

ESA Announces Plans for 17th Annual Meeting

Dates set for May 23-25, 2007 in Boston

The Electricity Storage Association is pleased to announce the dates for its 2007 Meeting. This 17th annual event will be held May 23-25, 2007 in downtown Boston, at the

2007 Meeting Highlights

Tuesday, May 22: Board of Directors Meeting; Evening Reception and Registration

Wednesday, May 23: Meeting Sessions; Banquet at New England Aquarium

Thursday, May 24: Meeting Sessions

Friday, May 25: Tour Beacon Power

If you have a topic of interest to present to the energy storage community, please send an e-mail to Matt Lazarewicz at m.lazarewicz@electricitystorage.org.

Omni Parker House Hotel.

The meeting is hosted by ESA member Beacon Power, and will include a tour of Beacon's facility.

Bringing you the latest developments in the

Electricity Storage industry, the ESA's annual meeting cannot be missed. Whether you are new to electricity storage or are a seasoned veteran, this annual meeting has something for everyone, including technology updates, economic evaluations, new technologies, recent installations, and case studies.

Historic Hotel Provides Elegant Venue

The Omni Parker House, 60 School Street, Boston, is an historic luxury hotel in the heart of downtown. This three-diamond hotel offers its guests many amenities, including in-room internet service. The ESA has reserved a block of rooms at a rate of \$179 plus tax per night, available from Saturday, May 19 through Sunday, May 27. See the

ESA's meeting Web site at <http://electricitystorage.org/meeting07.htm> for further information.

Spouse activities are being planned and may include tours, shopping, museums and the Freedom Trail. Take advantage of reduced hotel rates both prior to and after the meeting and enjoy all that Boston has to offer.

Network Amongst the Sharks

Your meeting registration includes a fabulous banquet at the New England Aquarium, giving you the opportunity to socialize and network with old friends and meet new acquaintances. Where else can you dine surrounded by exotic and unusual aquatic animals? This is an event you surely won't forget.

Paid membership in ESA includes registration for one person for the meeting, but requires the Registration Form to be completed and submitted. Additional attendees from the same company or non-member attendees must pay an additional \$795 (US). Complete registration information can be found on our Web site.

Further meeting details will be published in this newsletter and on our Web site as they become available. Mark your calendars now for this very important event! ◀

In this issue...

A Busy Week for Storage	2
Debaters Discuss Integration and Intervention	4
Member News Updates	5
Upcoming Events	6

A Busy Week for Storage

IRES-1 and DOE Peer Review meetings gather leaders in storage community

The week of October 30 to November 3 was a busy one in the electricity storage community, with two meetings on two continents and a single day in between for some harried travelers to jet from one to the other. The week started with IRES-1, the First International Renewable Energy Storage Conference, subtitled “The Case of Energy Autonomy: Storing Renewable Energies.” The conference, organized by EUROSOLAR and the World Council for Renewable Energy, brought together 240 participants from 27 countries (from every continent except Antarctica) to the Science Park in Gelsenkirchen, Germany. The Science Park is no stranger to our industry, having hosted the 6th International Conference on Utility Battery Energy Storage back in 1999. This year’s gathering was much more impressive, however, reflecting the heightened interest in storage that renewables have brought forth.

IRES-1 had distinctive political overtones, with presentations from three members of national parliaments including the conference chairman, Dr. Hermann Scheer. Scheer is one of the driving forces behind the German feed-in tariffs that have driven huge growth in renewable energy in that country. It quickly became apparent that the “energy autonomy” in the conference subtitle referred to Scheer’s vision of 100% of electricity being derived from renewable resources. With this goal comes the view that the existing grid should be made compatible with renewables, rather than the other way around. Scheer was enthusiastically applauded by a vocal group of anti-nuclear, anti-coal devotees in the audience. Whatever your political views on the future mix of energy sources there is no doubt that increasing penetration of renewables has the potential to bring about a dramatic increase in the implementation of storage.

At the close of a very interesting conference the scientific chair, Professor Dirk Uwe Sauer, summed up with three conclusions:

- ▶ Energy storage technologies are available and sufficiently mature (if not fully commercially developed) to be able to support the large-scale integration of renewable generation in the grid.
- ▶ It is difficult at this stage to calculate the exact need for energy storage, in terms of rating, duration and location.
- ▶ The combination of renewables and storage will only come into widespread existence with government intervention.

Not surprisingly, Hermann Scheer had some thoughts on this last point. At a press conference on the first day



The Science Park in Gelsenkirchen...

he suggested that the feed-in tariffs for renewables could be modified to provide higher payments for renewables at certain times of the day. This would certainly provide incentives for the time shifting capability of bulk storage but it probably would not help in the case of the use of fast-acting, short-duration storage to stabilize the output of renewable generators. The important point is that there is an ongoing dialog on this issue, and this is where it helps to have elected legislators directly engaged.

The organizers are already discussing plans for future events, so it will be interesting to see how IRES develops in the coming years. Optional excursions were planned for the day after the conference, but for those of us attending the US Department of Energy Peer Review Meeting, the order of the day was to travel to Washington, DC by various means and to turn up ready for business on the Thursday morning—and to try to stay awake.



...complete with photovoltaic panels on the roof

The Peer Review Meeting started with an overview of the DOE Energy Storage Systems (ESS) program by its manager, Dr. Imre Gyuk. He showed how the discretionary budget for his program has been steadily whittled down to around \$1 million or so by a succession of earmarks, by

which ESS funds are allocated to legislators' pet projects in their districts. While many of these projects are indeed worthwhile, they nevertheless detract from the rational allocation of funds across the full spectrum of energy storage technologies and applications. Imre pointed out, however, that by working with the government's Small Business Innovation Research grant program and through state initiatives, notably with the California Energy Commission and New York State Energy Research and Development Agency, a little money had been made to go a long way.

The rather full day-and-a-half program was ably managed by John Boyes of Sandia National Laboratories who kept a tight rein on the 26 presenters to keep everything on schedule. There was a break in the program towards the end of the first day when the ESA held its mini-meeting (see separate article). The ESA then hosted a reception,

giving the 100 or so attendees ample opportunity to network.

In addition to updates on the development projects with which we have become familiar, we heard some promising results from various demonstration systems, including the 1.2 MW / 7 MWh NGK Insulators / S&C Electric sodium-sulfur battery system installed by American Electric Power in Charleston, West Virginia for upgrade deferral. Some of the projects funded by the California Energy Commission and New York State Energy Research and Development Authority are now yielding results, such as the Beacon Power flywheel systems now operating in both states in frequency regulation applications. We also heard the results of a study evaluating the use of storage in saving diesel fuel in the Kaua'i Island Utility Cooperative system. It seems that KIUC will move forward with an electricity storage system in the near future and you can expect that to be a popular sales opportunity, particularly during the winter months!

As the participants headed out to brave the Friday afternoon Washington traffic it was time to reflect on the strides that energy storage systems are making and, for some at least, to think about catching up on lost sleep after an extremely busy and interesting week for storage. ◀

At DOE Peer Review, Debaters Discuss Integration and Intervention

Reconciling renewables with storage a hot topic

BY ANTHONY PRICE
SWANBARTON CONSULTANTS

Air travel may rarely be a pleasant experience these days. Being sealed in a tube of lightly compressed air and attached to a number of gas turbines might be the dream of CAES enthusiasts, but for the normal passenger the best thing to look forward to is the arrival of a drink and meal, at least for those flying on an airline where such luxuries are allowed. Some time after I took my seat on the plane to Washington, Gerry Woolf, of BEST magazine, arrived and claimed the seat next to me. After a few of the usual pleasantries, we soon turned to the subject of energy storage. Gerry had attended the First International Renewable Energy Storage Conference (IRES I) organized by The World Council for Renewable Energy (WCRE) and EUROSOLAR in Gelsenkirchen, which was held over the previous two days. It was obvious that it was a good meeting for three reasons:

1. Over 250 people attended
2. Gerry couldn't stop talking about it
3. The theme of energy storage and renewables became the theme for the ESA mini meeting.

Barely twenty-four hours later (depending on your understanding of time zones) Jim McDowall, Chairman of the ESA, repeated his presentation to the IRES at the mini meeting. The ESA represents manufacturers, developers and users of all types of electrical energy storage, and Jim is now able to illustrate the power of storage by drawing on examples of successful projects across a broad spectrum of power and energy ratings.

Renewable generation of electricity will be a key component of many power systems in both the near and

distant future. It seems self-evident to many that storage and renewable generation should be the ideal partners. Jim drew on examples such as the Utsira project in Norway, the Electronic Shock Absorber (ESA) in Hawaii and the Subaru project in Hokkaido to illustrate the role that storage can play.

Utsira, famous for its prime listing on the British shipping forecast, is now the home of an extensive demonstration coordinated by Norsk Hydro. The project includes wind generators supplied by Enercon, coupled with an Enercon flywheel, SAFT NiCd Batteries and a Norsk Hydro electrolyzer and fuel cell system. Although a special case, as an island system, it does illustrate the concept of power system optimization by using storage.

In warmer climes, the Hawaii ESA project uses Maxwell and EPCOS capacitors to reduce the impact on grid operation caused by a high proportion of wind power generation. Meanwhile in Japan, J Power and Sumitomo have installed a VRB system to counteract the fluctuations caused by a large wind farm. There are other projects as well, VRB have announced a new project at the Sorne wind farm in Ireland.

Jim handed the meeting over to Gerard Thijssen to lead a discussion on the issues of storage and renewables. The debate on this has been going on for several years now, and perhaps is like a vintage motor car. The debate is hard to get going, but once started it will take on a life of its own. Spurred on by the prospect of drinks and canapés, ESA members made some excellent points.

Although enthusiasts for storage would argue that wind power is a perfect match, some recognized the unrequited love. Wind power developers generally don't want to add to the costs of their projects by adding storage. So, what

was different about the case in Europe? What did the 250 folk there have to keep them going for a 2-day conference? The answer from Germany was clear. Politics! Although there was some unhappiness in the way that renewables were being forced onto the network, to the anguish of the network operators, there was very clear political pressure from the local and state governments that renewable generation had to work, and so, if storage was needed then the politicians would push for it.

The discussion was enthusiastic and positive, with plenty of opportunity for everyone to join in. There was an international feel to the debate, with representatives from both sides of the Atlantic and Pacific Oceans giving examples from their experience and making the case for the way forward. I am not sure if we reached a single conclusion, but there was agreement that widespread integration of storage and renewables was only going to happen in the short term if there was some form of intervention. It was not clear who would do the intervening, for there is no single model of power system

ownership and operation that is valid world-wide. Some developers felt that they still had hard work to do to convince operators of renewable generation to join the storage movement, but others saw opportunities amongst different groups as potential customers. And here I think is the secret, the market for storage on the power network is changing as the generation mix changes. With increased wind and other forms of renewable generation there will be an increased need.

During the DOE Peer review, we heard about the planned storage projects in Wyoming and Iowa. Both of these link generation, transmission and storage and present significant opportunities for storage developers. I am sure that most storage developers have spotted the trends. Most utilities already have considered this and the more forward thinking ones are moving into position. Watch this space! ◀

Member News Updates

Appalachian Power Dedicates Mega Battery; New Technology Provides Extra Power, Reliability

At a commissioning ceremony in Charleston in July, Appalachian Power dedicated a new 1.2-megawatt battery that is the first megawatt-class sodium sulfur (NAS) battery to be used in North America. This advanced energy storage technology will help ensure that customers in and around Charleston have a reliable supply of electricity, and will allow Appalachian Power to defer an otherwise larger upgrade to help keep overall costs low.

Appalachian Power, an operating unit of American Electric Power, and its partners in the project participated in the commissioning ceremony. NGK Insulator's NAS Battery Division supplied the battery, S&C Electric's Power Quality Products Division supplied the power electronics and served as system integrator, and Kanawha Manufacturing made the steel housing for the battery.

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

The battery installation is expected to delay the need for equipment upgrades to the facility by six to seven years. The peak-shaving battery unit is capable of supplying 7.2 megawatt-hours of energy – enough for 500-600 households for six or seven hours. It will provide electricity to customers during the day, and will be charged at night when demand is lower.

The North Charleston installation is the first megawatt-class NAS battery system on a U.S. distribution system. Another NAS battery system of the same rating is now being installed on Long Island in New York.

For a complete article on the AEP NAS installation, see the October issue of *Power* magazine. ◀

VRB Power Announces Sale of 12-MWh VRB-ESS for New Wind Farm in Ireland

VRB Power Systems Inc. announced in August that it has entered into a sale agreement with Tapbury Management Limited of Ireland for the sale of a 1.5 MW x 8 hour (12-MWh) VRB-ESS™. Tapbury oversees the management of Sorne Hill Windfarm, a recently commissioned 32-MW windfarm which is located in Buncrana, Inishowen, Co. Donegal, Ireland.

This 12-MWh VRB-ESS will be coupled to phase II of the Sorne project which is an additional 6.9 MW of wind power for which turbines have been ordered and are due to be installed in the Fall of 2007. This will make Sorne, at 38 MW, one of the largest wind farms in Ireland. The total contract value for VRB Power from

on the heels of our recently announced sale of a smaller 120-kWh system to Risø National Laboratory in Denmark which will be assessed in both grid connected and off grid wind applications in Denmark.”

“In view of the significant potential market for storage in Ireland, its ideal location and the attractive capital and other incentives which would be available to us, we are investigating the possibility of establishing a manufacturing facility in Ireland along with a support centre for our European efforts,” concluded Hennessy.

The cost of electricity generation in Ireland has risen to amongst the highest in the world and this has led to a large focus on reducing dependence on natural gas imports, becoming more self-sufficient in terms of electricity generation and in maximizing its own natural resources. Ireland is also committed to the Kyoto Protocol and to reducing Greenhouse gases. At the end of 2005 renewables, largely wind, contributed 6.8% to electricity supply

and the Irish Government has set the target of 15% renewable energy generated electricity by 2010. By mid 2006, the amount of installed

and contracted renewable generation (mainly wind) in Ireland totalled 1,560 MW. There is a further 2,992 MW of renewable generation (again mainly wind) in the connection application process which would be a total of 4,552 MW of renewable generation on the system. This presents the clear prospect of Ireland having the largest share of renewable generation to total generation of any grid system in the world.

As the amount of wind penetration continues to increase rapidly, issues of intermittency and curtailment are becoming more and more common and storage is becoming a necessary component to ensure that this abundant resource can be maximized without causing wide-spread frequency deviation and disruption to the Irish grid. In addition, storage has the potential to improve the capacity of electricity being generated from wind farms and to ensure that all wind energy is captured whether generated at peak or off peak times. ◀

this sale is approximately US\$6.3 million. Contract details expect to be finalized by the end of the year.

Subject to the performance results from this initial 12-MWh VRB-ESS, Tapbury has the option to expand the power and storage elements of the system to cover the existing 32 MW of wind power at Sorne which would equate to approximately 50 MWh of additional VRB energy storage.

“This is a very important sale for the Company,” stated Tim Hennessy, Chairman and CEO of VRB Power. “It is the largest sale we have made to date and it provides validation of the potential for our storage systems to be coupled to wind farms in the large, growing wind markets in Ireland, Europe and North America as well as a number of other countries worldwide. The VRB technology is the most advanced wind coupled storage system in the world with a very large system installed in Japan and a smaller one installed in Australia. The repeated deep cycling in wind applications makes it virtually impossible for conventional batteries or even advanced batteries to compete with the VRB-ESS.”

“The negotiation of this sale has been ground-breaking from the point of view that this will be one of the largest flow batteries to be coupled to a wind farm and it will be the first large scale system of this type to be installed in Europe. This project will provide high level visibility and credibility for our technology for wind applications in what is a fully commercial project. It follows

Member News Updates

Future Events

ESA Annual Meeting 2007

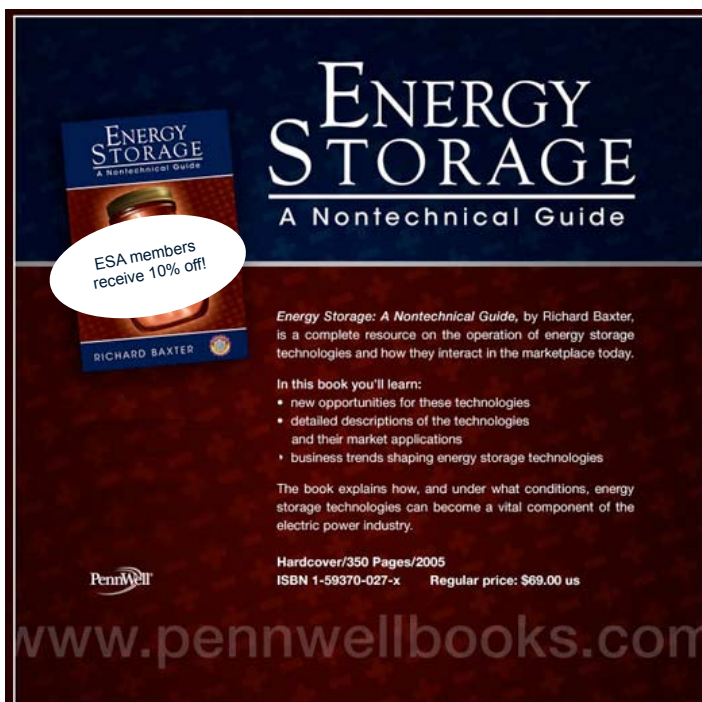
May 23-25, 2007, Boston, Massachusetts. See page 1 for details, as well as <http://electricitystorage.org/meeting07.htm>

Battcon 2007

April 30 - May 2, 2007, Tampa, Florida. Three day, non-commercial, technical symposium for storage battery users from various industries. <http://www.battcon.com>

EESAT 2007

September 23 - 26, 2007, San Francisco, California. Electrical Energy Storage Applications and Technologies Conferences (EESAT) are biennial conferences with specific emphasis on the latest commercial developments in the use of electricity storage for the power industry. <http://www.sandia.gov/eesat/2007/index.html>



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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 \$795 per year which includes attendance at meetings, conference proceedings, special tours, and social events.

Join the ESA between now and December 31 and receive full ESA 2007 member benefits at no additional cost.

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 e-mail membership@electricitystorage.org.