

## Summary:

For the February 25<sup>th</sup> issue of NAATBatt's Advanced Battery Weekly, we highlight the ongoing sector activities.

The NAATBatt index was flat while the Advanced U.S. and Asia Indices declined 3.7% and 1.2%, respectively. The S&P 500 and Russell 2000 decreased 1.3% and 1.6%, respectively.

Executive Director James Greenberger suggests that the political battle raging in Washington over the funding of ARPA-E highlights the importance of finding new ways to finance long-term research and development of energy technology. Read "**Thinking About Alternatives for Financing New Energy Technology**" in the Executive Director's Notes section of this newsletter below.

## Key Highlights:

- **BMW** is creating a new sub-brand -- "**BMW i**" -- for its upscale electric vehicles (EVs). The company also announced BMW i's first two production vehicles (the **i3** and the **i8**) -- both due in 2013.
- **KEMA** has opened the 1<sup>st</sup> U.S. energy storage performance testing lab. The performance testing involves a utility grid interconnection to test large-scale systems in their desired application for up to 2 MW.
- The **Zhejiang** province capital city of **Hangzhou** is on track to become the second Chinese city to begin operation of electric-powered taxis. The city plans to add 600 electric cars to its taxi fleet this year. The city has received delivery of 30 EVs from **Zotye Automobile International** and **FAW Haima Automobile**.
- **American Clean Energy** and **Envision Solar** introduced the **Solar Tracking Tree™**. The product is a parking lot canopy that combines solar tracking technology with an EV charging station and could generate enough energy to remove 15 tons of CO<sub>2</sub>, replace the usage of 1,600 gallons of gas and power 2.5 homes.
- **Highview Power Storage** is scheduled to open the **United Kingdom's** first cryogenic power storage plant (that uses liquid nitrogen to store and release energy) next month. The pilot facility near **Slough** has been providing electricity to the **National Grid** since April 2010 by evaporating liquid nitrogen stored at -200°C to drive turbine generators.
- **Panasonic** is targeting automobile-related products sales (such as lithium-ion batteries for EVs and car navigation systems) of 1.5 trillion yen (or \$18+ billion) in fiscal 2018. The company is planning to aggressively market the products for Japanese automakers through the production of environmentally friendly vehicles in high growth markets such **China, India** and other emerging economies.
- Researchers at the **University of Rome Sapienza (Italy)** and **Hanyang University (South Korea)** have developed a novel, advanced lithium-ion (li-ion) battery chemistry. The scientists use a **tin-carbon** anode and a cathode made of **lithium manganese oxide** doped with **nickel** and **cobalt**.
- **Hyundai Motor** is proposing changes to management rules in an effort to secure rare earth metals (like **neodymium**) used in electric and hybrid cars. Hyundai is planning to mass produce an all-EV next year.

- **Balqon Corp** has signed a \$16 million deal to build 300 drive systems for inner-city buses in China. The exclusive agreement with **Winston Global Energy** is for the construction of electric buses and trucks, motorhomes and even marine vessels throughout much of **North and South America, Asia** and the **Middle East**.
- **Porsche** unveiled the **Boxster E** prototype. The vehicle is equipped with two 90 kilowatt (kW) electric motors and a 29 kilowatt-hr (kWh) battery pack.
- **Toyota Motor** will launch home battery chargers for EVs next year. The chargers, which will be compatible with non-Toyota cars, will come in two types. One would extend from the exterior wall of a home and the other would be for setting up in a garage.
- **China** is planning to produce a million EVs annually by 2015. The **China Ministry of Industry and Information Technology** has pledged to invest more than 100 billion yuan (or \$15+ billion) over the next 10 years to support new energy vehicle production.
- The all-electric **Rolls-Royce Phantom 102EX** will be unveiled in March at the Geneva Motor Show. The company is using the EV to explore alternative drive-trains and clarity on which alternative technologies may be suitable for future cars.
- **Cambridge's** EV charging points will be connected to other cities which will enable seamless travel. The city already has six charging points installed. By linking the stations to an internet management system **Chargevision**, drivers will be able to charge up at cities at **Oxford, Milton Keynes, and Hillingdon**.

## A Few More Details:

BMW is creating a new sub-brand -- "BMW i" -- for its upscale electric vehicles (EVs). The two production vehicles (the i3 and the i8) are both due in 2013. The i3 is being targeted at buyers in congested urban centers, such as London, Shanghai and New York. The PHEV i8 is a performance sports car. The EVs will use carbon fiber to help offset the extra weight added by the batteries.

*Source: USA Today*

KEMA has opened the 1<sup>st</sup> U.S. energy storage performance testing lab. KEMA's energy storage performance testing verifies the performance, interoperability, and integration of any energy storage system. The testing is conducted on a single component cell or stack level through to utility-scale, megawatt systems. The performance testing uses a utility grid interconnection to test large-scale systems in their desired application for up to 2 MW.

*Source: KEMA*

The Zhejiang province capital city of Hangzhou is on track to become the second Chinese city to begin operation of electric-powered taxis. The city plans to add 600 EVs to its taxi fleet this year. The city has received delivery of 30 vehicles from Zotye Automobile International and FAW Haima Automobile. The cars are all painted in yellow with "pure electric car" and "new energy taxi" emblazoned on both front doors and hood (as shown in **Exhibit 1**). The city has already finished construction on three charging stations, with an additional six to be completed this year.

*Source: PanOrient News*

### Exhibit 1: All-Electric Taxis For Fleet Usage in Hagzhou



*Source: Gasgoo*

American Clean Energy and Envision Solar introduced the Solar Tracking Tree™ (as shown in **Exhibit 2**). The product is a parking lot canopy that combines solar tracking technology with an EV charging station. Unlike most tracking systems, which use a fixed-tilt mechanism to follow the sun, the Solar Tree moves on a pivot, which allows it to stay on sun even if, heaven forbid, the sun begins spiraling in the sky. According to American Clean Energy, each Solar Tree generates enough energy to remove 15 tons of CO<sub>2</sub>, replace the usage of 1,600 gallons of gas and power 2.5 homes.

## Exhibit 2: The Solar Tree



Source: American Clean Energy

Highview Power Storage is scheduled to open the United Kingdom's first cryogenic power storage plant (that uses liquid nitrogen to store and release energy) next month. The company estimates the cost of storing energy cryogenically will be less than \$1,000 per kilowatt (kW) when the technology is mature – about 25% the cost of sodium-sulphur batteries and 25% to 50% of pumping water uphill into reservoirs. The pilot facility near Slough has been providing electricity to the National Grid since April 2010 by evaporating liquid nitrogen stored at  $-200^{\circ}\text{C}$  to drive turbine generators.

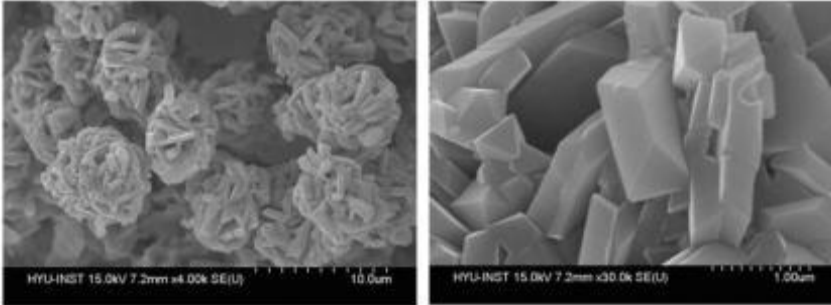
Source: The Engineer

Panasonic is targeting automobile-related products sales (such as lithium-ion batteries for EVs and car navigation systems) of 1.5 trillion yen (or \$18+ billion) in fiscal 2018. The company is planning to aggressively market the products for Japanese automakers through the production of environmentally friendly vehicles in high growth markets such as China, India and other emerging economies. By region, sales are projected to double in China in fiscal 2015 from fiscal 2009 ending March 31, 2010, and rise 60% in North America.

Source: Japan Today

Researchers at the University of Rome Sapienza (Italy) and Hanyang University (South Korea) have developed a novel, advanced lithium-ion (li-ion) battery chemistry. The scientists use a tin-carbon anode and a cathode made of lithium manganese oxide doped with nickel and cobalt. The tin-carbon anode has a high cycling life of several hundred cycles without a reduction in capacity, as well as discharge-charge efficiency approaching 100%. The new manganese-based cathode materials have a higher stability at low temperatures compared to the lithium cobalt oxide cathode used in conventional batteries.

## Exhibit 3: Cathode with LiMnO Doped with Ni And Co



Source: PhysOrg

Hyundai Motor is proposing changes to management rules in an effort to secure rare earth metals (like neodymium) used in electric and hybrid cars. The company has been more focused on making more fuel efficient gasoline models and is playing catchup to Asian rivals such as Nissan. Hyundai is planning to mass produce an all-EV next year.

Source: NTDTV

Balqon Corp has signed a \$16 million deal to build 300 drive systems for inner-city buses in China. The exclusive agreement with Winston Global Energy is for the construction of electric buses, trucks (such as the Nautilus E-30 shown in **Exhibit 4**), motorhomes and even marine vessels throughout much of North and South America, Asia and the Middle East. The drive systems being built at the Harbor City assembly plant cost about \$53,000 each and will be exported to China during the next 18 months.

**Exhibit 4: An etruck with a 40 mile range and haul 60K lbs load**



Source: Long Beach Press-Telegram

Porsche unveiled the Boxster E prototype (as shown in **Exhibit 5**) with two 90 kilowatt (kW) electric motors and a 29 kilowatt-hr (kWh) battery pack. The EV has approximately 240 horsepower, good for a 0-60 mph time of 5.3 seconds and an estimated driving range of 100 miles per charge.

Source: Miami Herald

**Exhibit 5: The Boxster E Prototype**



Source: *DailyTech*

Toyota Motor will launch home battery chargers for EVs next year. The chargers, which will be compatible with non-Toyota cars, will come in two types. One would extend from the exterior wall of a home and the other would be for setting up in a garage. The company expects to sell 20,000 to 30,000 units in the first year, with each costing about several tens of thousands of yen to 200,000 yen (\$3,000) including installation costs.

Source: *Nikkei and AsiaOne*

China is planning to produce a million EVs annually by 2015. The country's goal is to produce 100 million new cars and buses each year by 2020. The China Ministry of Industry and Information Technology has pledged to invest more than 100 billion yuan (or \$15+ billion) over the next 10 years to support new energy vehicle production.

Source: *People's Daily and Guardian*

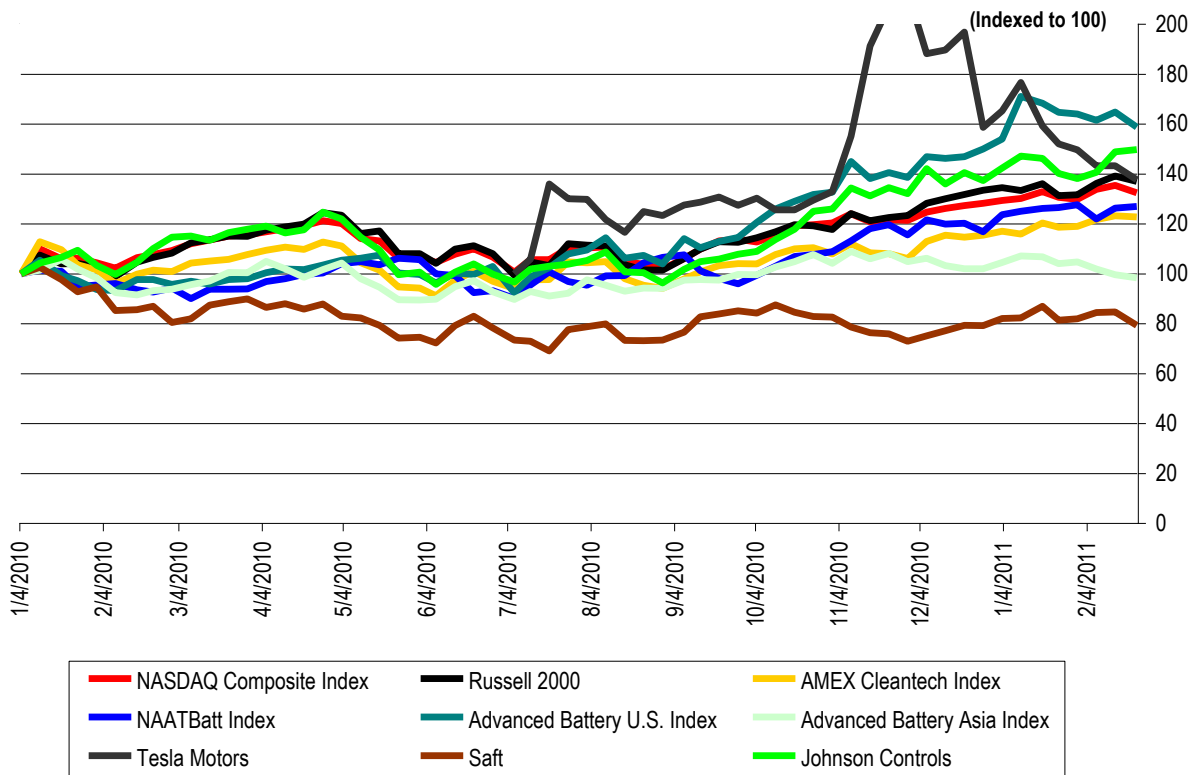
The all-electric Rolls-Royce Phantom 102EX will be unveiled in March at the Geneva Motor Show. However, there are currently no plans for commercial production. The company is using the 102EX to explore alternative drive-trains and clarity on which alternative technologies may be suitable to drive Rolls-Royce motor cars of the future.'

Source: *Daily Mail*

Cambridge's EV charging points will be connected to other cities which will enable seamless travel. The city already has six charging points installed. By linking the stations to an internet management system Chargevision, drivers will be able to charge up at cities at Oxford, Milton Keynes, and Hillingdon. Cambridge City Council will also be able to monitor all the charging points through the system. Cambridge's current charging points are found in Grafton East car park, Queen Anne terrace car park, and at Marshalls Citroen and Nissan dealers in Newmarket Road.

Source: *Cambridge First*

**Exhibit 6: Indices Performance**  
(From January 4, 2010)

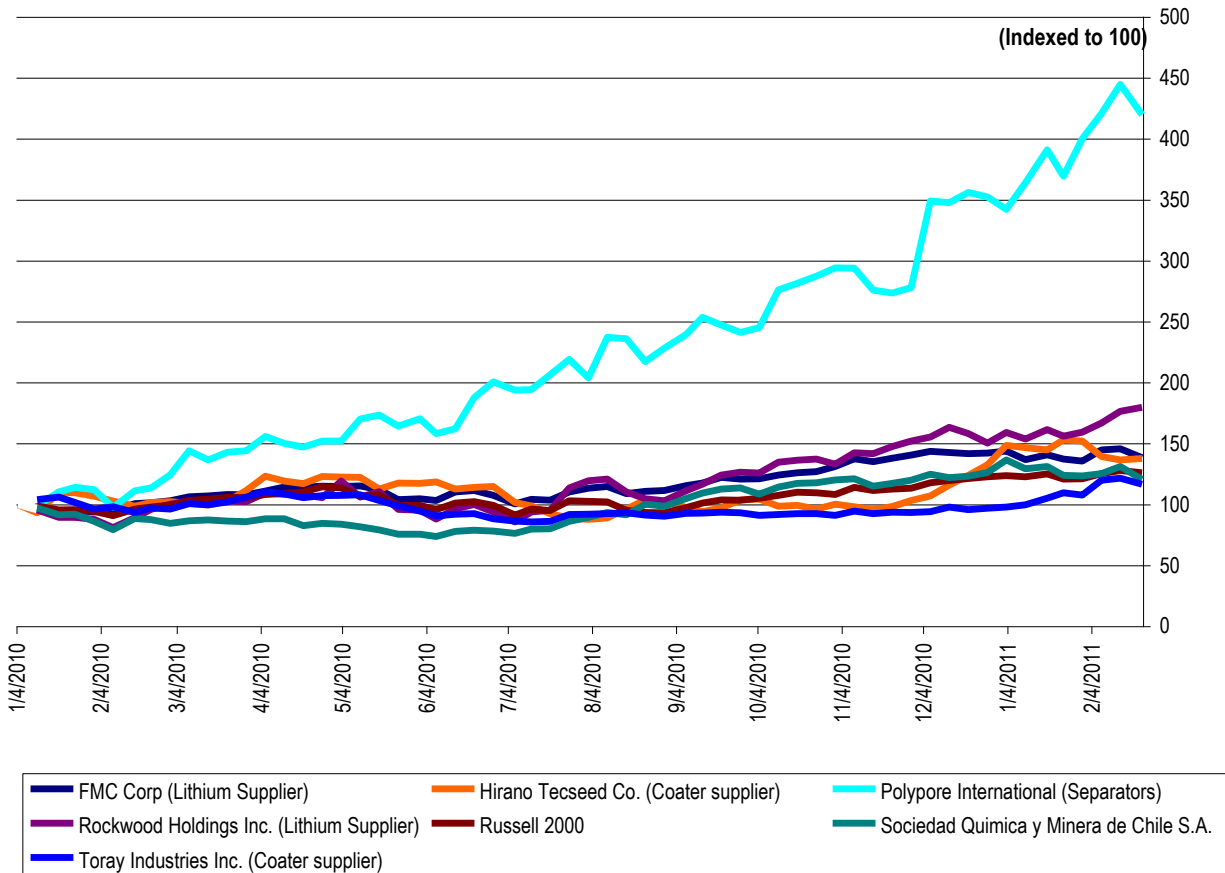


Index	Close on 2/22/2011	52-Wk High	% of 52-Wk High	Performance		
				LTM	YTD	Week
Dow	12,212.8	12,418.0	98.3%	17.4%	4.6%	(0.5%)
S&P 500	1,315.4	1,344.1	97.9%	18.5%	3.4%	(1.3%)
NASDAQ	2,756.4	2,840.5	97.0%	22.5%	2.4%	(2.2%)
Russell 2000	813.0	838.0	97.0%	28.5%	1.8%	(1.6%)
AMEX Cleantech Index	1,203.8	1,236.8	97.3%	20.8%	4.8%	(0.4%)

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 7: Supplier Performance  
(From January 4, 2010)**



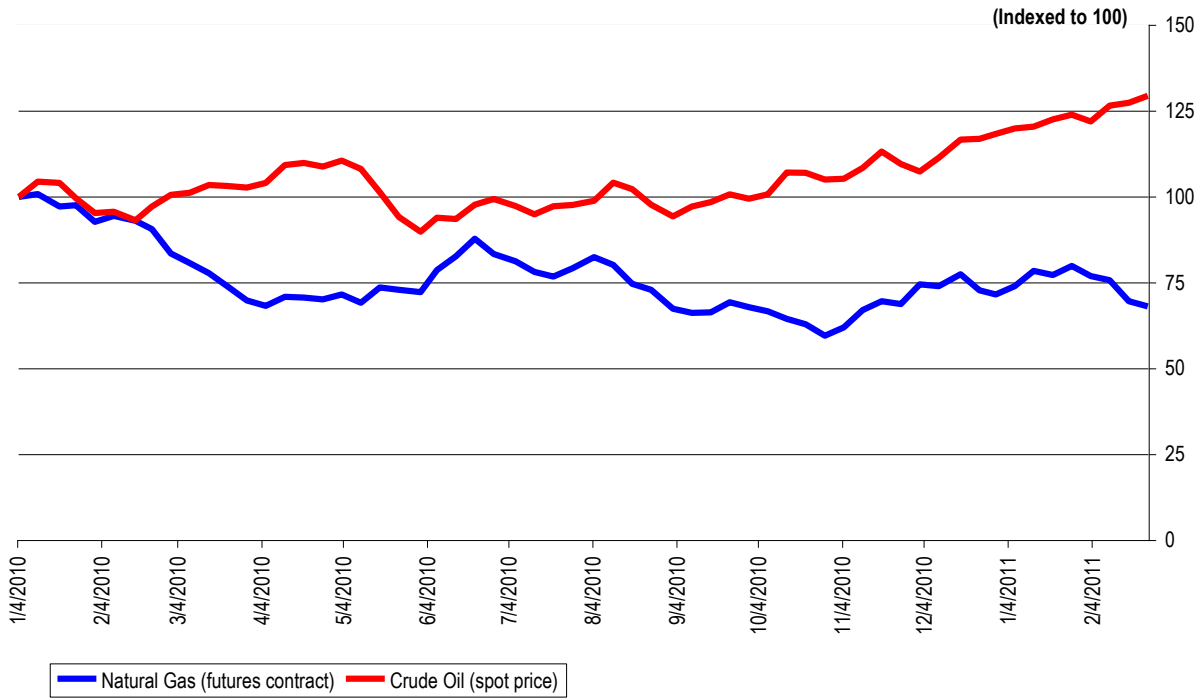
Source: Bloomberg

**Exhibit 8: Commodity Prices**

Commodity	Price on 2/22/2011	Price on 2/14/2011	Price on 1/21/2011	1 Week Change	1 Month Change
LME Copper (Cash, \$ per tonne)	9,653	10,148	9,485	(4.9%)	1.8%
LME Lead (cash, \$ per tonne)	2,563	2,630	2,549	(2.6%)	0.5%
LME Nickel (cash, \$ per tonne)	28,860	28,760	25,850	0.3%	11.6%

Source: LME

**Exhibit 9: Natural Gas and Crude Oil**  
**(From January 4, 2010)**



Source: EIA

## Executive Director's Notes



### **THINKING ABOUT ALTERNATIVES FOR FINANCING NEW ENERGY TECHNOLOGY**

Next week the 2011 ARPA-E Energy Innovation Summit will be held in Washington, D.C. The Summit is a much-anticipated annual conference highlighting the development of next generation energy technologies in the United States and the Department of Energy's flagship Advanced Research Projects Agency – Energy (ARPA-E), which provides critical financial support for those technologies.

The Summit will convene at a time of considerable uncertainty. Although the Obama Administration's FY 2012 budget proposes to increase funding for ARPA-E to \$650 million, up from the \$389 million last appropriated in FY 2009, H.R. 1, the continuing budget resolution proposed by House Republicans, cuts the ARPA-E budget to a mere \$50 million.

It is hard to tell what is policy and what is posturing in the budgetary Donnybrook unfolding in Washington. Optimists hold that that if bi-partisan consensus can be reached on anything, it is on the importance of technology innovation to the long-term competitiveness of the U.S. economy and on breaking the stranglehold of foreign petroleum upon it. Pessimists point out that with political priorities so sharply focused on short-term job creation, funding for research and development is an obvious candidate for the knife.

Either way, Summit participants will be in the thick of it. The federal government shuts down on March 4, if a new continuing resolution is not agreed upon. That could mean a long walk home for many Summit participants if airport flight controllers are placed on furlough.

Levity aside, the uncertain future of ARPA-E highlights the serious question of how the development of next generation energy technology can be funded in the United States. Funding next generation energy technology is critical. The future of vehicle electrification and its ability to break the petroleum stranglehold depends entirely upon the scientific community's ability to develop new, more powerful, next generation batteries. For reasons I have written about before, the private venture capital community is structurally incapable of financing this kind of innovation. The money must come from somewhere else.

We will see over the next week how much of a political football ARPA-E and similar energy research programs have become. In the meantime, let's root for the optimists. But we must also start thinking about alternatives. ARPA-E is a great idea and a good program. But this week's lesson should be that we have to keep thinking about new ways to fund critical advanced energy research. Building the electric vehicles that ultimately replace petroleum-fueled cars will require as much creativity by policy and financial experts as by experts in battery and materials sciences.

A handwritten signature in black ink, appearing to read "James J. Greenberger".

James J. Greenberger  
Executive Director

February 25, 2011



## NAATBatt Membership Applications for 2011

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### **2011 Membership Applications and Dues Structure**

NAATBatt is now 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

**Get More Information!** **NAATBatt Workshop on Problems in Utility Deployment of Distributed Energy Storage Systems:** On **April 21, 2010**, NAATBatt and the U.S. Department of Energy will co-host in Chicago an interactive workshop examining the issues, problems and challenges that electric utilities face in deploying distributed energy storage systems on the grid. Although DES systems have many benefits, profitably deploying DES systems and adding them to rate base continues to be a major challenge for utilities. The NAATBatt/DOE workshop will encourage utility and battery executives to sit together and have a frank discussion about those challenges and how they might be addressed. The workshop is by invitation only. For more information about the workshop, please click [here](#).

**Save the Date!** **NAATBatt 2011 Annual Meeting and Conference:** NAATBatt has announced that its 2011 Annual Meeting and Conference will be held on **September 7-9, 2011** in Louisville, Kentucky. More information about the 2011 conference will be posted soon on the NAATBatt Web site at: [www.naatbatt.org](http://www.naatbatt.org). Visit the NAATBatt Web site for information about the 2010 conference. Please save the date for 2011!

**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 James Greenberger at [jgreenberger@naatbatt.org](mailto: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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- **ARPA-E Energy Innovation Summit:** The ARPA-E Energy Innovation Summit will be held on **February 28-March 2, 2010**, at the Gaylord National Resort & Convention Center in National Harbor, MD. The Summit will showcase the next generation of clean energy technologies and discuss the activities of the DOE's ARPA-E program. The Web site for the Summit may be viewed at: <http://www.ct-si.org/events/EnergyInnovation/about/>

- **Midwest Energy Forum:** The Midwest Energy Forum will be held at the University of Chicago Booth School of Business' Gleacher Center in downtown Chicago on **March 3, 2011**. The conference will highlight new energy technologies being developed in the Midwest region, including transportation-related technologies. The conference Web site can be found at: <http://www.chicagobooth.edu/mef/2011/>.
- **Cleantech Forum San Francisco:** Cleantech Forum San Francisco will be held on **March 14-16, 2011** at the Hyatt Regency San Francisco. The latest in the Cleantech Network's ongoing series of cleantech conferences, the Forum will focus on the growing role of information technology in the cleantech sector. The Forum's web site can be found at: <http://events.cleantech.com/sanfrancisco/event-overview>.
- **Advanced The 28<sup>th</sup> International Battery Seminar & Exhibit:** Power Source's annual International Battery Seminar & Exhibit will be held on **March 14-17, 2010**, at the Broward County Convention Center in Fort Lauderdale, Florida. A link to the conference Web site can be found at: <https://powersources.net/florida/28th.html>.
- **TREM11: Strategic Metals for National Security and Clean Energy:** The TREM11 conference on rare earth and strategic metals will be held on **March 22-23, 2010** at the Ritz-Carlton Pentagon City, in Arlington, Virginia. NAATBatt is a supporting organization of the conference. Information about the conference can be found at: <http://www.tremcenter.org/>.
- **4th Annual Energy Storage Summit:** The 4<sup>th</sup> Annual Energy Storage Summit will be on **March 28-30, 2011** in San Francisco, California. The Summit will focus on grid-connected energy storage technologies. The Summit's Web site can be found at: <http://www.energystoragesummit.com/Event.aspx?id=434682>.
- **Plug-In Electric Vehicle Infrastructure USA 2011:** The Plug-In Electric Vehicle Infrastructure USA 2011 conference will examine five key areas of interest to those working with PEV's and their supporting infrastructure. The conference will be held **March 31-April 1, 2011**, at the Hilton Mission Bay in San Diego California. The conference Web site is: <http://www.evupdate.com/electricvehicleusa/index.shtml>.
- **2011 Battery Conference:** The 2011 Battery Congress will be held at the University of Michigan – Michigan League in Ann Arbor, Michigan on **April 11-12, 2011**. Information about the Congress can be found at: <http://batterycongress.org/about-2/>
- **Electric Drive Vehicle Association 2011 Meeting and Annual Conference:** The EDVA 2011 Meeting and Annual Conference will be held on **April 19-21, 2011** in Washington, D.C. The Web site for the meeting can be viewed at: <http://www.edtaconference.org/ht/d/sp/i/18736/pid/18736>.
- **Workshop on Problems in Utility Deployment of Distributed Energy Storage Systems:** NAATBatt will sponsor a special workshop and roundtable discussion among utility and battery executives in Chicago on **April 21, 2011**. The purpose of the workshop is to identify the specific challenges that utilities face in evaluating, procuring, deploying and adding to their rate base advanced battery systems for storing electrical energy in the distribution portion of the grid. Attendance at the workshop is by invitation only. Please direct inquiries to: [igreenberger@naatbatt.org](mailto:igreenberger@naatbatt.org)
- **The Council for Chemical Research Annual Meeting:** The Council for Chemical Research will hold its annual meeting on **May 1-3, 2011** in Dearborn, Michigan. The title of the meeting is

“Advanced Materials: Driving Transformative Research in Transportation and Automobiles”. The conference Web site may be viewed at: <http://www.ccrhq.org/2011-annual-meeting>.

- **The Battcon™ International Stationary Battery Conference:** The Battcon™ International Stationary Battery Conference is a three day, noncommercial, technical event for storage battery users from a broad range of industries. The conference will be held from **May 16 to 18, 2011** at the Swan and Dolphin Resort, Orlando, Florida. The conference Web site is: <http://www.battcon.com/>
- **21<sup>st</sup> Annual ESA Meeting:** The 21<sup>st</sup> annual meeting of the Electricity Storage Association will be held on **June 6-8, 2011** at the Fairmont Hotel in San Jose, California. Information about the meeting can be found on the meeting Web site at: [http://www.electricitystorage.org/ESA/calendar/21st\\_esa\\_annual\\_meeting\\_-\\_save\\_the\\_date/](http://www.electricitystorage.org/ESA/calendar/21st_esa_annual_meeting_-_save_the_date/).
- **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/>.
- **NAATBatt 2011 Annual Meeting and Conference: September 9-11, 2011** in Louisville, Kentucky (see note above).
- **2<sup>nd</sup> Battery Safety Conference:** Knowledge Foundation will host the 2<sup>nd</sup> 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](http://www.knowledgefoundation.com/viewevents.php?event_id=253&act=evt)
- **7<sup>th</sup> Lithium Mobile Power Conference:** Knowledge Foundation will host the 7<sup>th</sup> 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](http://www.knowledgefoundation.com/viewevents.php?event_id=254&act=evt).

## Contact Information:



**National Alliance for Advanced Technology Batteries**

122 South Michigan Avenue, Suite 1700  
Chicago, Illinois 60603  
(312) 588-0477

[www.naatbatt.org](http://www.naatbatt.org)

**Officers**

Randy Moore  
*Chairman*

[rmoore@naatbatt.org](mailto:rmoore@naatbatt.org)

Jim Greenberger  
*Executive Director*

[jgreenberger@naatbatt.org](mailto:jgreenberger@naatbatt.org)

Michael Lew  
*Head of Business Development*

[mlew@naatbatt.org](mailto:mlew@naatbatt.org)

Ralph Brodd  
*Chief Technology Officer*

[rbrodd@naatbatt.org](mailto:rbrodd@naatbatt.org)

Sandy Kane  
*Chief Financial Officer*

[skane@naatbatt.org](mailto:skane@naatbatt.org)