

# STORAGE WEEK

3 Connected Meetings Covering Opportunities in the Fundamental Reshaping of the Power Industry via Energy Storage

July 13-16, 2009, San Diego

July 15, 2009, 8-5pm

## Energy Storage Technology & Investment Outlook

8:00-8:15 *Welcome from the Chairman:*  
**Brad Roberts**, Executive Director, ELECTRICITY STORAGE ASSOCIATION (ESA)

### Session I: DOE and ARRA Stimulus Funding

8:15-8:45 *Presentation:*  
**Progress in Energy Storage Applications and Technologies**

- A review of energy storage technologies and application areas
- Progress in application of fast storage to frequency regulation
- Storage for peak shaving and reliability
- The growing argument for storage as a complement to renewables
- Renewed interest in CAES

*Presenter:*  
**Dr. Imre Gyuk**, Program Manager, Energy Storage Research, U.S. DEPT. OF ENERGY

8:45-9:15 *Presentation:*  
**A Call for 10MW of Storage from UC San Diego**

One of the biggest and most advanced research universities in the U.S., UC San Diego is working toward a world-class sustainable energy infrastructure. The university aims to produce 7.4 MW in green energy from on-site photovoltaic, biogas fuel cells and wind energy procurement, as well as move toward hybrid and electric vehicles. Future projects include energy storage systems that adjust to the intermittency of renewable energy and provide permanent load-shifting. Mr. Washom will provide details on a forthcoming RFP for 10 megawatts of energy storage.

*Presenter:*  
**Byron Washom**, Director, Strategic Energy Initiatives, UNIVERSITY OF CALIFORNIA, SAN DIEGO

9:15-9:45

*Presentation:*

**Overview of the Grid-scale Energy Storage Market**

- Segments
- Dollar values
- Angles of attack (example companies targeting specific segments)

*Presenter:*

**Dan Cline**, *Analyst*, LUX RESEARCH

9:45-10:15

*Networking Break*

10:15-11:45

*Panel Discussion:*

**Who's Doing What and Where the Money Is Going**

The interest in energy storage tech continues to grow, and VCs are making their bets on companies and market opportunities. Figuring out who the winners are most likely to be requires knowledge and understanding of not only the technology but also the competitive environment now, the emerging smart grid environment, and where the power and transportation industries are headed. Opportunities exist not just in batteries per se, but in battery components, control systems and full customer solutions, including service, innovative third party business models and long-term deployment.

*Moderator:*

**Richard Baxter**, *Principal*, CRA INTERNATIONAL

*Panelists:*

**Mark Townsend Cox**, *Chief Executive Officer*, NEW ENERGY FUND LP

**Keith Gillard**, *Principal*, BASF VENTURE CAPITAL AMERICA INC.

**John L. Petersen**, *Partner*, FEFER PETERSEN & CIE

**David H. Wells**, *Partner*, KLEINER PERKINS CAULFIELD & BYER

**Marianne Wu**, *Partner*, MOHR DAVIDOW VENTURES

11:45-1:15 *Group Luncheon*

## TRACK 1: STORAGE TECHNOLOGY SURVEYS

- 1:15-1:30 *Chairman's Introduction*  
**Dan Rastler**, *Program Manager*, ELECTRIC POWER RESEARCH INSTITUTE
- 1:30-2:00 *Presentation:*  
**Advances in Lead Acid Chemistries and Components**  
While Lithium Ion is the darling of venture capital investment at the moment, Lead Acid should not be counted out, as it is still much cheaper for many stationary and mobile applications. The batteries in power-assist hybrid electric vehicles (HEVs) are required to operate from a partial-state-of-charge baseline and to provide, and accept, charge, for short periods, at very high rates. Under this regime conventional lead-acid batteries accumulate lead sulfate on the negative plate and fail quickly. This failure mode can be effectively countered by the inclusion of certain forms of carbon at greater concentrations than have been used in lead-acid batteries in the past. So effective is this preventive measure that VRLA batteries benefiting from the inclusion of such carbon have been able to substitute for nickel metal hydride batteries in power-assist HEVs with no significant loss of performance.  
*Presenter:*  
**Dr. Patrick T. Moseley**, *President*, ADVANCED LEAD-ACID BATTERY CONSORTIUM; *Manager*, Electrochemistry, INTERNATIONAL LEAD ZINC RESEARCH ORGANIZATION
- 2:00-2:30 *Presentation:*  
**Horizons in Lithium Ion Development**  
Transformational advances well beyond today's technologies are needed to satisfy the needs of high-mileage hybrid and all-electric vehicles as well as stationary storage applications. The near-term future in the transportation area will be dominated by Li-ion batteries. Fundamental and applied research is underway to develop more robust, safer, higher energy density, and more powerful Li-ion batteries, and to explore potential materials beyond lithium to enable revolutionary breakthroughs needed for a secure energy future. To respond to this challenge, new nanostructured and multifunctional materials will be developed to increase energy capacity and power densities and encompass basic materials research to prototype device development with the transfer of its intellectual property to industrial manufacturers at each step along the way.  
*Presenter:*  
**Mark Peters**, *Deputy Associate Laboratory Director*, ARGONNE NATIONAL LABORATORY
- 2:30-3:00 *Networking Break*

3:00-3:30

*Presentation:*

**Scaling Lithium Battery Development from Cell to Pack**

There are two complementary halves that define a good battery. The first is the fundamental materials and cell developments (as outlined in Dr. Peters talk) that define the battery capabilities and performance characteristics. The second aspect (the focus of this talk) extends the strong fundamental cell technology to build a battery suitable for the demands of automotive and stationary applications. This talk surveys the lessons, challenges and directions being undertaken for good cell packaging design, strategic manufacturing/shipping, control optimization, thermal control, battery module and battery pack design. These global developments focus on optimizing the battery pack for the rigors of variable environment, harsh performance and 10-year design life.

*Presenter:*

**Sankar DasGupta**, *Chief Executive Officer*, ELECTROVAYA

3:30-4:00

*Presentation:*

**UltraCapacitors Review**

Ultracapacitors have the ability to discharge very large quantities of power in short bursts. They are valuable both for certain kinds of short-duration ancillary services to the grid, as well as an augment for lead acid and lithium ion auto batteries. Much activity is taking place in ultracapacitor research, and this review will highlight technologies, components and chemistries that may have major market impacts within the next 2-3 years.

*Presenter:*

**John Miller**, *President*, JME, INC.

4:00-4:30

*Presentation:*

**MW-Scale Storage Solutions Deployed as kW-Scale Systems**

RedFlow Technologies now has Zn-Br electricity storage systems installed in utility trials in rural locations in Australia. Positioned at the customer's meter, clusters of these units are successfully working together to manage peak loads on the network. This approach maximises the value of energy storage to utilities while minimising risk. Individual systems have capacities of up to 30 kWh, and are readily installed and integrated with solar PV. RedFlow is now preparing to expand its manufacturing plant for increased production in 2010 and utility trials in USA.

*Presenter:*

**Chris Winter**, *Chief Executive Officer*, REDFLOW TECHNOLOGIES LTD

## TRACK 2: STORAGE PRODUCT PRESENTATIONS

- 1:15-1:45 **A123 Systems**  
*Presenter:*  
**Ric Fulop**, *Vice President, Marketing, A123 SYSTEMS*
- 1:45-2:05 **Grid Storage Technologies (GST Zinc/Air Battery)**  
*Presenter:*  
**Michael Oster**, *Chief Executive Officer, GRID STORAGE TECHNOLOGIES*
- 2:05-2:25 **EnerSys**  
*Presenter:*  
**Steve Vechy**, *Director of Marketing, UPS/Utility, ENERSYS*
- 2:30-2:55 **Exide Technologies**  
*Presenter:*  
**Mike Berger**, *Director of Engineering, North American Industrial Products, EXIDE TECHNOLOGIES*
- 2:55-3:15 **Austin Energy: A Dispatchable Wind/Solar Power System Using Dual-Mode Energy Storage**  
*Presenter:*  
**Mark Kapner**, *Senior Strategy Engineer, AUSTIN ENERGY*
- 3:15-3:35 **Prudent Energy**  
*Presenter:*  
**Tim Hennessy**, *President, PRUDENT ENERGY*
- 3:35-3:55 **ZBB Energy**  
*Presenter:*  
**Christopher Kuhl**, *Sales Applications Engineer, ZBB ENERGY*
- 3:55-4:15 **Adiabatic Small CAES (3 to 30 MW/hrs)**  
*Presenter:*  
**Septimus van der Linden**, *Principal, BRULIN ASSOCIATES*
- 4:15-4:35 **Expansion Energy LLC**  
The VPS Cycle: Utility-Scale Power Storage via Liquid Air Production  
*Presenter:*  
**David Vandor**, *Managing Director, EXPANSION ENERGY LLC*
- 5:00 *Day Three Adjourns*