

Toronto Meeting Highlights Systems Performance, Innovative Storage Solutions

Updates given on government initiatives; wind applications growing

The 2005 Annual Meeting of the Electricity Storage Association in Toronto delivered good news in the electricity storage industry with reports from several companies of installations performing as expected and more systems being brought on line.

The meeting, held May 23-26, 2005 consisted of presentations made by manufacturers, utilities, and government agencies and also included tours of local area energy firms.

Tim DeVries of Golden Valley Electric Association reported on the battery energy storage system (BESS) in Fairbanks, Alaska. The system was fully installed by December 2003 and was to complete an 18-month availability guarantee period in which the system had to demonstrate 98% availability at full capacity. DeVries reported that the system has met its warranty performance obligations and has prevented nearly 364,000 customer disconnections in the utility's service area.



A fabulous view of Toronto's Skylon Tower from the top of the Westin Harbour Castle.

Ted Takayama of NGK Insulators presented information on sodium-sulfur (NAS) battery installations in

Japan. NGK and the Tokyo Electric Power Company (TEPCO) have completed over 100 projects to date with approximately 120 MW of installed capacity. Most applications are for load shifting (or customer peak shaving) while some also perform emergency backup and UPS depending on the customers' needs. NGK expects to manufacture 58 MW of capacity in 2005 and increase up to 140 MW over the next few years. Their current manufacturing facility has a capacity of 65 MW per year with landspace for another 200-MW expansion. Takayama reported that NGK is targeting China for further cost reductions in manufacturing, while expanding its markets to outside Japan, particularly Europe and the U.S. with wind being the most promising application.



Mindi Farber-DeAnda (SAIC), Dutch Achenbach (Kaua'i Island Utility Cooperative), Imre Gyuk (DOE), and Georgianne Peek (Sandia National Laboratories) enjoy the dinner cruise aboard the Mariposa Belle.

Brad Williams of PacifiCorp reported on the ongoing development and success of the Castle Valley VRB energy storage system (VRB-ESS), a 350-kVA, 250-kW, 8-hour system located on the Utah Power grid. Built in order to defer a \$5 million transmission line through an environmentally sensitive area, the VRB-ESS enabled

PacifiCorp to avoid a lengthy permitting process that was expected to take as long as five years. The system has been operational for a year and a half, and has fully met the peak load constraint problems that previously plagued the Castle Valley area. Mr. Williams reported



Board member Mark Kuntz of VRB Power Systems and John Boyes of Sandia National Laboratories.

that feeder deviations have improved and that line losses have been reduced by approximately 40 kW. Customer response has also been favorable. Several upgrades have

been performed to assure the reliability of the system, and software enhancements are underway to maximize efficiency, automatically peak shave during summer and winter high demand periods, and provide continuous, integrated volt/var control. PacifiCorp is also considering other applications for the VRB technology.

Growing Wind Capacity Provides Opportunities

Gentaro Koshimizu of Electric Power Development Co. reported on the January 2005 commissioning of a 4-MW, 6-MVA, 1.5-hour VRB system in Japan, used for wind stabilization. Installation of wind power in one area of the country has been limited due to frequency instability problems associated with intermittent wind. In order to break through this limitation and increase wind capacity in Japan, the New Energy and Industrial Technology Development Organization (NEDO) has funded the use of an energy storage system coupled to a large scale (19-turbine) wind farm on the island of Hokkaido. A Vanadium Redox Battery Energy Storage System (VRB-ESS) was installed at Tomamae Wind Villa farm

and began operation in early 2005. The 4,000- kW/ 90- minute or 6,000-kW/20-minute system will operate until 2008 while engineers refine the control system software to reduce the battery rating while maximizing the efficiency of the system.

In another wind application, Ken Mattern of S&C Electric Company discussed an “Electronic Shock Absorber” device which incorporates super capacitor energy storage and power electronic inverter modules along with a sophisticated control system to stabilize the rate of power flow from wind fluctuations. The 500-kW system is containerized in a 30-foot trailer, expandable up to 2 MW in the same space. The system has no moving parts and is designed to enable wind farm operators to meet the utility ramp rate requirements. The first demonstration project is scheduled to be deployed by Hawaiian Electric Company in late 2005.

All told, an exciting number of new and existing problems are being solved by electricity storage systems at utility scale. ESA participants received a first-hand view of how these technologies are optimizing grid systems and improving operations for utilities around the world.



Ted Takayama of NGK Insulators.

New York and California Energy Storage Program Updates

Joe Sayer, project manager at NYSERDA, updated attendees on projects that include a NAS battery for the New York Power Authority at a Long Island bus depot in Garden City. The battery system will be used to store

electricity at night and use it during the day to power a natural gas compressor for refueling buses. Demand charges for electricity on Long Island are \$35/kW/month for the summer months and it is expected that



Outgoing Board Chair Bill Hassenzahl, left, presents Carl Keyes of Kinectrics a certificate of appreciation for organizing the ESA's 2005 meeting.

the battery system will provide significant economic advantages for the bus system. Matt Lazarewicz of Beacon Power

also updated the audience on a planned grid frequency regulation project involving Beacon Power's high-energy flywheel storage system. The system will be located at an industrial site in Amsterdam, NY.

Pramod Kulkarni of the California Energy Commission discussed CEC/DOE projects and emphasized the need for economic modelling tools for screening potential energy storage applications. He suggested increasing end-user participation by coordinating an industrial customer forum at EESAT (see "Future Events").

Repowering of Sabana Llana BESS

In 1994, the Puerto Rico Electric Power Authority built a 20-MW battery energy storage system to fulfill Puerto Rico's spinning reserve requirements. The system also provided frequency control and voltage regulation, but was retired from service after only five years due to accelerated failures. Javier E. Pueyo Font and Carlos J. Castro Montalvo discussed the replacement of these battery banks at Sabana Llana. PREPA completed installation work on the two battery banks in August 2004 and expects the full system to be on-line this month. The lead-antimony cells are designed to perform in rapid

discharge mode (SOC > 35%), frequency control mode (SOC > 60%) and voltage regulation mode and are expected to have an eight-year life.

Kinectrics and SatCon Treat Attendees to Site Tours

Attendees to the meeting were given a tour of Kinectrics state-of-the-art laboratories and testing facilities on Tuesday afternoon. Demonstrations included a high voltage test and testing of fabrics in high current situations.

The visit to SatCon included breakfast, a presentation overview of SatCon by Vince Scaini, and a plant walk-through to



Steve Cress of Kinectrics gives a tour of the testing facilities.

witness the assembly of large inverters for fuel cells, battery storage and photovoltaic applications.

The group then traveled to Niagara Falls, Ontario to tour Ontario Power Generation's pumped storage and generating plant and to see the Falls. ◀

ESA Elects New Board Members and Officers

The ESA elected new board members and officers at the annual meeting in Toronto. Rick Winter of Distributed Utility Associates and Haresh Kamath of EPRI Solutions were newly elected to the board.

Officers were appointed during the meeting as well. Jim McDowall of Saft America takes over as Chairman, Ben Norris of Norris Energy Consulting Co. is Treasurer, Winter was elected Secretary and Brad Roberts of S&C Electric was named Chair-Elect. Rounding out the board are Mark Kuntz of VRB Power Systems, Gerard Thijssen of KEMA, Matt Lazarewicz of Beacon Power, Ali Nourai of American Electric Power, and Carl Keyes of Kinectrics.

Board members serve for two-year terms and meet via teleconference once a month. Their job is to set the direction for the association, organize the annual meeting, recruit new members, add content to the website, and further spread information about storage.

The board also created a new position "Member Emeritus" and elected Phil Symons to this position. Symons is a past Chairman of the ESA board and has greatly contributed to the growth of the organization for many years. ◀

A Message from the Chair..

It was with great pleasure and not a little trepidation that I took over as Chair of the ESA's Board of Directors at the recent annual meeting in Toronto. Phil Symons and Bill Hassenzahl will be tough acts to follow! Still, I have inherited the organization in sound condition (thanks, Bill!) and am very excited about the prospects for the ESA in the next couple of years.

While I am passing out votes of thanks let me also mention Carl Keyes for hosting a thoroughly enjoyable and successful meeting in Toronto and Ali Nourai for a great job coordinating the agenda. With a quality technical program, interesting tours, and - what else would you expect? - a dinner cruise, this meeting set the bar at a high level for newly elected director Haresh Kamath when he hosts next year's meeting in Knoxville. At least he has already booked the cruise!

As always with our meetings, the networking discussions were every bit as valuable as the formal program, and it seems that there are several new opportunities for substantial projects in the electricity storage arena.

In addition, the ESA is looking at new initiatives, including the possibility of educating legislators in the U.S. and elsewhere about the benefits of storage (contact Mark Kuntz for more information), and improving our website (under Gerard Thijssen's direction). These are indeed important times for storage and the ESA!

Finally, let me take this opportunity to welcome Haresh and Rick Winter as our newest Board members (welcome back, in Rick's case). I would also like to congratulate Brad Roberts for being elected to the position of Vice Chair/Chair-Elect, Ben Norris for



New ESA Board Chair Jim McDowall (Saft) second from left, with Tim DeVries (Golden Valley Electric Association), Clint Lowery (Southern Company) and Ed Innes (Manitoba Hydro).

being reelected as Treasurer, and Rick for taking over as Secretary. And while I'm at it, I should also thank Matt Lazarewicz for his assistance with many areas of the Board's work. It is because of the fine team of directors we have built up that I can look forward with excitement to my tenure as Chair.

With best wishes,
Jim McDowall



Rikiya Abe and Gentaro Koshimizu (J Power), Hiroyuki Abe and Ted Takayama (NGK Insulators).



Dan Mears (Technology Insights) and Gerard Thijssen (KEMA).



The day was perfect to view Niagara Falls.

The 2005 ESA Meeting in Toronto offered something for everyone. Social events including the pre-meeting mixer and the dinner cruise in Toronto Harbour gave attendees the chance to network and reunite with colleagues. Tours of Kinectrics, SatCon, and the Niagara Falls generating station enhanced the technical presentations and many had the opportunity to sightsee in Toronto and Niagara Falls.



Edward Buiel (MeadWestvaco), Phil Symons (Consultant), Nancy Clark (Sandia National Laboratories), and Ali Nourai (American Electric Power).



The turbine hall of Ontario Power Generation's Niagara Falls Generating Station.

USDOE, Sandia, ESA Announce Plans for EESAT 2005

The U.S. Department of Energy, Sandia National Laboratories, and the Electricity Storage Association have announced they are sponsors of EESAT 2005, the fifth biennial conference on Electrical Energy Storage Systems Applications and Technologies, to be held at the Sir Francis Drake Hotel in San Francisco, Calif., October 17-19, 2005.

EESAT 2005 will present technical and economic papers from international sources that cover topics on specific electrical energy storage technologies and applications, with an emphasis on the latest commercial developments for the use of electricity storage in the power industry.

EESAT 2005 will address a wide range of electrical energy technologies, including conventional and advanced battery energy storage, electrochemical capacitors, SMES, flywheels, CAES, and pumped hydro.

Further information will be made available in the next newsletter. ◀

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/> 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.