Peer Review and Update Meeting 2014 — U.S. Department of Energy
Energy Storage Systems Program (ESSP) Peer Review

Renaissance Washington Hotel, 999 Ninth Street, Washington, DC 20001
September 16 - 19, 2014

Tuesday, September 16

4:00 - 6:00pm	Early Registration		

Wednesday, September 17

7:30 AM	Registration (all-day)		
	Complimentary Breakfast sponsored		
8:30 AM	Welcome	Amanda Spinney	Sandia National Laboratories
	Welcome and DOE Perspective DOE / OE Program Overview	Dr. Imre Gyuk	US Department of Energy/Office of Electricity Delivery and Energy Reliability
	DOE / ARPA-E Program Overview	Dr. John Lemmon	US Department of Energy / Advanced Research Projects Agency–ENERGY
	DOE / ARRA / NETL Program Overview	Ron Staubly	US Department of Energy / American Recovery and Reinvestment Act
	DOE / OE / SNL Program Overview	Sean J. Hearne	Sandia National Laboratories
	DOE / OE / PNNL Program Overview	Vincent Sprenkle	Pacific Northwest National Laboratory
9:35 AM	BREAK		
	Session 2		
9:55 AM	Energy Storage Safety	Sean J. Hearne	Sandia National Laboratories
	Advances in PNNL's Mixed Acid Redox Flow Battery Stack	David Reed	Pacific Northwest National Laboratory
	Redox Flow Battery Optimization	Tom Zawodzinksi	Oak Ridge National Laboratory
	Ionic Liquid Flow Battery	Travis Anderson	Sandia National Laboratories
	Next Generation Aqueous Redox Flow Battery Development	Wei Wang	Pacific Northwest National Laboratory
11:55 AM	LUNCH On Your Own		
	Session 3		
1:10 PM	Organic Flow Battery Development	Wei Wang	Pacific Northwest National Laboratory
	Iron Based Flow Batteries for Low Cost Grid Level Energy Storage	Jesse Wainright	Case Western Reserve University
	Room Temperature Sodium Flow Battery	Leon Shaw	Illinois Institute of Technology
	Sodium-based Battery Development	Dave Ingersoll	Sandia National Laboratories
	Room temperature Na-ion battery development	Xiaolin Li	Pacific Northwest National Laboratory
	Na-ion Anode Development	Donghai Wang	Pennsylvania State University
3:10 PM	BREAK		
	Poster Session 4		
3:25 PM	See next page for list of projects in poster session		
5:55 PM	Sponsored Reception		

Poster Session 4

3:25 PM

Manufacturing Cost Model for Redox Flow Battery	Scott Whalen	Pacific Northwest National Laboratory
Redox Flow Battery Membrane Development	Xiaoliang Wei	Pacific Northwest National Laboratory
Catalyst Development for V/V Redox Flow Battery	Bin Li	Pacific Northwest National Laboratory
A Single Substance Organic Redox Flow Battery	Paul Rasmussen	Vinazene, Inc.
Flow Battery Structures to Improve Performance and Reduce Manufacturing Cost	E. Jennings Taylor	Faraday Technology, Inc.
Small Organic Molecule Based Flow Battery for Grid Storage	Michael Aziz	Harvard University, School of Engineering and Applied Sciences
2.5kW/10kWh Redox Flow Battery (RFB) with Low-cost Electrolyte and Membrane Technologies	Thomas Kodenkandath	ITN Energy
Flow-assisted Zinc Anode Batteries for Grid-scale Electricity Storage	Sanjoy Banerjee, Valerio De Angelis, Nilesh Ingale	The City University of New York
Low-Cost Sodium-Ion Battery to Enable Grid Scale Energy Storage: Prussian Blue-Derived Cathode and Complete Battery Integration	Jong-Jan Lee	Sharp Labs of America
Planar Na-beta Batteries for Renewable Integration and Grid Applications	Bob Higgins & Dave Lucero	Eagle Picher
Advanced Sodium Batteries with Enhanced Safety and Low-Cost Processing	Joonho Koh	Materials & Systems Research, Inc.
A Robust and Inexpensive Iron-Air Battery for Grid-Scale Energy Storage	Sri Narayan	University of Southern California
An Inexpensive Metal-free Organic Redox Flow Battery for Grid-scale Storage	Sri Narayan	University of Southern California
High Energy Storage Capacity Low-Cost Iron Flow Battery	Robert Savinell	Case Western University
10kW 80kWh Energy Storage System Based on All-Iron Hybrid Flow Battery	Julia Song	Energy Storage Systems
Quaternary Phosphonium Based Hydroxide Exchange Membranes	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
Energy Storage Integration With Renewables, Demonstration and Testing in a Microgrid Setting	Bill Torre	University of California, San Diego

5:55 PM Sponsored Reception

Thursday, September 18

7:00 AM	Registration (all day)		
	Complimentary Breakfast sponsored		
	Session 5		
8:00 AM	**Welcome to Day 2**	Amanda Spinney	
8:05 AM	Novel, Lost-Cost Liquid Sodium Anode + Liquid Cathode-Based Cells for Energy Storage	Steve Martin & C Austen Angell	Arizona State University / Iowa State University
	Na-metal halide battery development	Jin Y. Kim	Pacific Northwest National Laboratory
	Nitrogen/Oxygen Battery - A Transformational Architecture for Large Scale Energy Storage	Frank Delnick	Sandia National Laboratories
	Magnetic Alignment of Nanoparticles	Jim Martin	Sandia National Laboratories
	Flywheel Materials Development	Tim Boyle & Tim Lambert	Sandia National Laboratories
	BREAK		
	Session 6		
10:25 AM	Development of Electrode Architectures for High Energy Density Electrochemical Capacitors	Bruce Dunn	University of California, Los Angeles
	Novel Dielectrics	Geoffrey Brennecka	Sandia National Laboratories
	Reliability Characterization of Wide-Band Gap Semiconductor Switches	Robert J. Kaplar	Sandia National Laboratories
	Highly Efficient, High Power Density GaN-based DC-DC Converters for Grid-Tied Energy Storage Applications	Daniel Martin	Arkansas Power Electronics International
	60kW DC-AC Inverter with Internal Isolation using GaN Devices	Frank Hoffmann	Princeton Power Systems, Inc.
12:05 PM	LUNCH On Your Own		
	Session 7		
1:20 PM	Flow Battery Solution for Smart Grid Renewable Energy Applications	Ron Mosso & Sheri Nevins	EnerVault & Raytheon Ktech
	20 MW Flywheel Frequency Regulation Plant (Hazle Spindle)	Barry Brits & Jim Arseneaux	Beacon Power
	Compressed Air Energy Storage	Mike Medeiros & Robert Booth	Pacific Gas and Electric Company
	Isothermal CAES: Fuel-free, site-flexible energy storage for renewables integration and T&D substitution	Ben Bollinger & Dax Kepshire	SustainX
	Detroit Edison's Advanced Implementation of community Energy Storage Systems for Grid Support	Nicholas Carlson & Haukur Asgeirsson	DTE Energy
	Grid-Scale Energy Storage Demonstration for Ancillary Services Using Ultrabattery	John Wood & Jeff Seasholtz	Ecoult and EastPenn Deka
3:20 PM	BREAK		
	Poster Session 8		

See next page for list of projects in poster session

Poster Session 8

3:50 PM

Energy Storage Analysis Laboratory - Cell Testing	David Rosewater	Sandia National Laboratories
Multi-Objective Optimization for Power Electronics Used in Grid Tied Energy Storage Systems	Sarah Hambridge	Sandia National Laboratories
Impact Study of Value-Added Functionality on Inverter Reliability in Energy Storage Systems	Eric Green	North Carolina State University
Reliable High Performance Gate Oxides for WBG Devices	Jon Ihlefeld	Sandia National Laboratories
Development of a Monolithically Integrated SiC Semiconductor Switch	Ranbir Singh	GeneSiC Semiconductor
Superconducting Magnet Energy Storage System with Direct Power Electronics Interface	V.R. Ramanan	ABB
Lithium Sulfur Batteries for Grid Applications	Chengdu Liang	Oak Ridge National Laboratory
Lower Cost Carbon-fiber for Flywheel Applications	Bob Norris	Oak Ridge National Laboratory
CESA Demonstration: Duke Energy	Dave Schoenwald	Sandia National Laboratories
High Frequency Link Converters using Advanced Magnetics	Josh Yee	University of California, Davis
High Temperature Capacitor with New Dielectric Materials and Novel Thermal Spray Deposition Routes	Rashmi Dixit	DRS Research
6.5 kV Silicon Carbide Half-Bridge Power Switch Module for Energy Storage System Applications	John Hostetler	United Silicon Carbide, Inc.
Design and Development of a Low Cost, Manufacturable High Voltage Power Module for Energy Storage Systems	Brandon Passmore	Arkansas Power Electronics International, Inc.
High Voltage Capacitors for DC-Link Applications	Angelo Yializis	Sigma Technologies International, Inc.
Real-Time In-Situ Metrology for Lithium-Ion Battery R&D and Manufacturing	Jong Yoo	Applied Spectra, Inc.
Status of International Energy Storage Working Group	Vish Viswanathan	Pacific Northwest National Laboratory
Amber Kinetics Flywheel Energy Storage Demonstration	Edward Chiao	Amber Kinetics
Development of a 100 kWh/100 kw Flywheel Energy Storage Module	Jim Arseneaux	Beacon Power
Enhanced Metal-Air Energy Storage System with Advanced Grid-Interoperable Power Electronics Enabling Scalability and Ultra-Low Cost	Cody Friesen	Fluidic Energy
Semi-Solid Rechargeable Power Sources-Flexible, High Performance Storage for Vehicles at Ultra-Low Cost	Taison Tan	24 M Technologies, Inc.
Open Framework Electrode Batteries for Cost-Effective Stationary Storage	Colin Wessells	Alveo Energy
ES Market Structures	Cesar Silva Monroy	Sandia National Laboratories
Wind Integration in West Texas: 1 MW / 1 MWh Lithium-ion Battery System	Elizabeth Endler	Shell International Exploration & Production (US) Inc.

Friday, September 19

7:30 AM	Registration (all day) Complimentary Breakfast sponsored		
	Session 9		
8:30 AM	**Welcome to Day 3**	Amanda Spinney	
	Advanced Membranes for Flow Batteries	Cy Fujimoto	Sandia National Laboratories
	Standards Development	Dave Schoenwald	Sandia National Laboratories
	National Codes and Standards Effort	Dave Conover	Pacific Northwest National Laboratory
	DOE Global Energy Storage Database	Georgianne Huff	Sandia National Laboratories
	EPRI DOE Handbook	Abbas Akhil	Sandia National Laboratories
10:15 AM	BREAK		
	Session 10		
10:35 AM	The Architectural Diversity of Metal Oxide nanostructures: An opportunity for the Rational Optimization of Group II Cation Based Batteries	Esther Takeuchi	Stonybrook University
	Tehachapi Wind Energy Storage Project Using Li-Ion Batteries	Blake Chalson & Christopher Clarke	Southern California Edison
	BPA - Damping Control	Dave Schoenwald	Sandia National Laboratories
	Powin/BPA Demonstration Project	Vish Viswanathan	Pacific Northwest National Laboratory
	WA State Clean Energy Fund – Use Case Analysis	Michael Kinter-Meyer	Pacific Northwest National Laboratory
12:15 PM	LUNCH On Your Own		
	Session 11		
1:30 PM	Demonstrations Overview & Commissioning	Dan Borneo	Sandia National Laboratories
	Energy Storage Test Pad - System Testing	David Rosewater	Sandia National Laboratories
	Secondary Use of Vehicle Batteries on the Electric Grid	Michael Starke	Oak Ridge National Laboratory
	Energy Storage Demonstrations & Evaluation	Ben Schenkman	Sandia National Laboratories
	E&I Market Assessment Update	Jacquelynne Hernandez	Sandia National Laboratories
	CESA ESTP, Connecticut DEEP	Todd Olinsky-Paul	Clean Energy States Alliance
	Demonstrations of Modular Energy Storage in the Northwest	Patrick Balducci	Pacific Northwest National Laboratory
	Notrees Wind Storage	Jeff Gates	Duke Energy
4:30 PM	Closing Remarks	Dr. Imre Gyuk	US Department of Energy/Office of Electricity Delivery and Energy Reliability