

# Electricity Storage Association's 14th Annual Meeting Hosted by AEP

## AEP Chairman Mike Morris delivers keynote address

Hailed by participants as “the best and most well-organized conference on energy storage ever,” the Electricity Storage Association’s (ESA) 14th annual meeting, hosted by American Electric Power was held in Columbus from May 18-21, 2004.

The conference was opened by Mike Morris, AEP Chairman, President and Chief Executive Officer, who spoke on the importance of staying focused on the commercial aspects of bringing energy storage technologies to market. He emphasized the need to explore new and innovative ownership options, including leasing arrangements where end-users pay for the storage service, with ownership, operation and maintenance taken care of by others.



Mike Morris, AEP Chairman, President, and Chief Executive Officer delivers opening remarks at the 14th annual Electricity Storage Association meeting in Columbus.

technology,” wireless communications, and the tendency for leadership of established industries to overlook the poten-

tial of new technologies, Morris stated, “If we believe now as executive officers of electric utilities that our system as we know it will never change, then we're missing a huge bet on what the marketplace will ultimately demand of us.”



### Annual meeting draws record attendance

One hundred participants attended the meeting from seven different countries. Thirty people represented 11 utilities from the U.S., Canada, the UK and Japan (AEP, Atlantic Municipal, Georgia Power, First Energy, Southern, RWE Innogy, Kyushu Electric, TEPCO, Manitoba Hydro, PacifiCorp, TVA). Five more participants representing utility interests were present from EPRI, EPRI PEAC and Connectrix. Representatives from four government institutions dealing with electricity storage (DOE, Sandia, NYSERDA, CEC) were also present. In all, technology users such as utilities, utility interest groups and governmental organizations made up nearly half the participants.

During the conference, 34 presentations were given on different aspects of electricity storage, from development to implementation, with a high degree of focus on utility needs and perspectives. Six different storage technologies that are being developed, tested or applied at AEP were showcased in tours of AEP facilities in Groveport and Gahanna, providing further evidence of the ESA’s contention that electricity storage technologies are for real,

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# Meeting highlights commercial successes

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and rapidly emerging as practical solutions to electricity infrastructure problems.

## Pre-conference tutorials add new dimension to ESA proceedings

Twenty-five participants attended a pre-conference tutorial session with Andrew Burke, University of California – Davis, Institute of Transportation Studies, speaking on ultracapacitors for utility applications and Matthew Lazarewicz, Beacon Power Corp., Wilmington, Mass. ([www.beaconpower.com](http://www.beaconpower.com)), providing material on fly-wheel costs, design considerations and economics.

## Battery technologies moving forward

PacifiCorp's Brad Williams updated participants on the vanadium redox battery installation in Moab, Utah. PacifiCorp installed the 250-kVA, 2000-kWh battery, manufactured by VRB Power Systems Inc., on an 85-mile, 25-kV distribution feeder at a substation near Moab and has been running it in full-power cycling operations since March. The battery installation was an alternative to a substation upgrade that would have taken three to five years. PacifiCorp has had to deny new service on this line and respond to complaints from the Public Service Commission.

As a result of the installation, feeder deviations have improved by 2% and the power factor improvement has

reduced line losses by 40 kW. Williams also discussed local automated control and remote monitoring, technical issues that have arisen with the inverters in the power electronics package and permitting issues.

Momoki Katakura, Associate Director, Energy Marketing Dept. of Japan's Tokyo Electric Power Corp., (TEPCO) discussed the sodium-sulfur (NAS) battery commercial installations. According to Katakura, 52 MW of NAS batteries are operating at 19 sites. AEP's demonstration unit in Ohio is the only installation outside of Japan. NGK Insulators Ltd., Nagoya, has started mass production with an annual capability of 65 MW.

TEPCO is operating large-scale (1000-6000 kW) devices at its substations while industries such as semiconductor plants, hospitals, amusement facilities, and shopping centers use them to avoid voltage sags, supply emergency power, and shift load. Japanese government subsidies are available for "load leveling" up to one-third of the design, equipment, and construction costs.

Yoshiyuki Baba, Senior Officer and General Manager, Kyushu Electric Power Corp., discussed his utility's 4 MW of NAS battery installations. Baba explained advantages of NAS over distributed generation but also disclosed that Kyushu just breaks even financially on the installations and the current system price of \$2000/kW makes it difficult to promote NAS batteries. Baba presented the customer economics from several installations:

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Meeting chair Dr. Ali Nourai of AEP welcomes attendees to the 14th annual Electricity Storage Association meeting.



A group enjoys the pre-conference mixer. From left, Malcolm Jacques, Mark Kuntz, Anthony Price, Michael Gattrell, John Boyes, and Katsuji Emura.

## New York and California detail funding opportunities

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- ▶ A 1-MW subway installation that will produce \$440,000/year energy savings and is paid for by a service fee of \$230,000/year. Kyushu expects to achieve a 5.1 year payback on this installation.
- ▶ A 2-MW x 7.2 hour boat racing facility installation that provides load leveling and enhanced reliability. Operating 100 days per year, the system produces \$328,000/year in energy savings and is paid for by a \$390,000/year service fee. The difference, however, is more than compensated for by the enhanced reliability, which has enabled races to continue during what would otherwise have been an outage.

### Opportunities for storage discussed

Gary Walzer, director, Taratec Corp., Columbus, who specializes in technical and economic assessments of emerging industrial technologies argued that locational marginal pricing (LMP) structures offer significant opportunities for storage. The PJM Interconnection, where LMP forms the basis for competitive grid services,



Imre Gyuk, DOE Program Manager and Phil Symons, ESA board member, have a chat at the mixer.

therefore may be one of the best places to consider storage. However, other grid systems' efforts to institute LMP have weakened along with their progress towards a competitive market.

Regarding finding early niche markets for storage technologies, Walzer stated that, "there are no silver bullets, just smart application opportunities."

Robert Taylor discussed studies conducted by Tennessee Valley Authority (TVA), Knoxville, that show frequency regulation as one of the highest value markets for storage. Frequency regulation is an ancillary service that is necessary for proper grid operation. Taylor suggested that "if utilities knew what frequency regulation costs, this market would emerge." Taylor also commented on capital costs:

"Storage must be cost-competitive with other technologies and strategies currently in use to provide frequency regulation, arbitrage, deferral, etc." TVA is working with EPRI (Electric Power Research Institute, Palo Alto, Calif.) on valuation methods to support and justify storage.



ESA board member Brad Roberts of S&C Electric Corp. talks with a group during a tour of AEP's storage facilities.

At a later session, TVA confirmed that they would be releasing an RFP in June for the deployment of storage technologies in their Columbus, Mississippi facility. This would make use of an interconnection, inverter and other facilities previously intended for the North American launch of Regenesys, which has now been canceled.

Mike Sanislo of High Energy Consulting spoke on the challenges of bringing disruptive technologies to market (at Pfizer, 96% of new products fail), and suggested ways that developers of storage technologies can attract lead users, conduct market analyses and maximize the use of demonstrations to understand customer benefits, not just technical issues.

Dale Krummen of AEP painted a vision of the future, describing a proposed storage-couple renewable energy project for San Cristobal in the Galapagos Islands.

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Conceived under a United Nations development program, and sponsored by the E7 member companies (AEP, EdF, Hydro-Quebec, Scottish Power, Enel, RWE, Ontario Power), the project utilizes storage and wind power to displace the current diesel-fired system. With the extreme environmental sensitivity of the site, this project has the potential to showcase the environmental benefits of storage.

The flow battery discussion group was characterized by a lively discussion of lessons learned and potential pitfalls along the road to commercializing this particular technology. Talks by John Hawkins, Stephen Clarke and Rick Winter highlighted the technical as well as financial challenges faced by technology developers as they struggle to gain credibility with customers and the financial community.

### **Funds are available to storage developers**

Pramod Kulkarni, California Energy Commission, discussed three of the storage projects that are being funded through the CEC and the DOE, the rationale for the level and nature of funding, and the role the funding is expected to play in commercializing storage technologies. The technologies and applications included are zinc bromine flow battery for T & D deferral, ultracapacitors for wind and hydro optimization, and flywheels for load leveling of an electric rail system. The CEC is pleased with the results of the solicitation so far, regretting only that there were no customer-side applications or major wind-storage applications.

Joseph Thayer, New York State Energy Research & Development Authority (NYSERDA), reviewed his state's program opportunity notice for storage and the perceived benefits of electric energy storage in meeting the state's energy needs. He pointed out the shortfalls that New York City and Long Island face under an extreme weather scenario, and expressed his vision for how storage technologies might provide a partial solution. The program has \$3.5 million in total funding, with \$1 million available for one or more demonstration projects, \$500,000 for new product development, and \$100,000 for market analysis studies.

A time of camaraderie and good food at the Capital Club was accompanied by a light-hearted update on Golden Valley's battery system. Jim McDowall of Saft America provided an array of photos, anecdotes and experiences from the process of building, testing and commissioning the world's most powerful battery. Already, the system has contributed to grid reliability, serving its intended function in preventing a number of outages.

### **AEP hosts tours of storage facilities**

On the final day of the event, AEP hosted tours of their storage application site in Gahanna as well as their laboratories at the Dolan Technology Center. Officials from AEP discussed a variety of storage-related technologies being demonstrated, including a monitoring program for the 500-kW NAS battery that has been operating for close to two years. The U. S. Department of Energy (DOE) is funding the monitoring program, Sandia National Laboratories, Albuquerque, N. M., is implementing it. A flywheel system, a lead-acid battery system, and the NAS battery are being evaluated for their ability to mitigate power-quality disturbances experienced by customers. At the Dolan Center, AEP is also conducting initial testing on two lithium ion battery technologies and a supercapacitor-based system. ◀

## **Order your copy of the ESA 2004 Proceedings**

A CD of the proceedings and list of attendees from the 14th Annual Meeting of the Electricity Storage Association will be distributed to all registered attendees in the month of June.

This valuable resource includes all abstracts, biographies and presentation materials, and is available to non-attendees for \$100. For further details, contact Cricket Rubino, [cricket@garlic.com](mailto:cricket@garlic.com).

## Message from the ESA Chairman

The Electricity Storage Association's 2004 annual meeting was the most extensive ever. There were over 100 attendees (a record), tours of six different storage technologies under test at AEP (also a record), over 35 presentations, and two tutorials. Kudos to the Meeting Chair, Dr. Ali Nourai, who put together this tremendous package, and a great deal of thanks to AEP, who, from the CEO, Mr. Mike Morris to the lab staff, supported the ESA 2004 meeting and events.

We are pleased with this year's meeting and we hope each year to improve. That can only occur if you all pitch in to help at the time of the meeting and if you contact us as to how to change. One change this year from 2003 is the delay in the process of making the CD of the meeting. Today I put the final CD in the mail to Sandia National Laboratory who will be publishing it and sending it to all attendees in the next few weeks. Thanks to Jim McDowall and Gerard Thijssen for their dedicated effort in its preparation. For your convenience, we are including the presentations from the meetings in 2001, 2002, and 2003 on the CD. We hope you will find this to be a valuable benefit of your membership in the ESA.

As we reflect on the annual meeting, it is important to look not only at the conference itself, but to where the organization has been, where it is going, and to external events that influence our business. This was the 14<sup>th</sup> annual meeting of the ESA and its predecessor, the Utility Battery Group (UBG). For several years the organization struggled in a utility- and user environment that showed little interest in electricity storage. Today, with a new approach to the electric power business from DOE in the formation of the Office of Transmission and Distribution, and through energy storage initiatives by both California and New York, we can anticipate an increased reliance on this technology in the future. The general meeting of the IEEE Power Engineering Society was held in Denver just two weeks after our meeting. Energy storage, particularly as it can be used as a partner with renewables, was of great interest and is likely to further increase in our organization.

Our next meeting is planned for Toronto, Ontario, Canada, on May 24 and 25, 2005 and we are investigating sites for the ESA 2006 meeting. You can expect a formal announcement this fall at the DOE energy storage PEER review, which is tentatively set for November 4 and 5, 2004. If you have questions or suggestions, please contact us by Email at [info@ElectricityStorage.org](mailto:info@ElectricityStorage.org). We would be delighted to hear from you.

Regards



Bill Hassenzahl

Chairman of the Board of Directors

## Future Events

### World Summit on Advanced Capacitors 2004 Washington, D.C., July 14-16, 2004

The *Advanced Capacitor World Summit* is designed to disseminate the latest information on EC uses in a variety of industries. Over 20 industry leaders will speak at the conference. Details are at <http://www.intertechusa.com>.

### DOE Energy Storage PEER Review November 4 and 5, 2004 (tentative).

### Battcon 2005

**TBA.** The ESA joins the IEEE Power Engineering Society once again as technical co-sponsors of the conference. To learn more about Battcon, visit the conference Web site: <http://www.battcon.com>, or follow the link from ESA's Web site.

### ESA 2005

**Toronto, Ontario, May 23-25, 2005.** Details will follow in subsequent newsletters and on the ESA Web site.

## About the ESA

### Our Mission

To promote the development and commercialization of competitive and reliable energy storage delivery systems for use by electricity suppliers and their customers, thereby bringing financial and technical benefits for energy storage operators.

### Membership Benefits

- ▶ Gain early knowledge of the latest developments in energy storage technology and field/customer applications of new/innovative storage technologies, and information on how these can be used for member's business advantage
- ▶ Early notification of upcoming business leads in US and abroad
- ▶ Enhanced exposure to potential customers for energy storage products and services
- ▶ Ability to network with users, manufacturers, and researchers in the energy storage field
- ▶ Access to ESA contact list of more than 800 names of industry leaders interested in energy storage
- ▶ Ability to actively interface with key representative from government and industry to receive insights into energy storage markets and strategic directions of key industrial firms

### Join Now

General Membership is \$750 per year which includes attendance at meetings, conference proceedings, special tours, and social events.

To join the ESA, complete our on-line membership form. You will be asked to provide credit card information over our secure transaction server.

For questions about membership in the ESA, contact Brad Roberts at (414) 423 8776 x109 or [membership@electricitystorage.org](mailto:membership@electricitystorage.org).