

EESAT 2005 Preliminary Agenda Set

EESAT 2005, the fifth biennial conference on **Electrical Energy Storage Systems Applications and Technologies**, has lined up speakers from around the world to present at the Sir Francis Drake Hotel in San Francisco, Calif., October 17-19, 2005.

Speakers from U.S., Japan, Switzerland, Finland, Germany, Austria and France will present technical and economic papers topics on specific electrical energy storage technologies and applications.

Technical Sessions, October 17 – 19th

- ▶ Economics and Policy
- ▶ Advanced Batteries and Electro-Chemical Capacitors
- ▶ Renewable and Distributed Energy Application
- ▶ Flywheels
- ▶ Compressed Air Energy Storage (CAES)
- ▶ Power Electronics
- ▶ Alternative Concepts
- ▶ NYSERDA/ DOE Joint Energy Storage Initiative
- ▶ CEC / DOE Joint Energy Storage Initiative

Scheduled Events

- ▶ Sunday, October 16, 2005
 - 4:00 - 6:00 pm – Registration at the Sir Francis Drake hotel
 - 6:00 - 7:00 pm – Welcome Reception at the Sir Francis Drake
- ▶ Monday, October 17, 2005
 - 5:30 - 7:00 pm – Reception at the Sir Francis Drake sponsored by the Electricity Storage Association
- ▶ Tuesday, October 18, 2005
 - 6:00 - 9:00 pm – Dinner Event at the Carnelian Room on the Embarcadero in San Francisco
- ▶ Wednesday, October 19, 2005
 - 2:30 - 6:00 pm – Tour of the Distributed Utility Integration Test (DUIT) facility, the first full-scale, integration test of commercial-grade, utility grid interactive Distributed Energy Resources (DER) in the United States.

Registrations for the meeting can be made by visiting the EESAT website: <http://www.sandia.gov/eesat/2005/>. Registration fees are \$550 for ESA members and \$700 for non-members. Registrations can be made online through a secure server or via fax or mail. ◀

Beacon Power Ships Smart Energy Matrix Flywheel Demonstration System To California

Company Also Announces Live Demonstration of System as part of EESAT in October

Beacon Power Corporation, a company that designs and develops advanced products and services to support more stable and reliable electricity grid operation, has announced that its first-ever Smart Energy Matrix demonstration system was shipped on September 15, 2005. The scale-power flywheel-based energy storage system, which was built under contract to the California Energy Commission, in collaboration with the U.S. Department of Energy (DOE) and the California ISO, is designed to demonstrate the feasibility of providing highly responsive and cost-effective frequency regulation services for the electricity grid. The demonstration system has a capability of approximately ten percent of the planned commercial version of the Smart Energy Matrix. The system will be installed in San Ramon, California at PG&E's Distributed Utility Integration Test (DUIT) site, where the country's first integration testing of commercial-grade, utility grid-interactive distributed energy resources is being conducted, including Beacon's system.

“With preparations at the installation site now complete, we received the go-ahead to ship this first Smart Energy ▶

Beacon Power, continued from page 1

Matrix demonstration system,” said Bill Capp, Beacon president and CEO. “This is a key milestone in the development and deployment of this technology, and we’re looking forward to putting it through its paces in a live grid-connected environment. We believe that the rigorous testing conducted in the coming months will show that flywheel energy storage can provide responsive performance, environmental benefits, and cost-effective operation.”

Beacon Power also announced that there will be a live demonstration of this Smart Energy Matrix system during a private tour of the San Ramon DUIT facility on October 19, 2005. The tour is part of the International Electrical Energy Storage Applications and Technologies (EESAT) Conference, taking place in San Francisco from October 17-19. Beacon Power is also presenting a related technical paper at the event.



Beacon’s Smart Energy Matrix demonstration system loaded onto a flatbed trailer.

“In the aftermath of the 2003 power outages, we are becoming increasingly aware of the importance of frequency regulation on the grid,” said Dr. Imre Gyuk, program manager of DOE’s Energy Storage Research Program. “We are pleased that Beacon has completed construction of the system with exemplary promptness and we look forward to seeing the installed device during the EESAT meeting.”

Beacon Power previously announced that it is also building a second scale-power Smart Energy Matrix demonstration



Beacon’s Project Director, Jim Arsenault, inside the flywheel system container.

system under contract to the New York State Energy Research and Development Authority (NYSERDA). This system, developed in collaboration with the U.S. Department of Energy and the New York ISO, is planned for delivery in the fourth quarter of this year. ◀

New US Energy Policy Includes Storage

On August 8, 2005, US President George W. Bush signed into law the Domenici-Barton Energy Policy Act of 2005. The new law authorizes \$85 billion (over ten years) in spending and tax incentives. A common theme throughout the legislation is clean energy (including but not limited to renewable energy), conservation, fuel diversity and efficiency.

Electricity storage is highlighted in Section 1224, “Advanced Power System Technology Incentive Program,” which authorizes the US Department of Energy to create an incentive program to support the deployment of advanced fuel cell, turbine, or hybrid power systems to generate or store electric energy. Subject to the availability of funds, a payment of 1.8 cents/kWh would be paid to the owner for the first 10 million kWh’s produced in any fiscal year. \$10 million is authorized but not necessarily appropriated for this program.

The Electricity Storage Association will be working with members of Congress to encourage the appropriation of these monies and to ensure that this incentive program is available for developers of storage systems.

Further Updates on Electricity Storage Program at California Energy Commission

In 2003 and 2004, the **California Energy Commission** (CEC) provided funds for demonstrating three electricity energy storage technologies in California through its Public Interest Energy Research (PIER) program. The PIER program entered into contracts to validate the technologies' performance and their ability to deliver the intended service to the transmission system, distribution systems or a customer site.

Beacon Power contracted with the PIER Program to develop flywheel-enabled electricity storage (Smart Energy Matrix) system for frequency control for the transmission grid in California. In July 2005 Beacon Power had a successful factory demonstration of the Smart Energy Matrix system. All seven flywheels and control systems were successfully demonstrated to respond to both local and remote access command signals. The system has been shipped to California for additional on-site testing and field demonstrations.

In another project, PIER signed a contract with the **Palmdale Water District** to develop and demonstrate

an ultracapacitor based EnergyBridge system for use in a MicroGrid that includes the interconnection of hydro-electric generation, natural gas generation, backup diesel generation, wind generation and the utility electric grid. Palmdale is commissioning several of the distributed generation systems and a new data acquisition system (DAS) is scheduled to be installed in the next month or so. This DAS will start collecting the baseline data used for the future assessments of the system performance and economic benefits provided by the EnergyBridge. Northern Power Systems and Black and Veatch have completed the prototype design of the EnergyBridge and fabrication of the system will start soon. The EnergyBridge is scheduled to be commissioned in 2006.

ZBB Energy Corporation has a contract with PIER to develop and demonstrate the economic benefits of utility distribution system upgrade deferral using four ZBB 500-kW/500-kWh mobile energy storage systems. ZBB is in the final stages of assembling the first 500-kW/500-kWh mobile energy storage unit and has started factory testing on the unit. ZBB anticipates completing factory acceptance testing of this first unit in the next two months at their manufacturing facility in Wisconsin. Once the unit has completed factory acceptance testing, it will be scheduled for shipment to the PG&E Test facility in San Ramon, California, for field testing and additional system performance demonstrations. The complete four-unit system is scheduled to be assembled and tested in 2006.

In addition to the CEC contracts with Beacon, ZBB and Palmdale, DOE also awarded contracts to **EPRI Solutions** (previously EPRI-PEAC) and **Distributed Utility Associates** for data collection and analysis activities to provide the independent assessment of the performance and economic benefits of these energy storage systems. The US DOE acts as a technical advisor to the Commission on the three electricity energy storage projects funded by the Public Interest Energy Research Program. ◀

Golden Valley BESS enters Guinness Book of World Records

The massive battery system in Fairbanks, Alaska, developed by ABB and battery maker Saft has powered its way to a certified Guinness world record as the world's most powerful battery.

The BESS was built for Golden Valley Electric Association (GVEA), an energy cooperative serving the area around Fairbanks. Energized in 2003, it gives GVEA power network continuous voltage support during normal operations as well as access to instantaneous emergency power.

The BESS qualified for the world record in when it was discharged at 46 MW for 5 minutes during commissioning tests. Guinness certified the record earlier this year.

AEP's Appalachian Power Unit To Install First U.S. Use Of Commercial-Scale Energy Storage Technology

American Electric Power (AEP) and two corporate partners finalized an agreement to install the first megawatt-class advanced energy storage technology to be used on a U.S. distribution system.

A 1.2-megawatt, stationary sodium sulfur (NAS[®]) battery-based system will be installed at an Appalachian Power Co. substation near Charleston, W.Va., and will be operating by early summer of 2006, before summer peak demand. Appalachian Power is an AEP operating unit. The installation is expected to delay the need for equipment upgrades to the facility by six to seven years, allowing that capital expense to be deferred.

AEP's partners in the agreement are NGK Insulators Ltd. (NGK), whose NAS Battery Division will provide

the NAS battery, and S&C Electric Company whose Power Quality Products Division will supply the power electronics and serve as system integrator.

The U.S. Department of Energy (DOE), through Sandia National Laboratories, is a supporting sponsor and will contribute to the funding of the project.

This peak-shaving unit is capable of supplying 7.2 megawatt-hours of energy. The battery is expected to last 15 years or 4,000 to 5,000 charge-discharge cycles at 90 percent of full energy capacity.

After the unit has operated six or seven years, AEP will analyze its equipment upgrade options and consider moving the NAS system to another site. ◀

A note from ESA Chair Jim McDowall...

This year's Battcon get-together in Miami in May was the ninth in the series and the most successful to date, with close to 450 attendees. The conference is endorsed by the ESA and has long had associations with the electricity storage community: the technical committee includes me, Garth Corey of Sandia National Laboratories and Dave Nichols of American Electric Power. Although the 2005 conference did not include any presentations on energy storage applications, the audience interest in new storage technologies continued to build from past conferences. Over 40% of the papers covered a broad spectrum of new and emerging technologies and their application in standby service.

The continuing development of nickel- and lithium-based technologies was covered in papers by Cobasys, Hoppecke, Tyco, Valence and Avestor. John Sears of Active Power continued his series of papers on thermal and compressed-air storage (TACAS), which could also be subtitled, 'how many storage technologies can

be stuffed in one box?' Also rather unusual for the standby battery field is the use of small high-temperature batteries, with lead-acid manufacturer FIAMM advocating the use of sodium-metal chloride batteries for telecom applications.

Another trend that has become evident is the increasing interest shown by fuel cell companies in standby applications. Three papers were presented on this subject. It seems that fuel cell developers have realized that sales to the automotive market are still several years away and that they must sell into other markets to survive. They are able to circumvent life issues with their proton-exchange membranes, since the fuel cells sit inactive for the vast majority of their service lives. This also avoids contentious hydrogen infrastructure issues, with hydrogen for these units simply being delivered in cylinders by industrial gas suppliers. Hydrogen in pressurized containers has long been used in nickel-hydrogen batteries for the space program, and now we are seeing this form of storage coming down to earth. ◀

ESA and Power Magazine team up to provide articles on electricity storage

Beginning with the September/October issue of *Power Magazine* the ESA logo will appear on the masthead page of each issue. After attending the annual meeting of the ESA in Toronto, *Power Magazine* editor Ken Wicker felt that the storage technologies presented at the meeting needed broader coverage, stating, "Our readers are people involved with power generation and need to know more about advancements in electricity storage."

This agreement between ESA and *Power Magazine* calls for a minimum of two articles on storage during the year. Plus, in 2006, *Power Magazine* will add a section on electricity storage systems in its annual supplier issue. Mr. Wicker published a brief article covering the ESA annual meeting in the July/August issue.

ESA members are encouraged to subscribe to *Power Magazine*. The subscription will be at no charge for managers and engineers of ESA member companies. For more information, contact the editor, Ken Wicker by e-mail: ken_wicker@platts.com. ◀

Future Events

EESAT 2005

San Francisco, California, October 17-19, 2005.

Scheduled sessions for include Storage with Distributed Generation, Flywheels Systems, Compressed Air Systems, Power Electronics, Technology Advances, Super Capacitor Development and Applications, Lithium Batteries, Lead Acid Battery Life Predictions, and Large Applications. For further information, visit <http://www.sandia.gov/eesat/2005/> or email eesatinfo@sandia.gov.

ESA 2006

Knoxville, Tennessee, May 16-18, 2006. Co-sponsored by EPRI Solutions. Further information will be available in future newsletters and on the ESA Web site at www.electricitystorage.org.

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 Gerard Thijssen in the Netherlands at +31 26 3 56 26 03 or email membership@electricitystorage.org.