <i>Sandia National Laboratories</i>
Reading, MA: RMLD Feasibility Study	Jane Parenteau — <i>Reading, MA Municipal District</i>
NAATBatt DES Roadmap Methodology	Jim Greenberger — <i>NAATBatt</i>
Energy Storage Demonstration Journal	Jaci Hernandez — <i>Sandia National Laboratories</i>
Flow Battery Modeling	Mario Martinez — <i>Sandia National Laboratories</i>
NYSERDA Energy Storage Projects	Dhruv Bhatnagar — <i>Sandia National Laboratories</i>
Market Structure	Jim Ellison — <i>Sandia National Laboratories</i>
Organic Flow Battery Development	Wei Wang — <i>Pacific Northwest National Laboratory-</i>
Redox Flow Battery Manufacturing Modeling	Scott Whalen — <i>Oregon State University</i>
Anion Membranes for Redox Flow Battery	Mike Hickner — <i>Pacific Northwest National Laboratory</i>
Li-ion Batteries for Community Energy Storage	Daiwon Choi — <i>Pacific Northwest National Laboratory</i>
Room Temperature Na-ion Battery Development	Xiaolin Li — <i>Pacific Northwest National Laboratory</i>
Enhancement of ES-Select	Ali Nourai — <i>DMV-KEMA</i>
Value proposition for the bundling services of a grid-connect storage in the PNW	Patrick Balducci — <i>Primus Power</i>
Redox Flow Batteries	Tom Zawodzinski — <i>Oak Ridge National Laboratory</i>
Lower Cost Carbon Fiber for Flywheels	James Gerald Hansen — <i>Oak Ridge National Laboratory</i>
Guide Update Introduction	Jim Eyer — <i>E&I Consulting</i>
DOE International Energy Storage Database	Janice Lin — <i>Strategen</i>

SBIR PROJECTS—Poster Session PR4 continued

A Single Substance Organic Redox Flow Battery	Paul Rasmussen — <i>Vinazene, Inc.</i>
Next Generation Processes for Carbonate Electrolytes for Battery Applications	Kris Rangan — <i>Materials Modification, Inc.</i>
Organic and Inorganic Solid Electrolytes for Li-ion Batteries	Nader Hagh — <i>NEI Corporation</i>
Realization of Multilayer High Temperature Capacitors with New Dielectric Materials and Novel Thermal Spray Deposition Route	Rashmi Dixit — <i>DRS Research</i>
High Voltage, DC-link Capacitors for Transportable Power Conversion Systems	Kirk Slenes — <i>TPL</i>
Superior Mg-ion Conducting Membranes Based on Textured MgZr₄(PO₄)₆ (MZP) through Low-Temperature Liquid Phase Sintering Techniques	Thomas Kodenkandath — <i>ITN Energy</i>
Acid Based Blend Membranes for Redox Flow Batteries	Alan Cisar – <i>Lynntech, Inc.</i>
Highly Selective Proton-conducting Composite Membranes for Redox Flow Batteries	Alan Cisar – <i>Lynntech, Inc.</i>
Modular Undersea Compressed Air Energy Storage (UCAES) System	James Kesselli – <i>Brayton Energy</i>
Sodium Intercalation Battery for Stationary Storage	David Ofer – <i>Tiax, LLC</i>
Flow Battery Structures to Improve Performance and Reduce Manufacturing Cost	E. Jennings Taylor – <i>Faraday Technology</i>
Nanocatalytic Rechargeable Lithium Air Cathode	D. "Pera" Peramungae – <i>EIC Laboratories, Inc.</i>
Low--Cost, High-Performance Hybrid membranes for Redox Flow Batteries	Hongxing Hu – <i>Amsen Technologies, LLC</i>
High Efficiency Cathode for Metal Air Batteries	Junqing Ma - <i>Giner, Inc.</i>
Low Cost, Optimized Redox Flow Battery Electrolytes, Novel Solid Ionic Conducting Membranes, and Rechargeable Air-Breathing Cathodes for Bat	E. Jennings Taylor - <i>Faraday Technologies</i>
Real-Time In-Situ Metrology for Lithium-Ion Battery R&D and Manufacturing	Jon Yoo - <i>Applied Spectra Inc.</i>
Low-Cost Integrated Package and Heat Sink for High-Temperature Power Modules	Jim Connell - <i>Advanced Thermal Technologies</i>

5:30 pm (Tentative) RECEPTION



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Friday, October 25

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TIME	PROJECT	SPEAKER
7:30 am	Registration (all day) & Complimentary Breakfast Sponsored by	
		8:00 am – Welcome : Georgianne Huff, <i>SNL</i>
		8:05 am – Session PR5 Chair
8:10	ARRA Notrees Wind Storage	Jeff Gates – <i>Duke Energy</i>
8:25	ARRA Solid State Li Metal Batteries for Grid-Scale Energy Storage	Mohit Singh — <i>Seeo Inc.</i>
8:40	ARRA Compressed Air Energy Storage	Mike Medeiros, Robert Booth – <i>Pacific Gas and Electric Company</i>
8:55	ARRA Detroit Edison's Advanced Implementation of Community Energy Storage Systems for Grid Support	Nicholas Carlson, Haukur Asgeirsson – <i>DTE Energy Co.</i>
9:10	ARRA Tehachapi Wind Energy Storage Project Using Li-Ion Batteries	Blake Chalson, Christopher Clarke— <i>Southern California Edison</i>
9:25	ARRA Beacon Power 20MW Flywheel Frequency Regulation Plant (Hazle Spindle)	Jim Arseneaux – <i>Beacon Power</i>
9:40 am – 10:00 am	BREAK	
10:00 am – 12:00 pm	Poster Session Two	

[Session PR5 Chair](#): John Lemmon

ARPA-E PROJECTS

Development of a 100 kWh/100 kw Flywheel Energy Storage Module	Jim Arseneaux – <i>Beacon Power</i>
Transformative Renewable Energy Storage Devised Based on Neutral Water Input	Katherine Ayers — <i>Proton OnSite</i>
Small Organic Molecule Based Flow Battery for Grid Storage	Michael Aziz – <i>Harvard University</i>
Flow-assisted Zinc Anode Batteries for Grid-scale Electricity Storage	Valerio De Angelis, Nilesh Ingale, Sanjoy Banerjee — <i>CUNY Energy Institute</i>
Electroville: High-Amperage Energy Storage Device-Energy Storage for the Neighborhood	Paul Burke, David Bradwell — <i>Massachusetts Institute of Technology</i>
Low-Cost Grid-Scale Electrical Storage Using a Flow-Assisted Rechargeable Zinc-Manganese Dioxide Battery	Tim Coyne - <i>CUNY</i>
Enhanced Metal-Air Energy Storage System with Advanced Grid-Interoperable Power Electronics Enabling Scalability and Ultra-	Cody Friesen – <i>Fluidic Energy</i>

Planar Na-beta Batteries for Renewable Integration and Grid Applications

Soluble Lead Flow Battery Technology

2.5kW/10kWh Redox Flow Battery (RFB) with Low-cost Electrolyte and Membrane Technologies

Advanced Sodium Batteries with Enhanced Safety and Low-Cost Processing

**Low-Cost Sodium-Ion Battery to Enable Grid Scale Energy Storage: Prussian Blue-Derived Cathode and Complete Battery Integration
Hydrogen-Bromine Electrical Energy Storage System**

A Robust and Inexpensive Iron-Air Battery for Grid-Scale Energy Storage

An Inexpensive Metal-free Organic Redox Flow Battery for Grid-scale Storage

Affordable Energy from Water and Sunlight

Transformative Electrochemical Flow Storage System

Redox Flow Batteries with High Power Density Cells

Superconducting Magnet Energy Storage System with Direct Power Electronics Interface

High Energy Storage Capacity Low-Cost Iron Flow Battery

10kW 80kWh Energy Storage System Based on All-Iron Hybrid Flow Battery

Hydrogen Bromine Flow Batteries for Grid Scale Energy Storage

Low Cost, High Performance and Long Life Flow Battery Electrodes

Low Cost, High-Energy Density Flywheel Storage Grid Demonstration

Potassium-Based Aqueous Flow Battery for Grid Application

Semi-Solid Rechargeable Power Sources-Flexible, High Performance Storage for Vehicles at Ultra-Low Cost

Demonstration of 2.5kWh Vanadium Redox Flow Battery (VRFB) Through Rationally Designed High Energy Density Electrolytes and Membrane-Electrode Assembly (MEA)

Hydrogen-Bromine Flow Batteries

Open Framework Electrode Batteries for Cost-Effective Stationary Storage

Quaternary Phosphonium Based Hydroxide Exchange Membranes

Robert Higgins — *EaglePicher Technologies, LLC*

David Keogh

Thomas Kodenkandath — *ITN Energy Systems, Inc.*

Joonho Koh — *Materials & Systems Research, Inc.*

Jong-Jan Lee – *Sharp Laboratories*

Guangyu Lin – *TVN Systems*

Sri Narayan — *University of Southern California*

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Daniel Nocera – *Sun Catalytix*

Michael Perry - *UTC*

Mike L. Perry - *UTC*

V.R. Ramanan — *ABB, Inc.*

Robert Savinell – *Case Western University*

Julia Song – *Energy Storage Systems*

Venkat Srinivasan - *ABB*

Tom Stepien – *Primus Power*

Mike Strasik — *The Boeing Company*

Olivier Sudre - *Teledyne*

Taison Tan, James Cross — *24M*

Paul Thoen - *ITNES*

Adam Weber

Colin Wessells

Yushan Yan — *University of Delaware*

High-Voltage and Low-Crossover Redox Flow Batteries for Economical and Efficient Renewable Electricity Storage

Yushan Yan — *University of Delaware*

UNIVERSITY PROJECTS

Iron Based Flow Batteries for Low Cost Grid Level Energy Storage

Jesse Wainright — *Case Western Reserve University*

The Architectural Diversity of Metal Oxide Nanostructures: An Opportunity for the Rational Optimization of Group II Cation Based Batteries

Esther Takeuchi — *Stony Brook University*

ARRA PROJECTS

ARRA Amber Kinetics Flywheel Energy Storage Demonstration

Edward Chiao — *Amber Kinetics, Inc.*

ARRA Painesville Municipal Electric Power Vanadium Redox Battery Demonstration Project

Joseph Startari — *Ashlawn Energy LLC*

ARRA Ultrabattery Project Results

Jeff Seasholtz — *East Penn*

12:00 pm – 1:20 pm LUNCH (On Your Own)

1:25 pm – [Session PR6 Chair](#)

1:30

1:45

University Projects

Paul Clem — *Sandia National Laboratories*

2:00

Reliable High-Performance Gate Oxides for Wide Band Gap Devices

Jon Ihlefeld — *Sandia National Laboratories*

2:15

DOE/EPRI Electricity Storage Handbook in Collaboration with NRECA

Georgianne Huff — *Sandia National Laboratories*

2:30 pm

Closing Remarks

Dr. Imre Gyuk — *US Department of Energy / Office of Electricity Delivery & Energy Reliability*