

Summary:

For the July 8th issue of NAATBatt's Advanced Battery Weekly, we highlight the ongoing sector activities.

The NAATBatt Index was down 3.1%, while the U.S. and Asia Indices increased by at least 4.1%. The Russell 2000 and S&P 500 were each up 4.5%.

Executive Director James Greenberger writes about the need for the federal government better to define a strategy for its grid-connected energy storage investments and the danger of its taking too broad an approach to energy storage. Read "*The Missing Strategy for Storage*" in the Executive Director's Notes portion of this newsletter below.

Key Highlights:

- **The Dow Chemical Company** and **Ube Industries** announced an agreement to form a joint venture (JV) to manufacture and market formulated electrolytes for lithium-ion batteries (li-ion) in energy storage applications. The **Advanced Electrolyte Technologies** JV (50/50) is expected to be finalized later this year, pending regulatory approval.
- Six new corporate partners have joined the **National Clean Fleets Partnership (NCFP)**. The new partners **Coca-Cola**, **Enterprise Holdings**, **General Electric**, **OSRAM SYLVANIA**, **Ryder** and **Staples** operate in aggregate a total of almost one million commercial vehicles nationwide.
- **Hydro-Québec**, **Université de Montréal**, **Centre National de la Recherche Scientifique** and **Süd-Chemie** have agreed on the issuing of sublicenses for **lithium metal phosphate/ lithium iron phosphate (LMP/LFP)** battery material. Initial sublicense agreements have been reached with **Sumitomo Osaka Cement**, **Mitsui Engineering & Shipbuilding**, **Tatung Fine Chemicals** and **Advanced Lithium Electrochemistry**. In addition, Sony Corporation has a non-exclusive license to manufacture LMP/LFP for use in its battery production.
- **Mitsubishi Motors** has launched two new versions ("M" and "G") of the **i-MiEV** electric vehicle (EV). The entry-level "M" version has a sticker price of 2.60 million yen (\$32,000) and a shorter range of 120 km (75 miles) compared with the upscale "G" version that has a price of 3.80 million yen (\$46,789) and can go 180 km (110 miles) on a full charge.
- The **Ministry of Knowledge Economy** has added **lithium** and **indium** to the list of rare earth metals. Korean companies are now able to directly develop or invest in overseas mines for the metals that are used to produce display panels (indium) and batteries (lithium) for EVs.
- **Nissan Motor** has taken the lead in the EV market by pulling ahead of **General Motors** in 1H11. **Leaf** sales totaled 3,875 while **Volt** shipments were 2,745 through June '11.
- The **U.K.'s Department for Transport** is scrapping a plan to have 9,000 recharging points by 2013 as it has decided that the programme is not viable. At present there are about 700 points.
- The **T.27** urban EV was unveiled in **London**. The T.27 measures just 2.5 meters long and has a unique cabin layout which features a central driver's position and two passengers in the rear.
- **Blue Back Square** is installing two charging stations in the retail center's **Lexicon** garage. **Connecticut Electric Car** (a newly formed division of **Newington Electric Company**) will be installing the car chargers.

- **Sevcon** is providing motor controls systems for the **Mia Electric**. The 3-seater EV has a range of about 55 miles on a full battery charge

A Few More Details:

The Dow Chemical Company and Ube Industries announced an agreement to form a joint venture (JV) to manufacture and market formulated electrolytes for li-ion batteries in energy storage applications. The Advanced Electrolyte Technologies (50/50 JV) is expected to be finalized later this year, pending regulatory approval. The JV's first manufacturing facility is expected to be built at Dow's Michigan Operations' site in Midland for startup in 2012.

Source: The Dow Chemical Company

Six new corporate partners have joined the National Clean Fleets Partnership (NCFP). The new partners are Coca-Cola, Enterprise Holdings, General Electric, OSRAM SYLVANIA, Ryder and Staples operate a total of nearly a million commercial vehicles nationwide. The NCFP is a public-private partnership that helps large companies reduce diesel and gasoline use in their fleets by incorporating electric vehicles (EVs), alternative fuels, and fuel-saving measures into their daily operations.

Source: DOE

Hydro-Québec, Université de Montréal, Centre National de la Recherche Scientifique and Süd-Chemie have agreed on the issuing of sublicenses for lithium metal phosphate/ lithium iron phosphate (LMP/LFP) battery material. Süd-Chemie (via subsidiary Phostech Lithium) was previously the exclusive licensed supplier of LMP/LFP. Süd-Chemie has agreed with the three patent owners, Hydro-Québec, Université de Montréal and CNRS, to facilitate the distribution of this technology through the creation of LiFePO₄+C Licensing AG, Muttentz/Switzerland which will issue sublicenses to suitable LMP/LFP producers capable to address the market demand. Initial sublicense agreements have been concluded with Japan-based Sumitomo Osaka Cement and Mitsui Engineering & Shipbuilding along with Taiwan-based Tatung Fine Chemicals and Advanced Lithium Electrochemistry. In addition, Sony Corporation has a non-exclusive license to manufacture LMP/LFP for use in its battery production.

Source: Sud-Chemie

Mitsubishi Motors has launched two new versions ("M" and "G") of the i-MiEV electric vehicle (EV). The entry-level "M" version has a sticker price of 2.60 million yen (\$32,000), down from 3.98 million yen, and a shorter range of 120 km (75 miles), compared with 160 km (100 miles) for the previous model. The upscale "G" version has a suggested retail price of 3.80 million yen (\$46,789) and can go 180 km (110 miles) on a full charge. The company will buy the smaller-capacity lithium-ion batteries for the i-MiEV's "M" grade from Toshiba Corp and continue using batteries made by its joint venture with Mitsubishi Corp and GS Yuasa Corp for the "G".

Source: Mitsubishi Motors

The Ministry of Knowledge Economy has added lithium and indium to the list of rare earth metals. Korean companies are now able to directly develop or invest in overseas mines for the metals that are used to produce display panels (indium) and batteries (lithium) for EVs. The country annually produces about 50,000 tons of indium (world's 3rd largest amount) and imported 108 tons last year (compared to 28 tons in 2009). The country is a large consumer of lithium, importing 7,988 tons of the metal in 2012 -- worth over \$40 million.

Source: JoongAng Daily

Nissan Motor has taken the lead in the EV market by pulling ahead of General Motors in 1H11. Sales of Leafs totaled 3,875 this year through June, buoyed by a record 1,708 units delivered last month. Deliveries of the Chevrolet Volt were 561 in June and 2,745 in the first half.

Source: *The Kansas City Star*

The U.K.'s Department for Transport is scrapping a plan to have 9,000 recharging points by 2013 as it has decided that the programme is not viable. At present there are about 700 points. The 8,600 EVs expected to be sold by the end of this year would require some 4,700 points.

Source: *The Independent*

The T.27 urban EV (as shown in **Exhibit 1**) was unveiled in London. The vehicle is powered by a 25 kilowatt (kW) electric motor and has a range of 100 miles. The T.27 measures just 2.5 meters long and has a unique cabin layout which features a central driver's position and two passengers in the rear.

Source: *The Independent*

Exhibit 1: The Electric T.27



Source: *Gordonmurraydesign.com*

Blue Back Square is installing two charging stations in the retail center's Lexicon garage. Connecticut Electric Car (a newly formed division of Newington Electric Company) will be installing the car chargers. The cost for a full charge will be about \$1.50 to \$2.00 for an EV with about a 100-mile range.

Source: *West Hartford News*

Sevcon is providing motor controls systems for the Mia Electric (as shown in **Exhibit 2**). The company's technology connects the battery with the motor, and serves as an engine management system. The 3-seater EV has a range of about 55 miles on a full battery charge

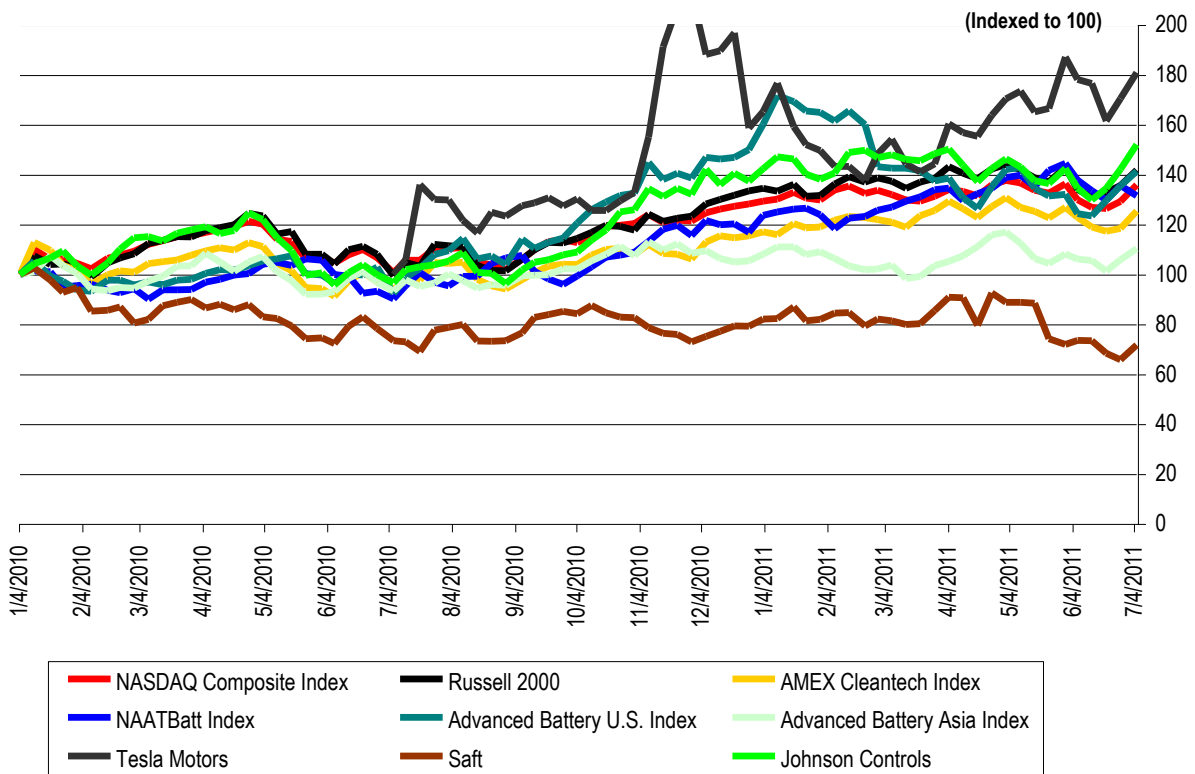
Source: *Sevcon*

Exhibit 2: The Electric Mia



Source: Boldride.com

**Exhibit 3: Indices Performance
(From January 4, 2010)**

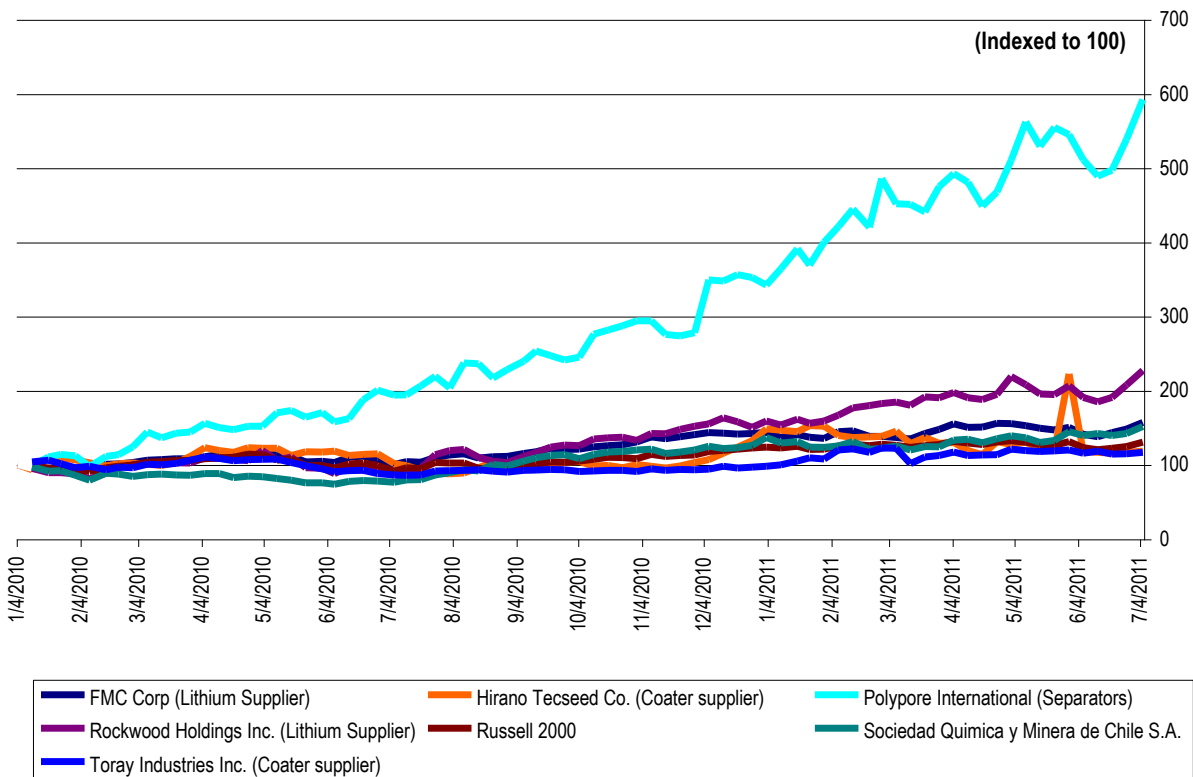


| Index | Close on 7/5/2011 | 52-Wk High | % of 52-Wk High | Performance | | |
|----------------------|----------------------|---------------|--------------------|-------------|------|------|
| | | | | LTM | YTD | Week |
| Dow | 12,569.9 | 12,928.5 | 97.2% | 29.6% | 7.7% | 4.4% |
| S&P 500 | 1,337.9 | 1,370.6 | 97.6% | 30.1% | 5.2% | 4.5% |
| NASDAQ | 2,825.8 | 2,887.8 | 97.9% | 33.1% | 5.0% | 5.1% |
| Russell 2000 | 841.6 | 868.6 | 96.9% | 39.1% | 5.4% | 4.5% |
| AMEX Cleantech Index | 1,229.8 | 1,292.4 | 95.2% | 33.4% | 7.1% | 5.9% |

Source: Bloomberg and ThomsonOne

Note: The select NAATBatt Index is a market-value-weighted average and includes ALTI, BASF, COP, ENS and XIDE. The Advanced Battery U.S. Index is a market-value-weighted average and includes HEV, MGA, MXWL, UQM and VLNC. The Advanced Battery China Index is a market-value-weighted average and includes BYD, CBAK, GS Yuasa, LG Chem and Panasonic.

Exhibit 4: Supplier Performance (From January 4, 2010)



Source: Bloomberg

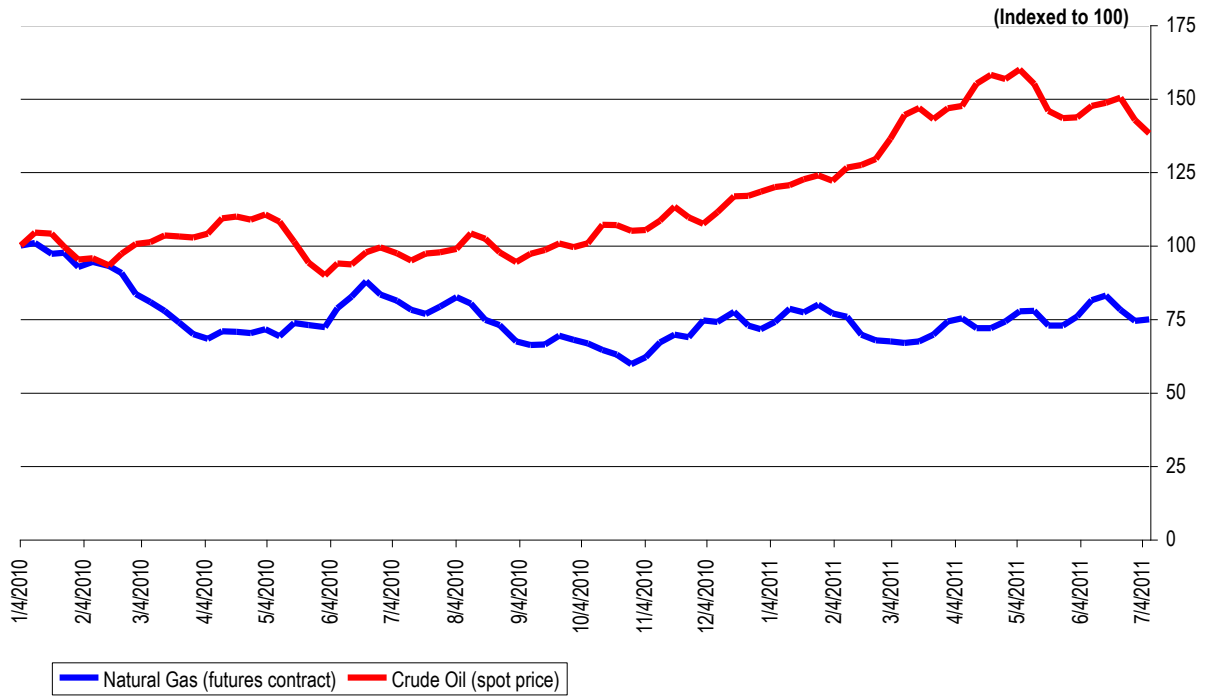
Exhibit 5: Commodity Prices

| Commodity | Price on 7/5/2011 | Price on 6/27/2011 | Price on 6/3/2011 | 1 Week Change | 1 Month Change |
|---------------------------------|----------------------|-----------------------|----------------------|------------------|-------------------|
| LME Copper (Cash, \$ per tonne) | 9,405 | 9,000 | 9,016 | 4.5% | 4.3% |
| LME Lead (cash, \$ per tonne) | 2,660 | 2,545 | 2,425 | 4.5% | 9.7% |
| LME Nickel (cash, \$ per tonne) | 23,100 | 21,945 | 22,535 | 5.3% | 2.5% |

Source: LME



Exhibit 6: Natural Gas and Crude Oil
(From January 4, 2010)



Source: EIA

Executive Director's Notes



THE MISSING STRATEGY FOR STORAGE

The past several months have seen an explosion of interest in grid-connected energy storage. Driven in part by the realization that the advanced automotive battery market will be slower to develop than many hoped, and by recent white papers on the economics of grid-connected energy storage by EPRI, Southern California Edison and Sandia National Laboratory, investment bankers, stock analysts and large industrial companies crowded into the Energy Storage Association's recent meeting in San Jose to try to figure out what is going on.

The enthusiasm for grid-connected energy storage is well-founded. The inability to store electric energy on the grid is, in many respects, the technological limitation that defined the design of our national power grid in the early 20th Century and that continues to account for its basic architecture today. The ability to generate electricity, to store it economically in large quantities, and to use it at a later time, would be the most disruptive technology to emerge on the power grid in the past 100 years.

That said, the technological ability to store electricity has been around for a while (in fact, it pre-dates the construction of our national power grid by several millennia). The reason that electricity is not stored in large quantities on the U.S. electricity grid today (other than 21.5 gigawatts of pumped storage hydropower) is because it is still generally less expensive to generate an electron than to store it. It is a safe bet that the day that calculation changes, the world will beat a path to the grid-connected energy storage door.

So the economic case for investing in new energy storage technologies is clear. The company that can bring to market a technology that stores electricity cheaper than a public utility or other customer can generate or acquire it will do very well.

But what is the case for government investment (either directly or through tax credits) in grid-connected energy storage technology? Why can't the government leave development of grid-connected energy storage to the private sector alone?

The case for government investment in storage turns on three arguments: First, that storage will help integrate variable renewably generated electricity onto the grid; second, that deploying certain types of energy storage technology on the grid will help battery makers achieve economies of scale, bring down the cost of electric vehicles and reduce petroleum imports, and, third, that distributed storage will help stabilize the grid and facilitate the fast charging of electric vehicles.

The first argument, which focuses on renewables integration, is the most tenuous. Most new forms of renewable energy (i.e., wind and solar) are variable and need to be balanced by other sources of electricity. Today, most of the stand by capacity used to balance variable renewables is provided by natural gas peaker plants. So, in effect, the first argument is that the government should invest in storage technology so that the country can burn less natural gas and, therefore, reduce greenhouse gas emissions.

An argument for investing in storage in order to reduce natural gas consumption, however, is a weak argument. While there would be some emissions benefit to reducing natural gas consumption, there are far more cost-effective ways to reduce greenhouse gas emissions than by reducing the use of natural gas, a form of energy that even President Obama classifies as “clean” and that apparently exists in greater domestic abundance than was generally understood just a few years ago.

A better case for government investment in storage technology is the second argument: that grid-connected storage can bring down the cost of electric vehicles. The electrification of motor vehicles is a critical part of any strategy to reduce U.S. petroleum imports. Yet the high cost of large format lithium-ion batteries remains the principal barrier to widespread adoption of electric vehicles. The inability of advanced battery manufacturers to take advantage of economies of scale is a big part of the cost problem. Today, PHEV and EV sales in the United States run at the rate of only a few hundred units per month. This creates a death cycle of advanced battery pricing, with battery production volumes being too low meaningfully to lower unit battery prices, and PHEV and EV prices remaining too high to generate larger battery production volumes.

Government investment in grid-connected energy storage can help break this pricing death cycle. If battery makers can use the same plants and processes to manufacture large quantities of batteries for the grid-connected market as for the automotive market, the prices of PHEV’s and EV’s can be significantly reduced, as battery suppliers will be able to amortize high plant costs over a larger number of units. Economy of scale is an important factor in the capital-intensive advanced battery industry. In the early part of the last decade, the price of lithium-ion batteries in consumer electronics fell significantly, in large part due to volume increases in that market. Expecting a similar volume-driven price drop in large format lithium-ion batteries would not be unreasonable.

Third and finally, the important role that grid-connected energy storage could play in stabilizing and protecting electricity distribution systems is often not fully appreciated. The vulnerability of the U.S. electricity grid to malicious attack and natural disaster is an issue of growing concern in the defense community. Promoting the development of microgrids within larger, centralized distribution systems would help address this concern. Energy storage technology deployed at the distribution level is an essential component of microgrid systems. The case for government investment in grid-connected energy storage as part of an effort to secure the power grid is compelling, as securing the grid against attack is a proper and necessary role of government.

Locating storage at the distribution level would also facilitate fast charging technologies for electric vehicles. Deploying fast charging stations will in turn make EV’s and PHEV’s more attractive to consumers and lower petroleum imports. Fast charging stations must discharge large amounts of electricity very quickly into EV’s and PHEV’s. Local energy storage is a critical component of most such systems.

The most compelling case for government investment in grid-connected energy storage, therefore, centers on two relatively narrow concerns: vehicle electrification and grid vulnerability. Current government initiatives to promote storage, however, lack any such focus. DOE funding of storage technologies and recent Congressional proposals to encourage storage investments seem simply to

focus on storage with a capital “S”, without any regard to how that storage will be used or what precise benefit it promises to the American public. Energy storage, it seems, has become an end in itself rather than a means to other ends.

The government badly needs to set a strategy for grid-connected energy storage. In a time of constricting budgets, it is critical that the few dollars available to develop this important technology are spent where they are most needed and where they will produce the greatest return for U.S. taxpayers. Grid-connected storage is a promising technology, which has the potential to address some of our nation’s greatest energy challenges. It would be a shame if the limited government funding for it simply becomes another give-away for a wide range of commercial interests.



James J. Greenberger
Executive Director

July 8, 2011



NAATBatt Membership Applications for 2011

2011 Membership Applications and Dues Structure

NAATBatt is accepting applications for membership for the 2011 calendar year. Membership dues for 2011 are \$10,000 for Corporate Members, \$10,000 for OEM Members, \$10,000 for Utility Members, \$5,000 for Associate Members, \$1,000 for Individual Members, and \$500 for Non-Profit/Government Members. Please click on <http://naatbatt.org/membership-inquiry/> and indicate that you are interested in a 2011 membership.

Why Join NAATBatt?

NAATBatt's mission is to grow the market for advanced electrochemical energy storage technology in North America. NAATBatt provides regular educational programming on topics of interest to the advanced battery community, a weekly newsletter chronicling developments in the North American advanced battery market, networking opportunities for industry participants and their customers, including our recently concluded conference on PEV's and the grid, and public policy initiatives, such as the recent NAATBatt-sponsored meeting with Chairman Jon Wellinghoff of FERC and production of written comments to FERC in support of distributed energy storage technology.

NAATBatt recently concluded the highly successful meeting and conference entitled "The Impact of PEV's on T&D Systems: Challenges and Solutions", in Louisville, Kentucky. The conference was the largest cross-industry event to date focused on the impact of plug-in electric vehicles on the grid. The conference outlined the improvements and upgrades that utilities must make to the grid in order for it to accommodate mass-market electric vehicles. The conference emphasized the critical role that grid-connected energy storage can play in promoting vehicle electrification in the United States. Emphasizing the necessary relationship between grid-connected storage and electric vehicles is one of NAATBatt's primary missions.

NAATBatt is a not-for-profit trade association qualified under Section 501(c)(6) of the Internal Revenue Code that is working for the benefit of the entire industry. **Every dollar spent on NAATBatt memberships and programs goes to recouping program costs and to supporting activities intended to benefit the entire advanced battery industry.** At a time when it seems that the only people making money on advanced lithium-ion technology are professional conference organizers, the advanced battery industry should take control of its own market and its own future. NAATBatt exists to market for the industry, not to the industry. But NAATBatt needs your support to do it. Please join us.

North American Industry Announcements and Calendar

**REGISTRATION
IS OPEN!!**

NAATBatt 2011 Annual Meeting and Conference: NAATBatt has announced that its 2011 Annual Meeting and Conference will be held on **September 7-8, 2011** in Louisville, Kentucky. The title of the program is “**New Markets, New Innovations: The Next 5 Years in Advanced Batteries.**” The program will take a hard look at near-term market opportunities for U.S. advanced battery manufacturers and let them hear from potential customers what those customers want now. The annual meeting will also feature a Battery Industry-Academic Advanced Battery Summit with presentations by some of the top university battery research programs in the United States. Attendees will learn who is working on what in the academic world. There is more going on than you think. Information about the 2011 conference is posted on the NAATBatt Web site at: www.naatbatt.org. Please join us in Louisville in September!

Presentations and Materials from the Workshop on Distributed Energy Storage Posted: Presentation materials, handbooks, attendee lists and working group discussion summaries from the recently concluded April 21 DOE/NAATBatt Workshop on Issues in Distributed Energy Storage have been posted on the NAATBatt Web site at: www.naatbatt.org. The materials are available for review to all Workshop registrants and to all NAATBatt members. If you have lost or never received your password to access these materials, please contact Jim Greenberger at jgreenberger@naatbatt.org.

Speaker Presentations from the NAATBatt 2010 Annual Meeting and Conference are Now Available! NAATBatt's 2010 Annual Meeting and Conference entitled “The Impact of PEV's on T&D Systems: Challenges and Solutions” was a great success. More than 40 industry experts presented and the conference on topics relating to how the grid was going to accommodate the new load that will be generated by plug-in electric vehicles. Copies of the speaker presentations are available on a secured portion of the conference Web site. Access to the Web site is free to NAATBatt members and conference attendees. Access to the presentations is now available to all other for the price of \$250. Please contact Jim Greenberger at jgreenberger@naatbatt.org for more information about accessing the presentations.

NAATBatt Membership Information. NAATBatt is taking applications for membership from well qualified industry participants and supporters. Membership in NAATBatt is a great way to keep abreast of developments in advanced technology batteries and to support the growth of a market for products that could change the world. Your support for NAATBatt programs, newsletters, and committees is essential to the success of our organization and our industry. To inquire about membership, please complete the following inquiry form: <http://naatbatt.org/membership-inquiry/>. NAATBatt will respond with additional information about membership.

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- **Storage Week 2011:** Infocast will host Storage Week 2011 in San Diego on **July 11-14, 2011**. The program, now in its third year, will cover a range of storage policies, markets, project applications and technologies involved in the integration of storage onto the grid. NAATBatt is a

Supporting Organization of the program and NAATBatt members will be entitled to a 15% discount on admission.

- **Plug-In 2011 Conference and Exhibition:** The Plug-In 2011 Conference and Exhibition will be held on **July 18-21, 2011** in Raleigh, North Carolina. The Conference Web site can be viewed at: <http://www.plugin2011.com/>.
- **Risk and Reward in the Over-Hyped Electric Vehicle Market:** Lux Research Inc. will present a free webinar entitled "Risk and Reward in the Over-Hyped Electric Vehicle Market" at 11:00 a.m. EDT on **July 19, 2011**. The webinar will discuss the market opportunities for advanced batteries by different vehicle type and the potential for innovation to leverage those opportunities. A link to the registration site may be found by clicking [here](#).
- **1st North American & Asian Lithium-Ion Technology Conference:** The North American & Asian Lithium-Ion Technology Conference will be held on **August 24, 2011** at the University of Nevada Las Vegas in Las Vegas, Nevada. The conference is co-sponsored by UNLV and an affiliate of the Lion Battery Industry Association of South China. More information about the conference can be found at: <http://lbiana.org/industry-events/>
- **NAATBatt 2011 Annual Meeting and Conference: September 7-8, 2011** in Louisville, Kentucky Registration is now open for the 2011 Annual Meeting and Conference, which will include the 1st Industry-Academic Advanced Battery Summit. See the note above for more details, or click [here](#).
- **Battery Power 2011:** Battery Power 2011 will be held on **September 20-21, 2011** in Nashville, Tennessee. The show will highlight the latest capabilities, design issues, trends and market forecasts in batteries and battery-powered products and systems. The conference Web site can be viewed at: http://www.batterypoweronline.com/bppt-conf11/bp11_index.php.
- **4th International EV Battery Tech USA: Global Cost Reduction Initiative:** EV Battery Tech USA will be held on **September 21-22, 2011**, in Detroit, Michigan. The leading automotive OEM's will attend the conference and discuss how to reduce the cost of EV batteries by specifically evaluating near-term advances in energy density, battery life extension, preventative methods for cell degradation and failure, battery safety improvement and testing. NAATBatt is a supporting organization of the conference and NAATBatt members are entitled to a 15% discount on registration. The conference Web site may be viewed at: <http://www.ev-battery-tech.com/>.
- **Developing Grid Storage Projects:** Infocast will produce the Developing Grid Storage Projects conference in Dallas, Texas on **October 5-6, 2011**. The conference will discuss the regulatory drivers and business models for grid storage projects in the United States. NAATBatt will be a supporting organization of the conference.
- **The Battery Show:** The Battery Show conference and exposition will be held in Novi, Michigan on **October 25-27, 2011**. The conference will include a business and a technology track as well as a wide range of exhibits by battery makers and suppliers. Information about the show can be found at: <http://www.thebatteryshow.com/conference-program-2011>.
- **2nd Battery Safety Conference:** Knowledge Foundation will host the 2nd Battery Safety Conference on **November 7-8, 2011** in Boston, Massachusetts. The conference will discuss safety incidents and product recalls regarding lithium-ion batteries. The conference Web site can be accessed at: http://www.knowledgefoundation.com/viewevents.php?event_id=253&act=evt

- **7th Lithium Mobile Power Conference:** Knowledge Foundation will host the 7th Lithium Mobile Power Conference on **November 9-10, 2011** in Boston, Massachusetts immediately following the battery safety conference. The conference will provide a general survey of the lithium-ion battery industry. The conference Web site can be accessed at: http://www.knowledgefoundation.com/viewevents.php?event_id=254&act=evt.
- **International Electric Vehicle Symposium:** The Electric Drive Transportation Association will produce the 26th international Electric Vehicle Symposium and exposition (EVS26) on **May 6-9, 2012** in Los Angeles, California. Information about EVS26 can be found at www.EVS26.org.
- **IEEE PES Transmission and Distribution Conference and Exposition:** The IEEE PES Transmission and Distribution Conference will be held in Orlando, Florida on **May 7-10, 2012**. The conference will focus on innovation in power delivery systems, including storage systems. Information about the conference can be viewed at: <http://www.ieeet-d.org/>.



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