

Summary:

For the May 14th issue of NAATBatt's Advanced Battery Weekly, we highlight the ongoing sector activities. On June 2nd, we will be hosting a webinar on "*Addressing The Challenges of Lithium Air Technology*".

The NAATBatt Index was up modestly, the U.S. Battery Index increased 4.2% while the Asia Battery Index declined 6.0%. The S&P500 and Russell 2000 declined 3.5% and 5.9%, respectively.

Key Highlights:

- **Endesa** and **Telefónica** have unveiled the first phone booth in **Madrid** that can also be used for recharging electric vehicles (EVs). This pilot scheme is intended to demonstrate the project's technical viability, as well as its commercial feasibility.
- **Nissan** has received over 13,000 orders in the U.S. and Japan for its Leaf all-EV -- exceeding production capacity of 12,000 EVs annually. The Leaf's price is over \$25,000 in the U.S. with federal tax credits.
- A study by **Deloitte Consulting** highlights high cost and limited performance could limit the number of electric cars to 2% to 5% of the U.S. market by 2020. The cost of producing batteries for EVs is expected to fall by 40% over the next 4 years to near \$600 per kilowatt-hour (kWh) in 2014 – down from near \$1,000 kWh today.
- **Sanyo Electric** has been chosen to supply **Suzuki Motor** with lithium-ion (li-ion) battery systems for its PHEVs. Suzuki is the 5th automaker to choose Sanyo as a supplier of li-ion batteries.
- **A123 Systems** has been chosen by **Eaton Corporation** to supply battery systems for production of a hybrid power system to be installed on a plug-in hybrid electric vehicle (PHEV). The program is partially funded by the **American Recovery and Reinvestment Act** from the **Transportation Electrification Initiative** administered by the **U.S. Department of Energy**.
- **Hong Kong** will rollout its first electric bus (ebus) in July, as **Kowloon Motor Bus** unveiled trial plans yesterday. Chargers will be installed at some bus stops for refueling en route. It takes about 30 seconds for the bus to charge power to run a kilometer further.
- **Canada Lithium Corp**, a developer of a \$150 million lithium carbonate mine processing plant will be conducting a full feasibility study. The company plans to have the **Quebec Project** in production by late 2012 with initial annual capacity of 42.6 million pounds of battery-grade lithium-carbonate.
- The **Conservatives** and the **Liberal Democrats** in Britain have announced plans to introduce a nationwide network of charging points. This is keeping with the Conservatives pledge to create a national car recharging network, while the Liberal Democrats have spoke of the need for a 'zero-carbon Britain'.

A Few More Details:

Endesa and Telefónica have unveiled the first phone booth in Madrid that can also be used for recharging electric vehicles (EVs) as shown in **Exhibit 1**. Reserved parking spaces will be located next to this and all other booths set up in Metropolitan areas where users will be able to park their EVs and recharge at no cost once they have obtained their free "zero emissions" pre-paid card from the Madrid city council. This pilot scheme is intended to demonstrate the project's technical viability, as well as its commercial feasibility. It will run until year-end.

Source: *EV World*

Exhibit 1: An EV Being Charged Using Power From a Phone Booth



Source: *EV World*

Nissan has received over 13,000 orders in the U.S. and Japan for its Leaf all-EV -- exceeding production capacity of 12,000 EVs annually. Nissan has received 8,500 orders from customers in the U.S. and 4,700 in Japan. Nissan hopes to build and sell 50,000 of the cars around the world during the first model year. The Leaf's price falls to 3 million yen (or \$32,000) with Japanese government incentives. The price is over \$25,000 in the U.S. with federal tax credits.

Source: *The Canadian Press*

A study by Deloitte Consulting highlights high cost and limited performance could limit the number of electric cars to 2% to 5% of the U.S. market by 2020. The cost of producing batteries for EVs is expected to fall by 40% over the next 4 years to near \$600 per kilowatt-hour (kWh) in 2014 – down from near \$1,000 kWh today. The study also showed that Nissan and General Motors face a potential problem with consumer perception of their brands when it comes to EVs. Survey findings showed that 17% of consumers would prefer to buy an EV from Toyota, 15% from Honda Motor and 12% from Ford Motor Co. The GM brand was fourth at 8% followed by Nissan at 4%.

Source: *Reuters*

Sanyo Electric has been chosen to supply Suzuki Motor with lithium-ion (li-ion) battery systems for its PHEVs. Suzuki is (20% owned by Volkswagen) will install the systems in 60 of its Swift small cars (see **Exhibit 2**) and begin test drives later this year. Suzuki is the 5th automaker to choose Sanyo as a supplier of li-ion batteries.

Source: *Reuters*

Exhibit 2: The Suzuki Swift



Source: *Akihabara News*

A123 Systems has been chosen by Eaton Corporation to supply battery systems for production of a hybrid power system to be installed on a Ford F550 based Plug-in Hybrid Electric Vehicle (PHEV). The goal is to develop a production ready plug-in hybrid power train system suitable for widespread utility use in light/medium duty service vehicles. The program is partially funded by a \$45 million grant in American Recovery and Reinvestment Act funds from the Transportation Electrification Initiative administered by the U.S. Department of Energy. It is managed by the Electric Power Research Institute (EPRI) under the lead of the South Coast Air Quality Management District (SC-AQMD).

Source: *A123 Systems*

Exhibit 3: The Eaton PHEV



Source: *Eaton*

Navistar International Corp is planning to deliver its first electric truck (etruck) to FedEx Corp. and deliver 400 of the vehicles by the end of 2010. The eStar model is the first medium-duty commercial vehicle to receive the U.S. Environmental Protection Agency's clean-fuel fleet vehicle certification and the California Air Resources Board's certification as a zero-emission vehicle. The li-ion batteries are being provided by A123 Systems. The eStar can travel 100 miles on a charge (6 to 8 hours to recharge). The system uses an 80 kWh li-ion battery made by A123 Systems that powers a 70-kilowatt motor (that translates to a pretty puny 93 horsepower). The etruck's top speed is about 50 miles per-hour.

Source: Dow Jones and Forbes

Hong Kong will rollout its first electric bus (ebus) in July, as Kowloon Motor Bus unveiled trial plans yesterday. The Volvo ebus is reportedly than cheaper a hybrid single-decker, which costs about HK\$4 million (or \$514,000) or a diesel at HK\$2 million (or \$257,000). Chargers will be installed at some bus stops for refueling en route. It takes about 30 seconds for the bus to charge power to run a kilometer further.

Source: The Standard

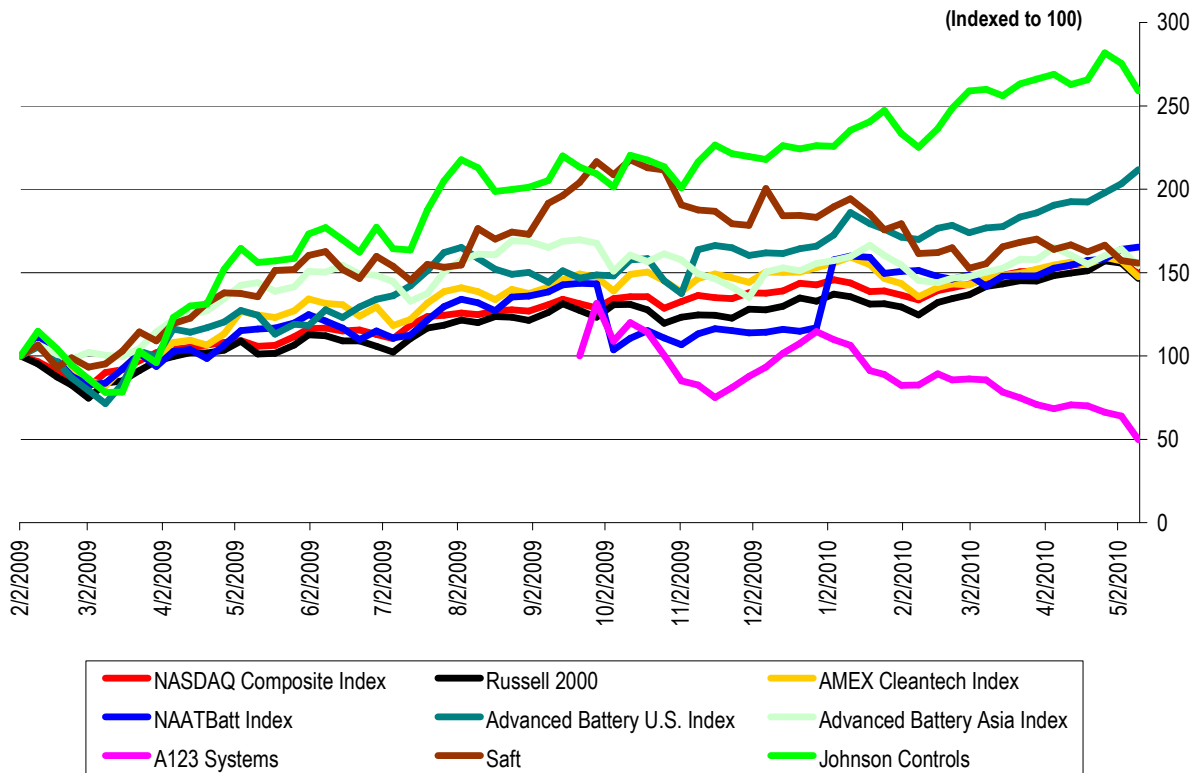
Canada Lithium Corp, a developer of a \$150 million lithium carbonate mine processing plant will be conducting a full feasibility study. The company plans to have the Quebec Project in production by late 2012 with initial annual capacity of 42.6 million pounds of battery-grade lithium-carbonate. Global demand for lithium is increasing 7% annually as electric and hybrid vehicles replace gasoline-powered cars and trucks.

Source: Montreal Gazette

The Conservatives and the Liberal Democrats in Britain have announced plans to introduce a nationwide network of charging points. This is keeping with the Conservatives pledge to create a national car recharging network, while the Liberal Democrats have spoke of the need for a 'zero-carbon Britain'. The joint statement indicates the parties agree to implement a full program of measures to establish an eco-friendly economy that includes the establishment of a smart grid and the roll-out of smart meters.

Source: Autoblog

**Exhibit 4: Indices Performance
(From February 2, 2009)**

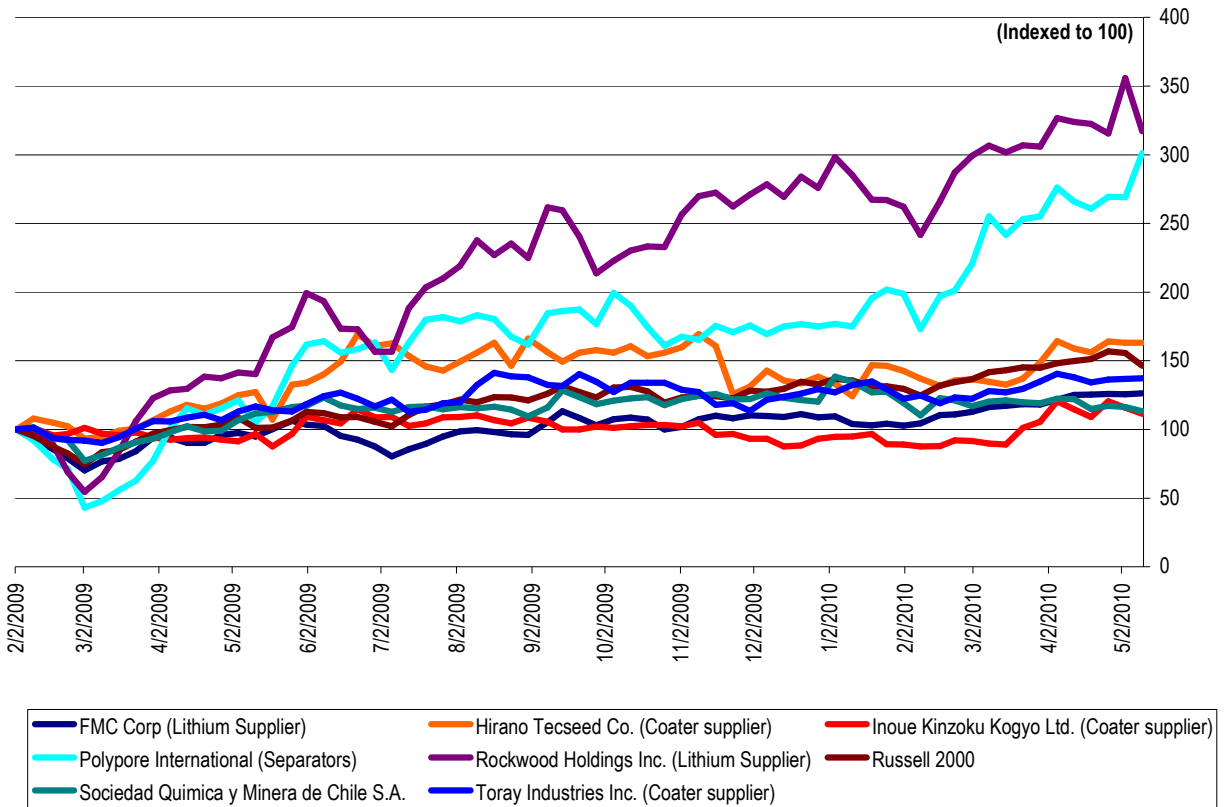


Index	Close on 5/10/2010	52-Wk High	% of 52-Wk High	Performance		
				LTM	YTD	Week
Dow	10,380.4	11,309.0	91.8%	23.3%	(0.5%)	(6.9%)
S&P 500	1,159.7	1,219.8	95.1%	25.6%	3.9%	(3.5%)
NASDAQ	2,374.7	2,535.3	93.7%	38.6%	3.5%	(5.0%)
Russell 2000	689.6	746.0	92.4%	36.0%	9.8%	(5.9%)
AMEX Cleantech Index	1,024.0	1,112.5	92.0%	17.4%	(4.0%)	(6.0%)

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 February 2, 2009)



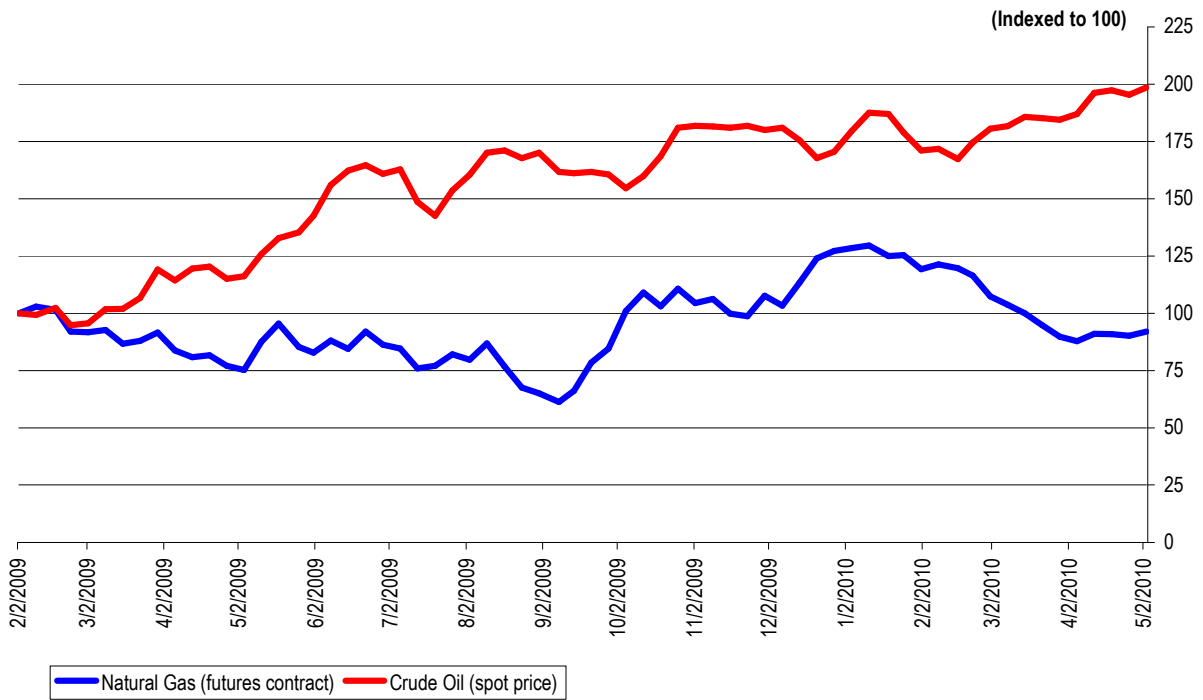
Source: Bloomberg

Exhibit 6: Commodity Prices

Commodity	Price on 5/10/2010	Price on 5/4/2010	Price on 4/9/2010	1 Week Change	1 Month Change
LME Nickel (Cash, \$ per tonne)	23,155	25,635	25,190	(9.7%)	(8.1%)
LME Lead (cash, \$ per tonne)	2,081	2,129	2,280	(2.3%)	(8.7%)

Source: LME

Exhibit 7: Natural Gas and Crude Oil
 (From February 2, 2009)



Source: EIA

Executive Director's Notes



BATTERY COSTS AND THE KERRY-LIEBERMAN ENERGY BILL

The advanced battery industry has been abuzz this week about a story in the The Sunday Times, which suggests that Nissan's cost for the Leaf battery pack is about \$375 per kWh (see: http://business.timesonline.co.uk/tol/business/industry_sectors/transport/article7086781.ece). This would, of course, be a tremendous accomplishment. According to the USABC, cost equivalence between ICE's and EV's would require that battery costs be approximately \$100 per kWh if the cost of gasoline is \$1.10 per gallon. Assuming current gasoline prices of \$3.30 per gallon, that would put cost equivalence today at about \$300 per kWh. \$375 per kWh is getting close. No wonder the buzz.

The Times article begs two important questions. The first, and most obvious, is whether the article got the cost number right. Most current estimates put the cost of a 25kWh vehicle battery pack in the \$900-\$1,300 per kWh range. Nissan will not, of course, disclose the actual battery cost for the Leaf other than to say that it is "competitive." While Nissan, because of its long time dedication to the EV platform, may in fact have a very competitive battery cost, \$375 per kWh is probably an optimistic assessment of what it has achieved.

The second question begged by the article is what price per battery kWh would constitute cost equivalence to ICE vehicles. That question necessarily consists of two parts, only the first of which relates to the cost of the battery. The second part relates on the price of the gasoline or other carbon-based fuel used to power ICE vehicles against which the cost of batteries is being compared. Today the price of gasoline reflects few of the external costs—global warming, defense costs, environmental degradation—that carbon-based fuels impose on society. The more those costs are honestly reflected in the cost of a gallon of gasoline, the easier cost equivalence of electric drive vehicles will be to achieve.

Focusing on the second part of that question--the price of fossil fuels--is particularly relevant this week in light of the introduction of the Kerry-Lieberman Energy Bill in the Senate on Wednesday. As in past proposals, Kerry-Lieberman contains a cap-and-trade provision, which seeks to make fossil fuels recognize some portion of their true external costs. That is certainly an idea that the advanced battery industry can rally behind in concept. The devil, of course, is in the details.

The advanced battery industry needs to follow the progress of the Kerry-Lieberman bill very closely. Getting fossil fuel prices to reflect more accurately their true external costs is essential to the success of electric drive vehicles and to the advanced battery industry. At the same time, how and on whom those costs are imposed matters a great deal. A cap-and-trade scheme that increases the cost of electricity relative to the cost of petroleum would be a step in the wrong direction, both for the advanced battery industry and for clean energy overall. Given the strength of the oil lobby, public sensitivity to gasoline

prices, and need of Senators Kerry and Lieberman to cut a deal, however, this outcome is quite possible and constitutes a real danger to our industry.

The buzz this week about battery prices and impending cost equivalence should be a call to action. While we must continue to push for the technological and manufacturing innovations that will reduce the cost of Li-Ion batteries, we must not lose sight of the fact that the second part of the question—the price of fossil fuels—is just as important and just as critical as the first. The advanced battery industry must demand that the true cost of fossil fuels be reflected in their price. But just as important, we must insist that those costs be reflected accurately and consistently across all carbon-based fuels. It would be a tragedy if the end result of a cap-and-trade scheme, which evolved to favor petroleum over other forms of fossil fuel, was to push the point of cost equivalence even farther away from where Nissan and others working hard on advanced battery technology have brought it today. We must not let that happen.

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

James J. Greenberger
Executive Director

Industry Announcements and Calendar

- **Next Webinar Program: Lithium Air** The NAATBatt bi-monthly Webinar series continues on Wednesday, June 2, 2010, with a program entitled "*Addressing the Challenges of Lithium Air Technology*". Lithium air is the next generation battery technology with, perhaps, the greatest potential, offering theoretical energy densities of more than ten times that of lithium-ion. But lithium air faces great challenges and its commercialization is highly uncertain. NAATBatt will take a look at this exciting if problematic technology and provide an honest assessment of where it is, how far it needs to go, and what it will take to get there. The speakers on June 2 will be Dr. Winfried Wilcke, Program Director at IBM's Almaden Research Center, and Dr. Lonnie Johnson, President and CEO of Excellatron Solid State LLC. The program will begin at 2:00 p.m., EDT and last approximately 60 minutes. To register, please go to: <http://events.meetingbridge.com/Register/?EventCode=06123170031>. Registration for the June 2 program is complimentary.
- **AABC Conference in Orlando:** The 10th Annual International Advanced Automotive Battery Conference & Symposia will run from May 17-21, 2010, in Orlando, Florida. Information and registration for the conference is at: <http://www.advancedautobat.com/AABC/index.html>.
- **Southern Growth Policy Center Conference:** A conference of Southern governors, automobile executives and economic development officials outlining strategies for continuing the development of the automobile industry in the South will be held in Lexington, KY on June 7-8, 2010. NAATBatt is a supporting organization of the conference. For more information about the program, entitled *Driving the Next 20 Years: Creating the New Southern Automotive Industry*, visit: <http://www.southerngrowth.com/conference/conf.html>.
- **The 15th International Meeting on Lithium Batteries:** The 15th International Meeting on Lithium Batteries will be held in Montreal, Canada on June 27-July 2, 2010. The meeting will honor Prof. John Goodenough of the University of Texas. Information about the meeting and registration information can be found at: <http://www.imlb.org/#>
- **Storage Week 2010:** Storage Week 2010, sponsored by Infocast, will be held on July 12-15, 2010 in San Diego. The conference will focus on grid level storage with separate tracks on bulk storage and grid services. Information about the conference can be found at: <http://www.infocastinc.com/index.php/conference/storage10>.
- **The Battery Show 2010:** The Battery Show, a conference and exposition focused on multiple battery chemistries and applications will be held in San Jose, California on October 5-7, 2010. Information about the show can be found at: <http://www.thebatteryshow.com/index.php>
- **Battery Power 2010 Conference:** Battery Power 2010 will be held in Dallas, Texas on October 19-20, 2010. NAATBatt is a supporting organization of the conference. Information about the conference and registration for it may be found at: http://www.batterypoweronline.com/bppt-conf10/bp10_supportingorg.php
- **NAATBatt Membership Information.** NAATBatt is now taking applications for 2010 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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