DOE Announces Energy Storage Systems Program Annual Peer Review

Meeting to be held in Washington, D. C., November 10-11, 2004

The US Department of Energy has announced the dates of the upcoming Annual Peer Review. The Washington Marriott Hotel in Washington, D. C. will host the meeting November 10-11, 2004. The ESA will hold a mini-meeting and a reception on the evening of November 10th.

"This will be both a peer review and a market place. The real measure of a project is not a paper report but its eventual commercial success!"

Dr. Imre Gyuk, Program Manager

During the Peer Review, reports will be presented on all projects supported by the DOE Energy Storage Program. Participants will be briefed on the latest developments in a broad portfolio of storage technologies for a wide spectrum of applications, including advanced batteries, flywheels, and ultracapacitors. Research in power electronics and results of analytical studies on the economical benefits of storage will also be covered.

The ESA will be teaming up with United States Energy Association (USEA) and, together with storage experts representing the European and Japanese storage communities, will present a global view of the status of electricity storage. USEA is the U. S. Member Committee of the World Energy Council (WEC). USEA is an association of public and private energy-related organizations, corporations, and government agencies and represents the broad interests of the U.S. energy sector by increasing the understanding of energy issues, both domestically and internationally.

Initial reports will be presented on projects of the Joint Storage Initiatives sponsored by the California Energy Commission and the New York State Energy Research and Development Authority in cooperation with the DOE Energy Storage Program.

Because a majority of active players in the field of energy storage will be attending, the Peer Review will provide an excellent opportunity for networking. Participants can pick up ideas for new research, develop new collaborations, or even discover partners for future commercialization of research projects.

Admission to the meeting is free; however, you must reserve your seat at the conference by calling or e-mailing Nancy Clark at Sandia National Laboratory (nhclark@sandia.gov or (505) 845 - 8056). Visit *http://www.sandia.gov/ess/* for further details.

ESA Plans 2005 Meeting

The ESA annual meeting is slated for May 23-25, 2005 in Toronto, Canada, hosted by Kinetrics. A call for papers and registration details will be published soon in this newsletter and on the ESA website.

Dispatch from the Energy Frontier

By Mark Kuntz, ESA Board

I recently drove a Toyota Prius, the hybrid-electric car that has the auto industry sitting up and taking notice. The handling and acceleration were impressive, and the sound level in the cabin, very quiet at all times, dropped to zero at idle, as the engine shut down; starting acceleration is provided by the electric drive. Incredibly, the instantaneous fuel monitor never dropped below 30 miles per gallon, and discussions with current owners indicate performance in excess of 50 miles/gallon on average. The car integrates a number of technologies not previously used in an automobile, but I would contend that it is *electricity storage* that enables their seamless integration and astounding performance.

Numerous paradigm-shifting capabilities are brought about by the presence of storage:

- The combustion engine operates more efficiently, running at full or near-full load all of the time.
- The engine is downsized without sacrificing performance, because under heavy demand, stored energy is brought into play to supplement its output.
- Idle losses are eliminated completely by turning off the engine while stopped or travelling at low speeds.
- Kinetic energy is captured and sent to storage by the use of regenerative braking.

The result is a car that delivers jaw-dropping fuel economy while actually boosting its performance and functionality above conventional cars in its class.

Mark Kuntz takes a break from chopping wood to test drive the Toyota Prius.

When the rest of the auto industry dipped its collective toe into the hybrid-electric field (with the possible exception of Honda), Toyota committed itself completely to being a leader in the field, designing the Prius from the ground up, optimizing the hybrid characteristics from the start. Now in its second generation design, Toyota is reaping the rewards of being first to market: there's an eight month waiting list in my market if you want a Prius at list price, and cars for immediate delivery are commanding as much as a $5,000 premium! Production is being ramped up to 300,000/year for 2005. Meanwhile, Ford and others are launching their first, feeble attempts at hybrids with reworked versions of existing models and correspondingly tepid improvements in performance.

What does all of this have to do with electricity storage for stationary power? Well, substitute some terminology and the analogy becomes quite obvious.

The capabilities brought about by the presence of electricity storage on a power grid include:

- The generator operates more efficiently, running at full or near-full load all the time.
- The generator can be downsized without sacrificing performance, because under heavy demand, stored energy is brought into play to supplement its output.
- Spinning reserve losses can be eliminated by turning the generator off at no and low-load conditions and providing energy from the store.
- Intermittent, renewable energy can be captured and routed to the store and utilized during peak periods as firm capacity.

The analogy fits in the near term for a microgrid

See Dispatch, continued on page 4

NGK Sets a New Record

NGK Insulators, Ltd of Japan set a new record for large batteries with the recent installation of an 8 MW NAS battery at the Hitachi Automotive Systems Factory in

Japan. The battery, used for daily load shifting, has an energy storage capacity of 57.6 MWh. The Hitachi NAS battery sets a new world record for battery energy, surpassing the previous record of 48 MWh, also held by a NAS battery at TEPCO's Ohito substation.

International interest in energy storage is increasing. NGK's exhibition booth at the recent CIGRE (the International Council on Large Electric Systems) meeting in Paris, France displayed information on the Hitachi battery system and visitors could see full size models of individual NAS cells. The CIGRE meeting was attended by over 3000 delegates from more than 100 countries and as a result of discussions during one of the conference sessions, CIGRE is forming a task force to prepare a technical brochure on energy storage and an article for the Electra magazine. Any ESA members who are also members of CIGRE and who wish to participate are invited to contact Anthony Price *(a.price@electricitystorage.org)*.

VRB Power Acquires Regenesys Storage Technology

VRB Power Systems, Inc., Vancouver, announced the completion of a transaction with RWE npower PLC, a subsidiary of German-based parent company RWE AG, whereby VRB Power will purchase an exclusive global license to the intellectual property and acquire all the related physical assets and inventory surrounding the Regenesys electricity storage technology.

Based in Vancouver, B.C. Canada, VRB Power Systems Inc. is an electrochemical energy storage company that has commercialized the patented Vanadium Redox Battery Energy Storage System ("VRB-ESS"). The Regenesys technology is also a redox battery flow battery system that utilizes sodium bromide/sodium polysulfide.

The acquisition includes an exclusive world wide license to all the Regenesys technology patents and know-how, Regenesys technology flow frame designs, assembly equipment and techniques and a significant inventory of Proton Exchange Membrane for USD $1.3 million. The license will remain exclusive for the first five years with provisions for extension to the exclusivity based on certain royalty payments.

RWE npower had announced earlier this year that the ongoing funding of the Regenesys project was no longer part of its core strategy, which is to focus on electricity generation, electricity supply and renewable energy.

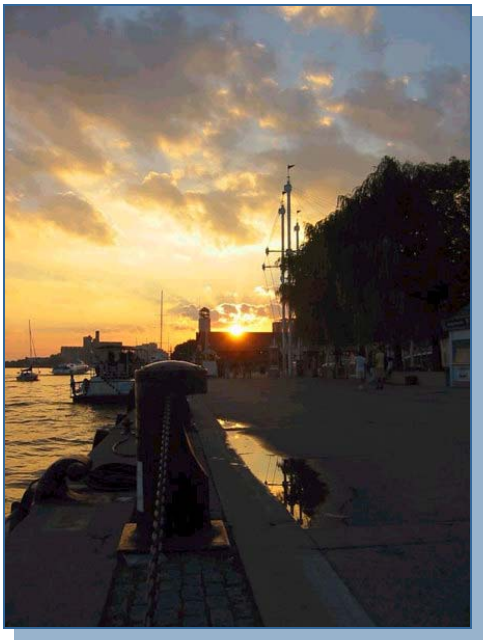
TVA Evaluates Options for Columbus Plant

This summer TVA solicited proposals for its Columbus, MS site that was to be used for a 12 MW x 10 hour Regenesys plant. TVA desires to dispose of the facility in a manner that would represent the best overall value to TVA, which could include multiple options such as revenue from a sale, lease or license, revenue from future power generation, as well as other energy technologies that may be adaptable to the site. Construction of the site began in 2000 and is now 85% complete. TVA is currently evaluating proposals.

ESA to be represented at CEPSI meeting in Shanghai

Brad Roberts of S&C will give a presentation at the CEPSI 2004 conference in Shanghai, China October 18-22. CEPSI (Conference of the Electric Supply Industry) is held every two years and is the main showcase for the electrical power industry in East Asia and the Western Pacific. It is sponsored by AESIEAP (the Association of the Electric Supply Industry of East Asia and the Western Pacific).

This is a high level meeting of executives from every major power company in Asia. Mr. Roberts' presentation is entitled "Growing Use of Large Scale Power Quality Protection Systems" and features some of the accomplishments of ESA members including S&C, Saft, and NGK . In addition, Mr. Roberts intends to comment on the ESA and its efforts to promote expanded use of electricity storage.



Toronto Harbourfront at sunset.

The beautiful city of Toronto is the site of the next ESA meeting, May 23-25, 2005.

Dispatch, continued from page 2

utilizing, say, a wind-diesel hybrid powerplant, and in the long term for larger grids with utility-scale storage in place. But a major piece is missing: Who is the Toyota of the electricity industry? Who is willing to commit fully and take the risks necessary to achieve the hyper-efficient electricity delivery system of the future? In Japan, the Tokyo Electric Power (TEPCO) has come the closest for advancing this business model with the NAS battery. In the U. S. and elsewhere, that player has yet to step forward, although several utilities are making admirable efforts to test and evaluate the various parts and pieces. But it will be the player willing to integrate and deploy these technologies on a broad scale within their own infrastructure that will gain the competitive advantage of being first to market. And it is this utility's customers who will be the beneficiaries of the enhanced reliability, security, and quality of power that a fully integrated network will deliver.

As a community of electricity storage proponents, we salute those companies who are making ready the various technologies required by the grid of the future. And we look forward to the day when the "Toyota" of our industry steps forward and makes that future happen!

DOE and NYSERDA Join in $7.1 Million Program to Demonstrate Advanced Electric Energy Storage Devices

Two major energy storage projects to demonstrate advanced electric energy storage devices in New York State have been selected as part of a joint initiative between the Department of Energy's (DOE) Energy Storage Research Program and the New York State Energy Research and Development Authority (NYSERDA). In addition, five smaller analysis and development projects for novel storage technologies have also been selected. The entire three-year program will cost $7.1 million.

The DOE Energy Storage program will contribute $900,000 in funding and provide technical oversight for design, operation, and monitoring of the demonstration sites through Sandia National Laboratories. NYSERDA will provide $2.6 million in funding and administrative support. The awardees will provide the remaining $3.6 million.

The NYSERDA / DOE energy storage initiative joins a similar collaboration between DOE and the CEC.

"These two joint initiatives are an excellent example of the important role the States play in bringing technology from research to the market place," Secretary of Energy Spencer Abraham said. "Energy Storage is well suited to provide backup power and congestion relief in urban centers and to help make renewable energy dispatchable."

Contracts for the following advanced energy storage demonstration projects are currently being negotiated and NYSERDA will announce the awards at a later date:

- New York Power Authority (NYPA), White Plains, NY; a project to shift a compressor peak load to off-peak capacity and provide emergency backup power by utilizing a sodium-sulfur (NAS) battery system at a major Long Island Bus depot facility. The primary application will be to supply up to 1 MW of power to a natural gas compressor for 6 – 8 hours/day, 7 days/week, particularly during the summer peak. The natural gas compressor fuels new natural gas busses that are replacing diesel fueled busses. The turnkey system will be provided by ABB, Inc. to include the power conversion system and overall system integration plus the NAS battery by NGK Insulators, Ltd.
- Beacon Power Corporation, Wilmington, MA; a project to provide grid frequency regulation by utilizing a high-energy flywheel energy storage system. Frequency regulation is necessary to balance the constantly varying differences between electricity generation and load and is expected to become increasingly important as renewable energy and distributed generation play a greater role. Using flywheels to provide frequency regulation will result in faster response and allow generators to operate at higher output with optimum efficiency and lower emissions. The demonstration will consist of a 50 – 100 kW system of seven Beacon flywheels adapted to operate on Niagara Mohawk's distribution grid and physically located at an existing industrial site in Amsterdam, NY.

"These two joint initiatives are an excellent example of the important role the States play in bringing technology from research to the market place"

Spencer Abraham, Secretary of Energy

Other projects selected include demonstration of commercial energy storage device in edge of grid application, Gaia Power Technologies; rotor development for advanced flywheel power systems, AFS Trinity Power Corporation; New York storage market analysis, Distributed Utility Associates; market analysis studies, EPRI PEAC Corporation; mini-CAES for transmission congestion relief, Ridge Energy Storage & Grid Services.

Future Events

CEPSI 2004

Shanghai, China, October 18-22. CEPSI (Conference of the Electric Supply Industry) is held every two years and is a high level meeting of power industry executives in East Asia and the Western Pacific. Visit *www.cepsi2004.com* for more information.

DOE Energy Storage PEER Review

November 10-11, 2004. See page 1 of this newsletter, or visit *http://www.sandia.gov/ess/*.

Battcon 2005

Miami Beach, Florida, May 2-4, 2005. 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.

Attendees of the ESA's Toronto meeting in May will be treated to a Toronto Harbour cruise on the Mariposa Belle.

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*.