NAATBatt
Advanced Battery Weekly

Summary:

For the December 17th issue of NAATBatt's Advanced Battery Weekly, we highlight the ongoing sector activities.

The NAATBatt, U.S. and Asia Indices experienced modest declines of 1.4%, 0.5% and 2.8%, respectively. The S&P 500 and Russell 2000 increased 1.4% and 1.5%, respectively.

Executive Director James Greenberger writes about the importance of developing grid-connected energy storage as a collateral market for advanced automotive batteries and suggests that building that market be made a top priority of national energy policy. Read Mr. Greenberger's commentary, "***Toyota, Tesla and Collateral Use***", in the Executive Director's Notes portion of this newsletter below.

Key Highlights:

- **Smith Electric Vehicles U.S. Corp.** has sold two of its all-electric trucks (etrucks) to the **U.S. Marine Corps**. The **Newton** etrucks will be built locally and delivered to the Marines' Camp Pendleton in February. The vehicles are being powered by lithium-ion (li-ion) batteries from **Valence Technology**.

- **THINK** has delivered its first U.S.-built cars to the **State of Indiana** for use in its government fleet. The 15 EVs (powered by **Ener1**) were shipped from THINK's manufacturing facility in Elkhart, Indiana are the first electric passenger vehicles with American-made batteries used in a U.S. fleet operation.

- The **U.K. Government** has revealed the first 9 EVS that will be eligible for their purchasers to receive subsidies of up to 5,000 pounds ($7,735) under a plan to promote low-carbon transport. The vehicles are **Mitsubishi's iMiEV**, **Daimler's smart fortwo electric drive**, **Peugeot's iON**, **Citroen's CZero**, **the Nissan Leaf**, **the Tata Vista electric vehicle**; **the Toyota Prius Plug-in**, **Vauxhall's Ampera** and **General Motors' Chevrolet Volt.**

- The **City Council of Brighton** (**Michigan**) approved an arrangement that will result in 3 EV charging stations. The deal with **ChargePoint America** will put Brighton on the cutting edge of the movement toward EVs.

- **Gridflex Energy LLC** has proposed a pumped-storage hydroelectric project that would use the ocean as the lower of two reservoirs. The 300 MW **Lanai Pumped Storage** project is intended to provide the **Hawaiian** electric grid with a way to absorb a planned 400 MW of wind power on a grid that only has about 1,200 MW of peak demand.

- **BYD is** planning to test-market the **e6** EV in the U.S. next year, after almost a year's delay. In addition, the company is in talks with officials in **Los Angeles** to supply e-buses that could eventually lead to a manufacturing plant in the city.

- The **Mission R** will be unveiled at the **International Motorcycle Show** in Long Beach. The electric bike is powered by a 14.4 kilowatt-hour (kWh) li-ion battery and can reach over 160 mile-per-hour (MPH).

- **Russia** has rolled out the gas-electric hybrid car "**Yo"** that can use either gasoline or natural gas to generate its electric power. The plan is for the EV to go on sale in Russia in mid-2012.

- The **U.K. Government** has chosen the Midlands as one of eight regions it wants to become "Plugged-In Places" – areas which will lead the drive to persuade motorists to use electric vehicles (EVs). By 2013, over 500 charging posts will be installed in key locations across the region; such as shopping centers and railway stations.

- The **University of Missouri-Kansas City** unveiled its first etruck that will serve the university's recycling program. The Smith Electric Vehicles all-electric truck was bought with a grant from the U.S. Department of Energy Clean Cities initiative.

- **Volkswagen** has unveiled an electric taxi (etaxi). The **Volkswagen Taxi Concept** is powered by an electric motor fed by li-ion batteries with a capacity of 45 kWh that enables the etaxi to reach a theoretical top speed of 74 MPH.

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A Few More Details:

Smith Electric Vehicles U.S. Corp. has sold two of its all-electric trucks (etrucks) to the U.S. Marine Corps. The Newton etrucks (as shown in **Exhibit 1**) will be built locally and delivered to the Marines' Camp Pendleton in February. The vehicles are being powered by li-ion batteries from Valence Technology. This was the 1st military sale through a government purchasing contract the company received earlier this year from the General Services Administration. The Marine Corps' have a goal of reducing total energy use by 30% by 2015 and increasing use of renewable electric energy to 25% by 2025.
Source: Kansas City Business Journal

Exhibit 1: The Electric Newton

Source: Smith Electric Vehicle

THINK has delivered its first U.S.-built cars to the State of Indiana for use in its government fleet. The 15 EVs (powered by Ener1) were shipped from THINK's manufacturing facility in Elkhart, Indiana are the first electric passenger vehicles with American-made batteries used in a U.S. fleet operation. The economics of electric vehicles for fleet operators in terms of cost of ownership are highly positive given the defined travel routes and centralized recharging and service.
Source: THINK

The U.K. Government has revealed the first 9 EVS that will be eligible for their purchasers to receive subsidies of up to 5,000 pounds ($7,735) under a plan to promote low-carbon transport.
The government has pledged 43 million pounds ($66.5 million) until the end of March 2012 to help British motorists shift to low-carbon vehicles. The EVs are Mitsubishi's iMiEV, Daimler's smart fortwo electric drive, Peugeot's iON, Citroen's CZero, the Nissan Leaf, the Tata Vista electric vehicle; the Toyota Prius Plug-in, Vauxhall's Ampera and General Motors' Chevrolet Volt. The government is planning to announce more eligible cars next year.
Source: Reuters

The City Council of Brighton (Michigan) approved an arrangement which will result in three electric vehicle charging stations. The deal with ChargePoint America will put Brighton on the cutting edge of the movement toward EVs. The city's cost will be a mere $3,600, as the bulk of the expense will come through federal grants totaling $18,000. The city will charge a flat fee of $2 for a full or half-charge. The charging stations could be installed within the next 90 days.
Source: WHMI

Gridflex Energy LLC has proposed a pumped-storage hydroelectric project that would use the ocean as the lower of two reservoirs. The 300 MW Lanai Pumped Storage project is intended to provide the Hawaiian electric grid with a way to absorb a planned 400 MW of wind power on a grid that only has about 1,200 MW of peak demand. During times when energy is in lower demand, wind energy can be used to pump water uphill. When power is needed during high-demand periods, the water is released through turbines. The Lanai Project would use the ocean as its lower reservoir. Design features would be put into place to ensure a watertight upper reservoir, corrosion resistance for equipment and protection of marine organisms.
Source: Gridflex Energy LLC

BYD is planning to test-market the e6 EV in the U.S. next year, after almost a year's delay. In addition, the company is in talks with officials in Los Angeles to supply e-buses that could eventually lead to a manufacturing plant in the city. The delay in the e6 (as shown in **Exhibit 2**) launch was due to the company's efforts to make the car roomier, especially its rear-seat area that was cramped because of a bulky battery pack that is stored under the seat. BYD is planning to ship up to 50 e6 EVs by the end of next year to fleet customers in Southern California, including the municipal government of Los Angeles.
Source: WSJ

Exhibit 2: The BYD e6

Source: Autoblog

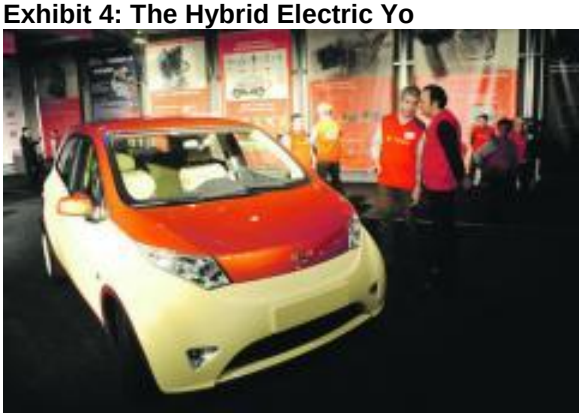
The Mission R (as shown in **Exhibit 3**) will be unveiled at the International Motorcycle Show in Long Beach. The electric bike is powered with a liquid-cooled, 100-kilowatt AC induction motor. Its 14.4 kilowatt-hours of lithium-ion batteries are sealed in a carbon-fiber box in a space that, on an internal-combustion machine, would normally house a gas tank and engine. The ebike weighs 545 pounds and can reach over 160 mile-per-hour.

Exhibit 3: The Electric Mission R

Source: Los Angeles Times

Russia has rolled out the gas-electric hybrid car “Yo” (as shown in **Exhibit 4**) that can use either gasoline or natural gas to generate its electric power. The plan is for the EV to go on sale in Russia in mid-2012. The Yo will cost about $14,500 and have a top speed of 80 miles per hour and a range of 680 miles — if both its natural gas and gasoline tanks are filled.

Exhibit 4: The Hybrid Electric Yo



Source: Todayonline

The U.K. Government has chosen the Midlands as one of eight regions in the UK it wants to become "Plugged-In Places" – areas which will lead the drive to persuade motorists to use electric vehicles (EVs). By 2013, over 500 charging posts will be installed in key locations across the region; such as shopping centers and railway stations. A consortium of Midlands businesses and local authorities has secured £2.9 million ($4.5 million) of Government funding towards the £6.3 ($9.7 million) million project. The strategy includes launching plug-in car grants of up to £5,000 ($7.735) per vehicle for a wave of EVs to be launched in 2011.

Source: Leicestershire Mercury

The University of Missouri-Kansas City unveiled its first etruck that will serve the university’s recycling program. The Smith Electric Vehicles all-electric truck was bought with a grant from the U.S. Department of Energy Clean Cities initiative. UMKC is the first university in the nation to operate a mid-class etruck on its campus.

Source: The Kansas City Star

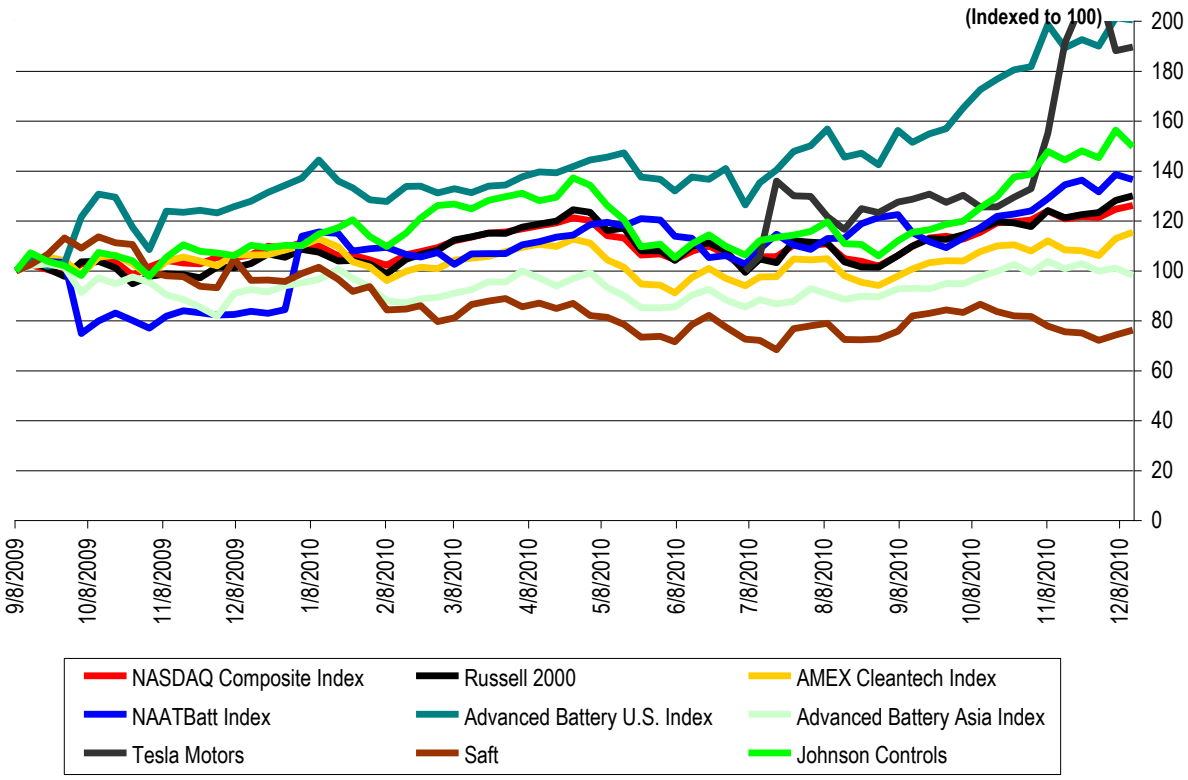
Volkswagen has unveiled an electric taxi (etaxi). The Volkswagen Taxi Concept (as shown in **Exhibit 5**) is powered by an electric motor fed by li-ion batteries with a capacity of 45 kWh that enables the etaxi to reach a theoretical top speed of 74 mph. The taxi will be able to travel 186 miles on one charge and an 80% charge taking around one hour to complete.

Source: AltTransport

Exhibit 5: The Volkswagen Taxi Concept

Source: AllCars Electric

Exhibit 6: Indices Performance
(From September 8, 2009)

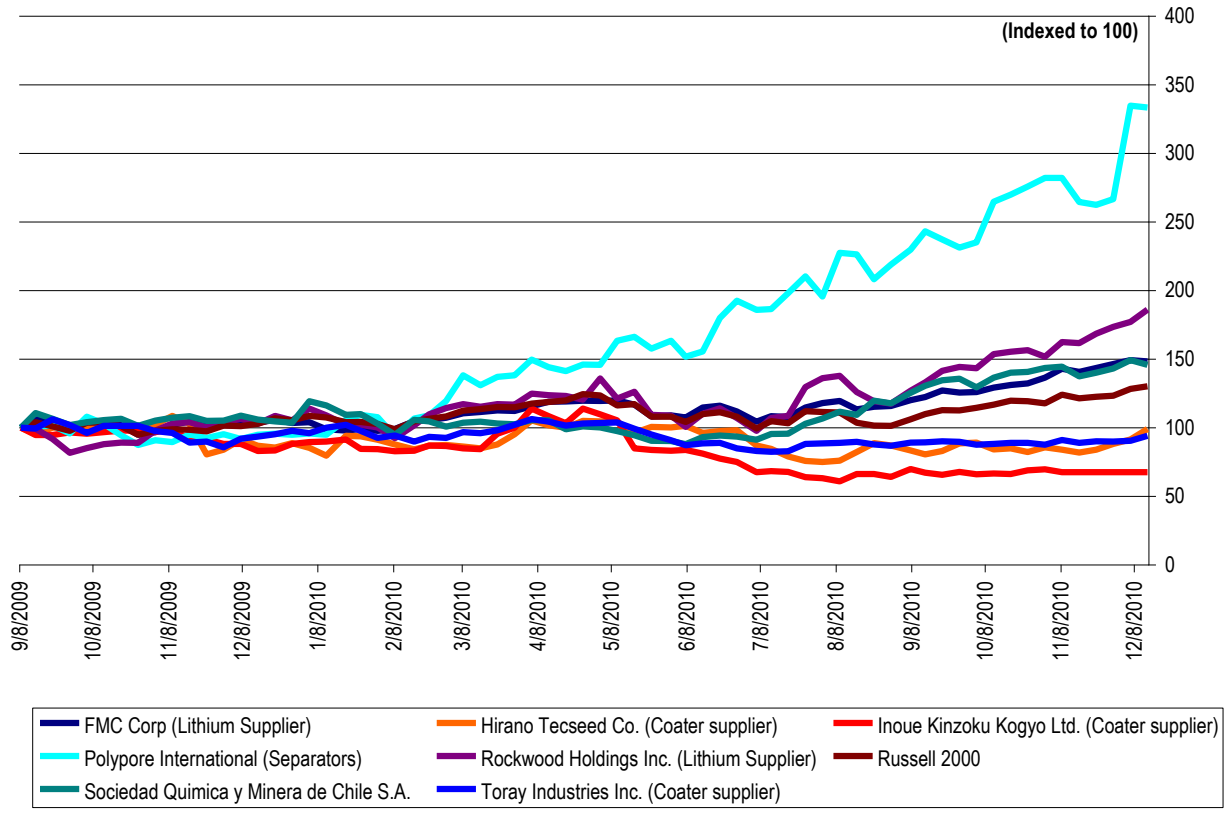


Index	Close on 12/13/2010	52-Wk High	% of 52-Wk High	Performance LTM	YTD	Week
Dow	11,428.6	11,553.5	98.9%	9.1%	9.6%	0.6%
S&P 500	1,240.5	1,246.7	99.5%	12.0%	11.1%	1.4%
NASDAQ	2,624.5	2,646.5	99.2%	19.2%	22.9%	1.1%
Russell 2000	772.1	779.9	99.0%	28.1%	22.9%	1.5%
AMEX Cleantech Index	1,132.7	1,139.1	99.4%	9.6%	6.2%	2.2%

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 September 8, 2009)



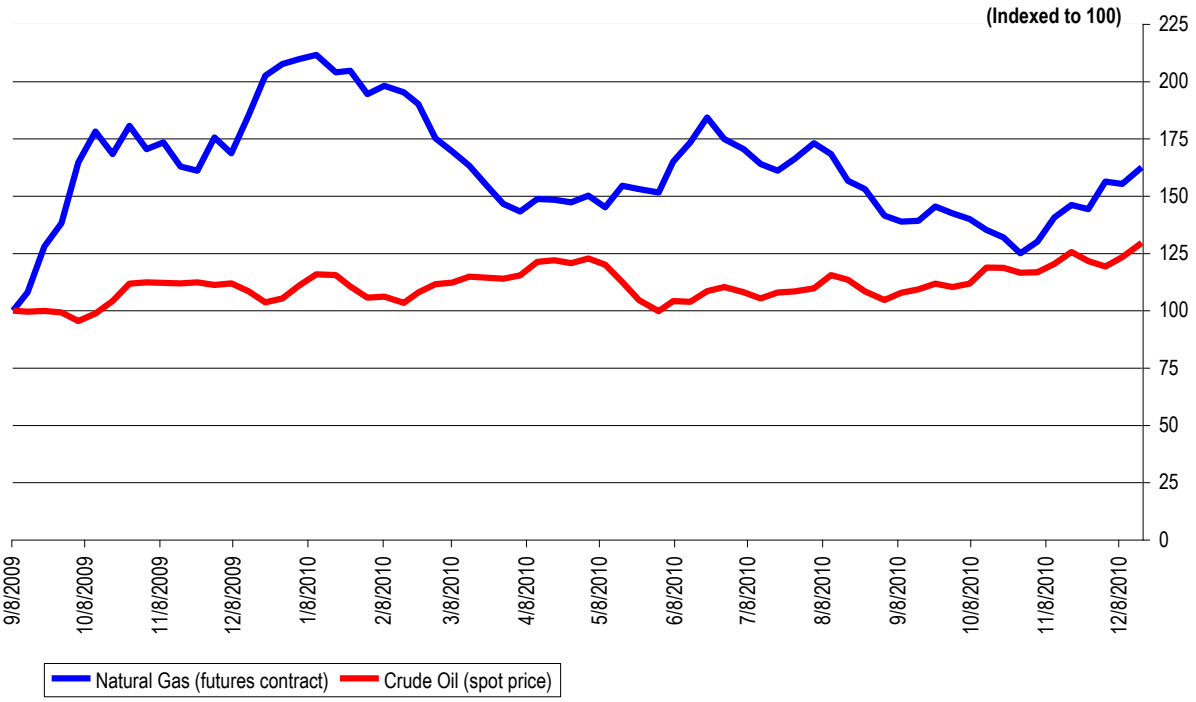
Source: Bloomberg

Exhibit 8: Commodity Prices

Commodity	Price on 12/13/2010	Price on 12/7/2010	Price on 11/12/2010	1 Week Change	1 Month Change
LME Copper (Cash, $ per tonne)	9,210	9,023	8,710	2.1%	5.7%
LME Lead (cash, $ per tonne)	2,419	2,401	2,533	0.7%	(4.5%)

Source: LME

Exhibit 9: Natural Gas and Crude Oil
(From September 8, 2009)



Source: EIA

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Executive Director's Notes

TOYOTA, TESLA AND COLLATERAL USE

The NAATBatt conference last week in Louisville nominally focused on the impact of plug-in electric vehicles on the grid. But its real focus was on the importance of using stationary, grid-connected energy storage technology, both as a way to mitigate the impact on the grid of new PEV load and as a way to bring down the cost of advanced automotive batteries.

The cost reduction effect of grid-connected energy storage on advanced automotive batteries stems in part from the ability of grid-connected storage systems to use aftermarket automotive batteries, thereby providing those batteries with a potentially significant residual use and value. But more importantly, using advanced batteries in PEV's that are not uniquely designed for automotive use, but are also usable for other large-scale collateral applications--such as grid-connected energy storage--will allow PEV makers to take advantage of economies of scale that can significantly drive down PEV costs.

So given the theme of the NAATBatt conference, it was ironic that on the first day of the conference Bloomberg ran an article about Toyota, Daimler and BMW testing battery packs assembled by Tesla Motors. Tesla battery packs rely on small format, 18650 lithium-ion cells of the type used in computer laptops and other consumer electronics. According to Bloomberg, the huge cost advantages of using small format cells that are produced in high volumes for use in collateral applications is what is driving the interest in using them for vehicle applications.

The article cites Tesla founder Martin Eberhardt comparing large format cell costs at about $700-$800 per kilowatt hour to small format cell costs of about $200 per kilowatt hour. While Mr. Eberhardt's figures do not reflect the costs of incorporating those cells into packs, he is nevertheless pointing to potential cost savings of about 400% on the most expensive component in plug-in electric vehicles. Given that the federal government has spent hundreds of millions of dollars over the last two years funding incremental improvements in lithium-ion technology, Toyota's interest in a battery strategy that offers the prospect of dramatic cost savings is easy to understand.

Of course, Toyota and NAATBatt are talking about exactly the same thing. The fastest, surest way to bring down the price of PEV's in the near term is to power them with batteries that can leverage scale in collateral energy storage markets. Using battery cells that are not custom designed for cars may involve a modest loss of battery performance in vehicle applications. But the elephant in the PEV room, and indeed the elephant in the room of most of the advanced energy storage market, is price, not

performance. The hard truth is that if prices cannot be brought down, and brought down quickly, there may be no market.

Where Toyota and NAATBatt differ is in the cell formats and collateral markets they are looking to leverage in order to bring down costs. For Toyota and other foreign automakers, small format cells and the consumer electronics market may seem an obvious choice. But it is far from clear that that is the best choice for the domestic, U.S. market.

The manufacture of small format, 18650 lithium-ion cells is a mature industry that has long since been lost to Asian manufacturers. If small format cells become the format of choice for vehicles, those cells will almost certainly be made in Asia, not in the United States. Expertise in pack assembly and related battery technology will grow up in Asia around the cell manufacturing and the possibility of using the PEV market to grow domestic employment and to leverage American innovation and technological expertise will be lost.

To achieve some of the most important advantages of vehicle electrification for the United States, it is necessary that large format cells become the technology of choice for PEV's. Large format cells have the additional advantage of likely being the better choice for vehicle applications from the standpoint of performance and safety. But to match small format cells on price, large format cells must similarly find a large, collateral market in which to take advantage of economies of scale.

All of this, of course, brings us back to the theme of the NAATBatt conference and to its focus on using large format, automotive grade batteries in grid-connected applications. This is more than just an interesting idea and must be more than just the subject of a few ARRA-funded demonstration projects. Developing a large-scale collateral market for automotive grade batteries is essential to the future of vehicle electrification in the United States and to the future of the U.S. advanced battery and automobile industries.

For large format batteries, that collateral market is almost certainly grid-connected, distributed energy storage applications. Developing that market will require the involvement and cooperation of federal, state and local governments and of public utility commissions. Developing that market is essential and must become a top priority of national energy policy over the next few years.

James J. Greenberger
Executive Director

December 17, 2010

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NAATBatt Membership Applications for 2011

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

- ***10x Advanced Battery R&D**:* 10X Advanced Battery R&D**:** Breaking Barriers in Advanced Battery Performance & Value will be held at the Techmart Meeting Center in Santa Clara, California on **January 10-12, 2011**. The conference will survey technology advances in battery

chemistries, ultracapacitors, fuel cells and other technologies that could dramatically reduce the costs of energy storage within a 3-10 year time frame. The conference Web site is: http://www.infocastinc.com/index.php/conference/414. NAATBatt is a supporting organization.

- ***Advanced Automotive Batteries Conference & Symposium 2011***: The Advanced Automotive Batteries 2011 Conference (AABC) will be held on **January 24-28 2011**, in Pasadena, California. This is the next domestic program in the series of conferences on automotive batteries produced by Dr. Menahem Anderman and Total Battery Consulting. The conference Web site can be found at: http://www.advancedautobat.com/automotive-battery-conference-2011/index.html.

- ***Advanced The 28th 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/.

- ***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/

- ***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/

- ***Shmuel DE-Leon Energy, Ltd.,*** an industry knowledge base company has developed a new power sources DataBase including 28,000 records of industry vendors, cells datasheets with a full parametric searching capabilities. The product provides industry users and companies with a knowledge tool to find the power sources resources and vendors for their EV needs. *See:* www.batteriesdatabase.com , www.sdle.co.il, or contact: shmueld33@gmail.com.

- ***Energy Overviews*** a media company which publishes weekly newsletters covering several renewable energy industry verticals, including Clean Transportation, is offering NAATBatt members as a group the opportunity to subscribe to Energy Overviews' newsletters, databases and other services for the price of $250 per year, a discount from the standard subscription rate of $587 per year, *provided that* at least 20 NAATBatt member companies accept this offer. See http://www.epoverviews.com/. If your company is interested in a subscription, please contact Jim Greenberger at jgreenberger@naatbatt.org.

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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, committees and the upcoming roadmap project 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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