NAATBatt
Advanced Battery Weekly

Summary:

For the June 24th issue of NAATBatt's Advanced Battery Weekly, we highlight the ongoing sector activities.

The NAATBatt and Asia Indices declined 2.8% and 4.0%, respectively. The U.S. Index increased 5.0%. The Russell 2000 was up 1.5% while the S&P 500 was flat.

Executive Director James Greenberger writes about the near term opportunities for advanced battery companies in the U.S. market. Read "***Mild Hybrids, Natural Gas and the Smart Grid Will Drive the Near Term Market for Storage***" in the Executive Director's Notes section of this newsletter below.

Key Highlights:

- **EVConnect** announced an exclusive services agreement with **Fisker Automotive**. Under the partnership, EV Connect will install and service electric vehicle supply equipment (EVSE) for Karma owners and 47 Fisker dealerships throughout the **United States** and **Canada**.

- The **American Automobile Association** (**AAA**) is planning to deploy fast-charging trucks to aid drivers of electric vehicles (EVs) when their batteries run down. The organization will test the trucks starting in August.

- The **U.S. Department of Energy** (**DOE**) is forecasting that by 2020 there will be 100 million EVs on the country's roads. The **Utilities Telecom Council** trade group is estimating that volume of vehicles will require a 16-fold increase in power usage in the next decade.

- A draft regulation by the **China State Council** is proposing EVs to be exempt from annual taxes starting in 2012. The draft is suggesting that pure electric, fuel cell and plug-in hybrid vehicles be exempt from taxation, while other hybrid vehicles are eligible for a 50% cut.

- **Electrovaya** has signed a contract to supply **Chrysler** with lithium ion (li-ion) batteries for a test fleet of 25 **Town & Country** minivans. The EVs will be part of a demonstration fleet for display to municipalities, state governments, universities and energy companies.

- **Toshiba** has been selected by **Ford Motor** to supply automotive inverters for EVs. Under the agreement, Toshiba will supply both inverters and motors as a package to Ford.

- **Renault** has announced that **British Gas** will be its preferred supplier of vehicle charging points for its range of electric car and vans in the UK. British Gas will supply and install charge points in homes and businesses across the country.

- The **General Motors India** unit showcased an electric version of its **Beat** with an aim to study the potential for such vehicles and use local engineering capabilities to bring down the cost of the car. The 300 cell, 20 kilowatt-hour (kWh), li-ion powered Beat can travel 130 km (over 80 miles) on a single charge under normal driving conditions.

- **Mercedes-Benz** is making a greener hybrid **Popemobile** for **Benedict XVI**. The rechargeable lithium-ion battery will allow it to drive 30 kilometers (or ~19 miles) without any polluting emissions.

- A **Drexel University** research team discovered that by shrinking the pores in a carbon supercapacitor, energy storage can increase. The pores are even smaller than the than the solvent-covered electric charge-carriers that were supposed to fit within them.

- **Booz & Company** is charting out a roadmap for promoting EVs in India as part of a joint initiative by the **Department of Heavy Industry** and **Society of Indian Automobile Manufacturers** (**SIAM**) under the national mission for electric mobility. The firm will conduct a study through September across India that will include companies and about 7,000 people.

- Two 240-volt charging stations were unveiled in the **EasyPark** lot by **Vancouver** city hall. Fifteen stations are being installed as part of a $140,000 pilot program from the **City of Vancouver**, **B.C. Hydro** and parking lot company **EasyPark**.

A Few More Details:

EVConnect announced an exclusive services agreement with Fisker Automotive. Under the partnership, EV Connect will install and service electric vehicle supply equipment (EVSE) for Karma owners and 47 Fisker dealerships throughout the United States and Canada. Before Fisker Karma owners leave the showroom floor, EV Connect will initiate the installation process for their Fisker-branded charging equipment for home or workplace charging.
Source: EVConnect

AAA is planning to deploy fast-charging trucks to aid drivers of EVs when their batteries run down. The organization will test the trucks starting in August. Initially, the group will have at least six "mobile charging units," including in states such as California, Oregon, Washington, Florida, Tennessee and Georgia.
Source: Bloomberg

The DOE is forecasting that by 2020 there will be 100 million electric vehicles (EVs) on the country's roads. The Utilities Telecom Council trade group is estimating that that volume of vehciles will require a 16-fold increase in power usage in the next decade. That will put pressure on utilities to safely manage the increased demand on the local grid.
Source: Chicago Sun-Times

A draft regulation by the China State Council is proposing EVs to be exempt from annual taxes starting in 2012. The central government is soliciting public opinions until mid-July. The draft is suggesting that pure electric, fuel cell and plug-in hybrid vehicles be exempt from taxation, while other hybrid vehicles are eligible for a 50% cut. The tax on cars with up to a 1.6 liter engine will range from 60 to 540 yuan ($8.92 to $80.30) annually. Autos with engines over 3.0 liters will pay from 2,400 to 5,400 yuan. Previously, the same tax was levied on vehicles regardless of engine displacement.
Source China Daily

Electrovaya has signed a contract to supply Chrysler with li-ion batteries for a test fleet of 25 Town & Country minivans (as shown in **Exhibit 1**). The EVs will be part of a demonstration fleet for display to municipalities, state governments, universities and energy companies. The company is using a proprietary SuperPolymer cell technology that is produced using a non-toxic NMP-free process.
Source: Electrovaya

Exhibit 1: An Electric Town & Country

Source: Electriccarsreport

Toshiba has been selected by Ford Motor to supply automotive inverters for EVs. Under the agreement, Toshiba will supply both inverters and motors as a package to Ford. The company is planning to build a new production line capable of manufacturing 150,000 inverters a year at its plant in central Japan. The new line will be ready to start supplying the inverters next April.
Source: Dow Jones

Renault has announced that British Gas will be its preferred supplier of vehicle charging points for its range of electric car and vans in the UK. British Gas will supply and install charge points in homes and businesses across the country. Renault is scheduled to launch the Kangoo Van Z.E. later this year, followed by the Fluence Z.E., Zoe and the Twizy tandem two-seater. The deal builds on British Gas' agreement with Renault's alliance partner, Nissan, to be the preferred supplier of charge points to its electric car, the Leaf.
Source: BusinessCar

The General Motors India unit showcased an electric version of its Beat (as shown in **Exhibit 2**) with an aim to study the potential for such vehicles and use local engineering capabilities to bring down the cost of the car. The 300 cell, 20 kilowatt-hour (kWh), li-ion powered Beat can travel 130 km (over 80 miles) on a single charge under normal driving conditions. General Motors will showcase the technology in other countries including Korea, China and Germany.
Source: The Economic Times

Exhibit 2: The Beat

Source: OneIndiaLiving

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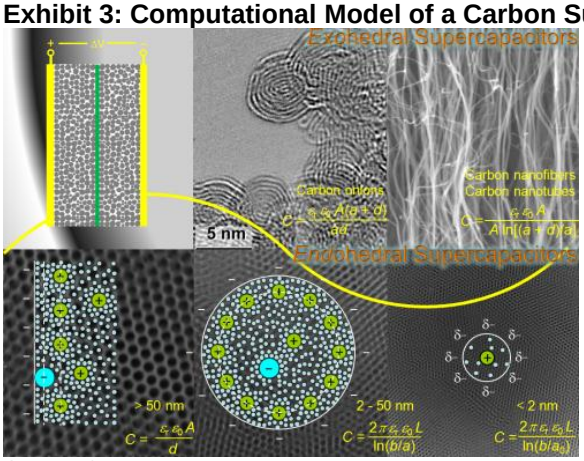
Mercedes-Benz is making a greener hybrid Popemobile for Benedict XVI. However, the EV will not be ready before the end of the year. The new Popemobile will be based on the four-wheel drive M Class Mercedes with a hybrid electric-petrol motor. The rechargeable lithium-ion battery will allow it to drive 30 kilometers (or ~19 miles) without any polluting emissions. The pope is not allowed to use a purely electric-driven car, as the Popemobile must have the capacity to take off swiftly in case of emergency.
Source: Herald Sun

A Drexel University research team discovered that by shrinking the pores in a carbon supercapacitor, energy storage can increase. The pores are even smaller than the solvent-covered electric charge-carriers that were supposed to fit within them. An electric double-layer capacitor, or supercapacitor, represents an advance on the technology that allows for far greater energy density. A computational model of a carbon supercapacitor with the effects of surface curvature included is shown in **Exhibit 3**. While in traditional capacitors two metallic plates are separated by a nonconducting material known as a dielectric, in a supercapacitor, an electrolyte is able to form an electric double layer with electrode materials that have very high surface areas.
Source: PhysOrg

Exhibit 3: Computational Model of a Carbon Supercapacitor

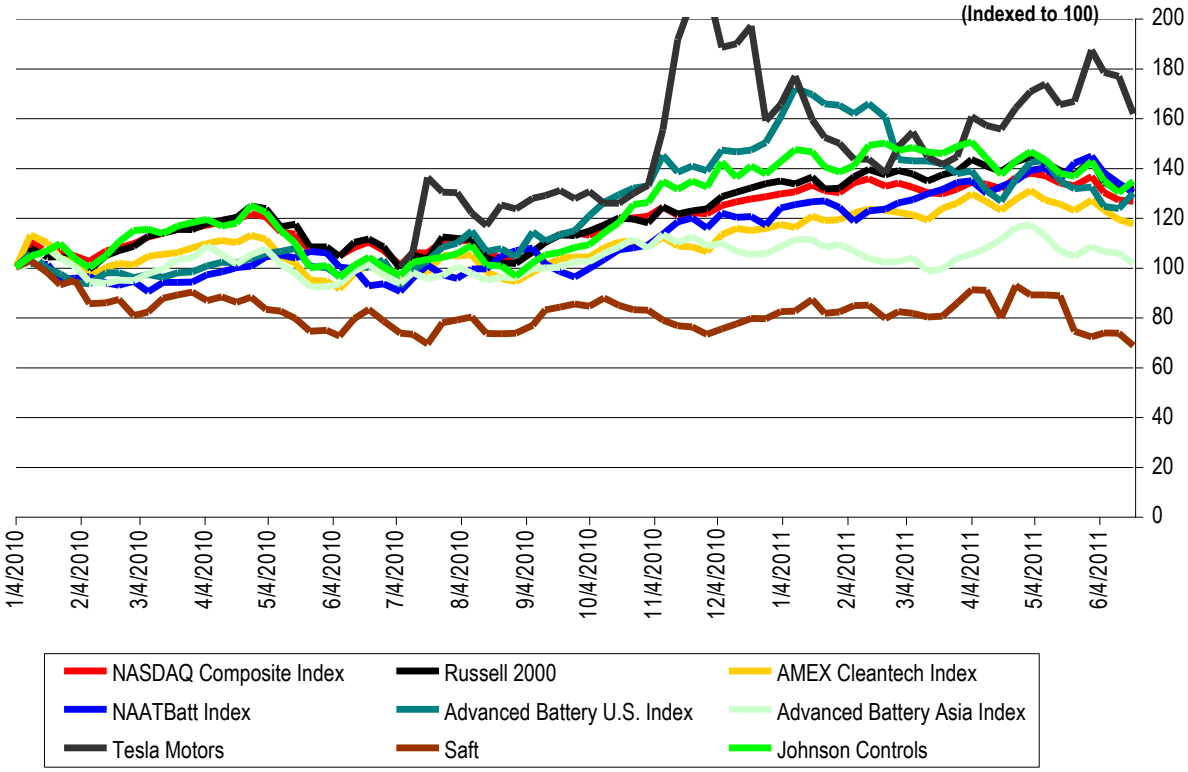


Source: ORNL

Booz & Company is charting out a roadmap for promoting EVs in India as part of a joint initiative by the Department of Heavy Industry and Society of Indian Automobile Manufacturers (SIAM) under the national mission for electric mobility. The firm will conduct a study through September across India that will include companies and about 7,000 people. The goal is to identify the issues that need to be addressed in order to promote adoption.
Source: The Economic Times

Two 240-volt charging stations were unveiled in the EasyPark lot by Vancouver city hall. Fifteen stations are being installed as part of a $140,000 pilot program from the City of Vancouver, B.C. Hydro and parking lot company EasyPark. The EasyPark Easy Charge program is part of Vancouver's Greenest City initiative to address greenhouse emissions and allows the city to test different charging methods.
Source: The Province

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

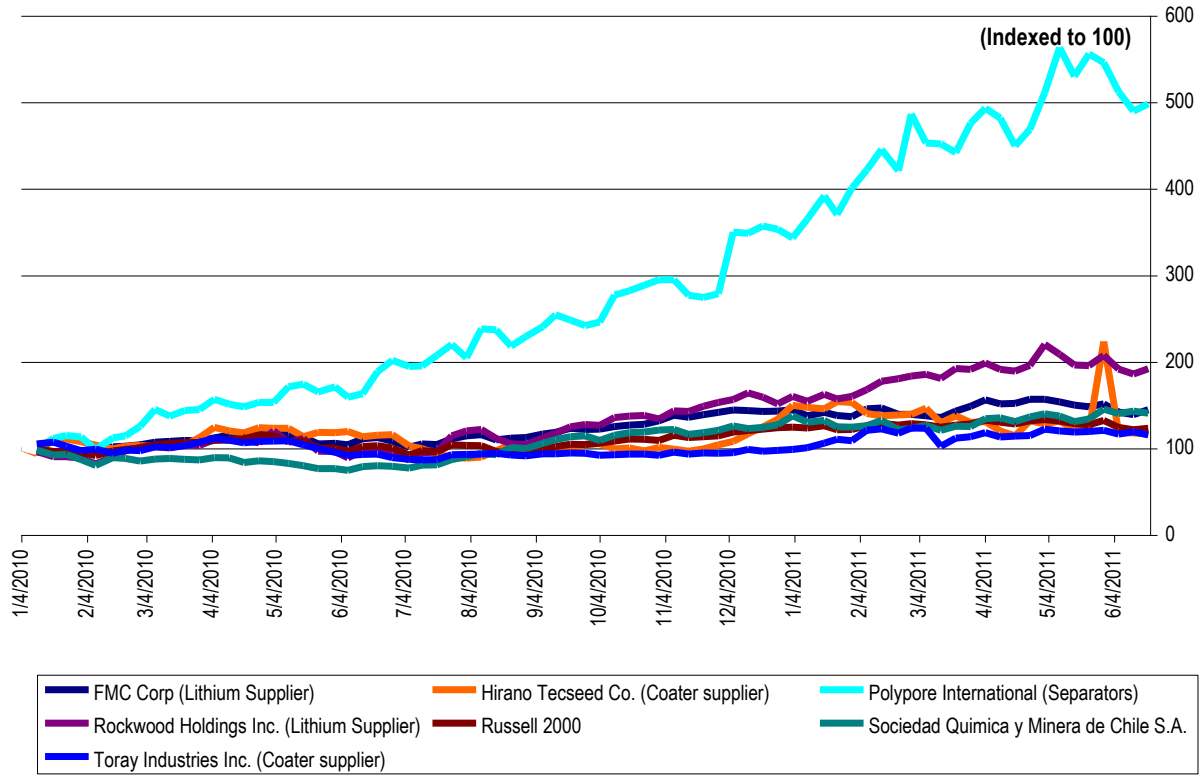


Index	Close on 6/20/2011	52-Wk High	% of 52-Wk High	Performance LTM	YTD	Week
Dow	12,080.4	12,928.5	93.4%	15.6%	3.5%	1.1%
S&P 500	1,278.4	1,370.6	93.3%	13.9%	0.5%	0.5%
NASDAQ	2,629.7	2,887.8	91.1%	12.3%	(2.3%)	(0.4%)
Russell 2000	788.5	868.6	90.8%	17.1%	(1.3%)	1.5%
AMEX Cleantech Index	1,150.2	1,292.4	89.0%	16.8%	0.1%	(1.5%)

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 5: Supplier Performance
(From January 4, 2010)



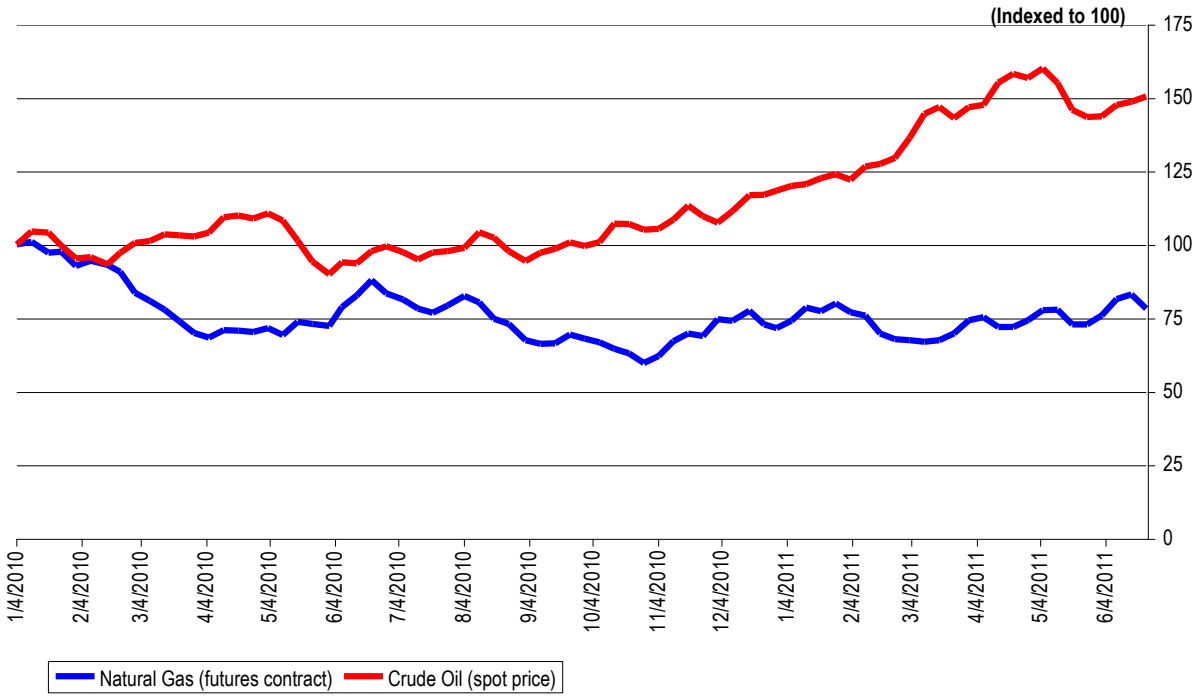
Source: Bloomberg

Exhibit 6: Commodity Prices

Commodity	Price on 6/20/2011	Price on 6/13/2011	Price on 5/20/2011	1 Week Change	1 Month Change
LME Copper (Cash, $ per tonne)	8,935	8,895	8,982	0.4%	(0.5%)
LME Lead (cash, $ per tonne)	2,375	2,512	2,485	(5.5%)	(4.4%)
LME Nickel (cash, $ per tonne)	21,405	22,245	23,450	(3.8%)	(8.7%)

Source: LME

Exhibit 7: Natural Gas and Crude Oil
(From January 4, 2010)



Source: EIA

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Executive Director's Notes

MILD HYBRIDS, NATURAL GAS AND THE SMART GRID WILL DRIVE THE NEAR TERM MARKET FOR STORAGE

Two weeks ago I wrote in this column about the next generation battery technologies discussed at the Beyond Lithium Ion conference at Pacific Northwest National Laboratory. While next generation technologies are interesting and a specific focus of NAATBatt, the short term health of the U.S. advanced battery industry will be decided in the here and now. It is accordingly appropriate for me this week to review some of the market forces that will drive demand for advanced battery technology over the next few years.

Several factors are likely to drive short to mid-term demand for advanced electrochemical energy storage technology. One of the most important will be the growing pressure for greater fuel economy in the U.S. auto fleet. Although Congress is deadlocked on anything having to do with an appropriation, that deadlock may not apply to mandates, such as CAFÉ standards for truck and automotive fuel efficiency. CAFÉ standards will tighten considerably over the next few years, and advanced battery technology companies will benefit from this development.

Advanced batteries offer automakers an important tool to increase the fuel economy of their fleets. While plug-in hybrids and full electric vehicles grab much of the media attention, the greater near term opportunity for automotive battery makers in the U.S. market lies in supplying start-stop and mild hybrid battery systems that will permit automakers to make marginal, though significant, improvements in the fuel economy of their cars and trucks. The interesting business question is what battery technology will come to dominate these smaller, higher power, lower energy systems. Lithium-ion, advanced lead acid, NiMH, Ni-Cd batteries and ultra-capacitors all have a chance to win this competition. The companies and technologies that do will have a bright future.

A second area of opportunity is grid-connected energy storage. Although much has been made of using storage on the grid, recent white papers by EPRI, Southern California Edison and others have suggested that adding storage to the grid does not make economic sense today. Regulatory initiatives, particularly in California, may open some initial opportunities. But the real, large scale market driver for grid-connected energy storage may come from an unlikely place: the natural gas industry.

The big energy story over the past few years has been the discovery of sizable domestic natural gas reserves on account of fracking technology. These additional reserves of a relatively clean, domestic power source have turned much of the last decade's debate about a national energy policy on its head. What is reasonably clear at this point is that over the next decade, natural gas will account for an

increasing percentage of base load electricity generation in the United States, as the addition of new coal and nuclear facilities are slowed, if not outright prevented, by environmental concerns.

But the predictions by many in the petroleum industry of "peak renewables" are greatly exaggerated. Ample supplies of natural gas do not necessarily mean low cost natural gas. If the past several decades of fossil fuel price history prove anything it is that fossil fuel prices are driven multiple factors and tend to be highly volatile, and somewhat unpredictable, over time. In the case of natural gas, the disparate chemical composition of natural gas deposits, the convoluted nature of its distribution and storage systems, and the whims of the energy trading markets all inform price. A national electricity system increasingly dependent upon natural gas for base load generation will become increasingly vulnerable to electricity price volatility.

In a natural gas-centric power grid, renewables will play a new and important role. Rather than serving primarily as a subsidy-dependent environmental answer to global warming, wind and solar power generation will become very rational, very economical ways for power users to hedge against possible high natural gas prices. While the economics of wind and solar generation are challenging in the face of low cost gas, coal and nuclear generation, the economics of renewables will look much better if power demand rises, coal and nuclear generation are constrained, and volatile natural gas prices increasingly influence the price of electricity nationwide. Far from stifling the growth of renewable power, greater penetration of the power sector by natural gas may have just the opposite effect, promoting a renaissance of investment in wind and solar systems.

This renaissance in renewable energy investment will have a substantially positive effect on the market for grid-connected energy storage. Solar and wind generation, being inherently variable, always need some sort of spinning reserve to balance their variability. Today, energy storage systems compete, largely with natural gas peaker plants, to provide that spinning reserve function. As the recent EPRI and SCE white papers implicitly suggest, storage technology is today losing that competition to low priced natural gas.

During the coming renewables renaissance, however, things will likely be different. Since the purpose of renewables will be to hedge against natural gas prices, it makes no sense to use natural gas as a spinning reserve for renewables' variability. Grid connected storage will become a critical part of the hedging strategy. Demand for large scale energy storage projects, and eventually for smaller distributed storage systems, will be driven by increasing reliance on natural gas for base load power.

The third and final near term market driver for advanced energy storage will be smart grid initiatives. Although hard to define, "smart grid" describes upgrades to the existing, early Twentieth Century design of the electricity grid in order to make the grid more reliable and more efficient. The ability to store electricity and use it on demand, rather than having to generate it, transmit it, and distribute it all within a nanosecond of consumption, will be an important component of any effective smart grid program. The smart grid should substantially reduce the cost of electricity delivery over time by making the use of the electricity grid more efficient. This increased efficiency will stem from eliminating or reducing the phenomenon of peak power, which drives the need for much of the grid's present infrastructure and capital costs.

The problem with smart grid is that its market driver is unclear. Consumers, as a general rule, don't care much about electricity or its price, so long as their power stays on and its price does not increase significantly. Some electric utilities may advocate for smart grid systems, if they can use those systems to capture valuable consumer data or earn a rate of return on investments in those smart grid systems. But the smart grid is a mixed proposition for many utilities (particularly utilities that own generation and transmission assets), which may not benefit from reducing the need for electricity generation and

infrastructure. State utility regulators might also push for smart grid programs. But while the regulatory structure in most states is well designed to control the costs of maintaining public infrastructure, they are generally poorly designed to review and administer large investments in new grid technology, the cost savings of which may not be fully realized by ratepayers for years to come.

But the smart grid will likely happen because it has powerful backers in the business community. Many of the largest and most powerful corporations in America have core competencies that are directly applicable to smart grid technology and have made major investments in business units that will sell it. In a market that is highly regulated and susceptible as much to political pressure as to economic pressure, the importance of political clout should not be underestimated. The fact that consumers will ultimately benefit from smart grid investments should also support the momentum of smart grid deployment.

The near to mid-term prospects for advanced energy storage technology are therefore not so bleak. Mild hybrid systems in cars and light trucks, a likely increase in demand for spinning reserve storage technology to supplement renewables, and increasing investment in smart grid technology, including energy storage technology, will permit many advanced battery companies to build successful businesses over the coming years.

James J. Greenberger
Executive Director

June 24, 2011

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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.

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North American Industry Announcements and Calendar

REGISTRATION NOW 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 Summit with presentations by the top university battery 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 save the date!

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.

- ***Automotive News Green Car Conference***: The Automotive News Green Car Conference will be held in Novi, Michigan on **June 13-14, 2011**. The conference has been expanded to two days and will include a ride and drive event. More information about the conference can be found at: http://www.autonews.com/Assets/html/green-car-conference/.

- ***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/.

- ***NAATBatt 2011 Annual Meeting and Conference***: **September 7-8, 2011** in Louisville, Kentucky Registration is now open! (see note above).

- ***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/.

- ***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.

- ***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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Contact Information:

National Alliance for Advanced Technology Batteries
122 South Michigan Avenue, Suite 1700
Chicago, Illinois 60603
(312) 588-0477

www.naatbatt.org

Officers

Randy Moore
Chairman
rmoore@naatbatt.org

Jim Greenberger
Executive Director
jgreenberger@naatbatt.org

Ralph Brodd
Chief Technology Officer
rbrodd@naatbatt.org

Michael Lew
Head of Business Development
mlew@naatbatt.org

Sandy Kane
Chief Financial Officer
skane@naatbatt.org