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Advanced Battery Weekly

Summary:

For the May 21st 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 down1.2%. The U.S. Battery Index was flat while the Asia Battery Index declined 3.5%. The S&P500 declined 2.0% and Russell 2000 was up a modest 0.9%.

Key Highlights:

- **Toyota** will be taking a $50 million stake in **Tesla Motors** as part of a deal to cooperate on the development of electric vehicles (EVs) and parts as well as the production system and engineering support.

- **Valence Technology** announced the signing of a 3-year exclusive supply agreement with **Optare PLC**. The Optare Solo EV features a 600 volt lithium-ion (li-ion) battery and a total capacity of 85 kilowatt-hours (kWh).

- **GE Energy Storage Technologies** introduced its **Durathon** battery for critical backup power. The battery is based on a sodium-metal halide chemistry and can provide back-up service for up to two decades.

- **Honda Motor** is skeptical about consumer demand for EVs. The limited driving range and time needed to recharge the battery are the primary areas of concern.

- **UQM Technologies** announced a supply agreement with **Electric Vehicles International (EVI)** to supply electric propulsion systems. The EVs will have a top speed of 60 miles per hour and a range of up to 115 miles per charge using Valence Technology's li-ion battery.

- **Navistar** announced that its **eStar** is in production and the company is taking orders. The plug-in eStar has a range of 100 miles per chargeand is powered by an 80 kWh li-ion battery pack.

- China auto manufacturer **Geely** is planning to unveil a budget car that would cost less than the Indian-made **Tata Nano**. Geely is planning to offer a li-ion battery powered version in 2015.

- **ZAP** has begun shipping a light-weight lithium battery system that fits in the same space as the lead acid battery used in its vehicles. The lithium battery has 2,000 life cycles (vs. 300-500 for lead acid).

- **AM General LLC** (known for manufacturing the Humvees and Hummers) is moving into the EV business. The company will handle final assembly of **Ford Motor's electric Transit Connect** commercial van

- **Toshiba Corp** is developing li-ion batteries with multiple automakers. The company has won orders from Honda Motor to supply batteries for electric motorcycles.

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A Few More Details:

Toyota will be taking a $50 million stake in Tesla Motors (post-IPO) as part of a deal to cooperate on the development of electric vehicles (EVs) and parts as well as the production system and engineering support. Tesla will begin manufacturing EVs in a factory that Toyota and General Motors formerly operated in Fremont. The company has built 1,000 Roadsters and plans to start manufacturing the Model S sedan in 2012.
Source: Los Angeles Times

Valence Technology announced the signing of a 3-year exclusive supply agreement with Optare PLC, a global leader in the manufacturing of single and double-deck buses and mini coaches. The supply agreement is worth about $3.8 million in revenues. The all-electric Optare Solo EV (shown in **Exhibit 1**) features a 600-Volt lithium-ion (li-ion) battery and a total capacity of 85 kilowatt-hours (kWh).
Source: Valence Technology

Exhibit 1: The Optare Solo EV

Source: EV World

GE Energy Storage Technologies, a unit of GE Transportation, introduced its Durathon battery for critical backup power. The Durathon battery is based on a sodium-metal halide chemistry and can provide back-up service for up to two decades. The battery can be used in uninterruptible power supply (UPS) applications for large data centers, hospitals, and other areas where a continuous supply of power is necessary. A UPS is an electrical apparatus that provides emergency power when utility mains fail; unlike a standby generator a UPS provides instantaneous protection for power interruptions.
Source: GE Transportation

Honda Motor is skeptical about consumer demand for EVs -- 10 years after its stopped selling its EV Plus battery-powered model. The limited driving range and time needed to recharge the battery are the primary areas of concern. Honda is planning to sell EVs in the U.S. to meet California emission rules. From model years 2012 through 2014, the largest car makers by volume in CA must sell about 60,000 plug-in hybrid electric vehicles and all-EVs combined according to the States Resources Board.
Source: Bloomberg

UQM Technologies announced a supply agreement with Electric Vehicles International (EVI) to supply electric propulsion systems. The initial term of the agreement is 1 year with delivery of 50 systems to commence in June. The EV as shown in **Exhibit 2** (models EVI MD and EVI WI) will have a top speed of 60 miles per hour and a range of up to 115 miles per charge using Valence Technology's lithium-ion battery.
Source: UQM Technologies

Exhibit 2: All-EV from EVI

Source: BrighterEnergy.org

Navistar announced that its eStar (as seen in **Exhibit 3**), the company's first electric-only powered commercial vehicle, is in production and the company is taking orders. The eStar has been built exclusively from the ground up as an EV -- the first in the new Class 2c-3 electric truck category. The plug-in eStar, with a range of 100 miles per charge, normally takes 6-8 hours to recharge. However, the swappable 80 kWh li-ion battery pack can also be charged within 20 minutes.
Source: Navistar

Exhibit 3: The Navistar eStar

Source: Navistar

China auto manufacturer Geely is planning to unveil a budget car that would cost less than the Indian-made Tat Nano. The Geely IG would sell for around $2,250 in China (in 2012) compared to the $2,700 asking price for the Nano in India. Geely is offer a li-ion powered version in 2015.
Source: The Economic Times

AM General LLC (known for manufacturing the Humvees and Hummers) is moving into the EV business. The company will handle final assembly of Ford Motor's electric Transit Connect commercial van. Azure Dynamics is producing the electric driving system. The Transit connect will be powered by a lithium-ion batteries from Johnson Controls-Saft.
Source: The Associated Press

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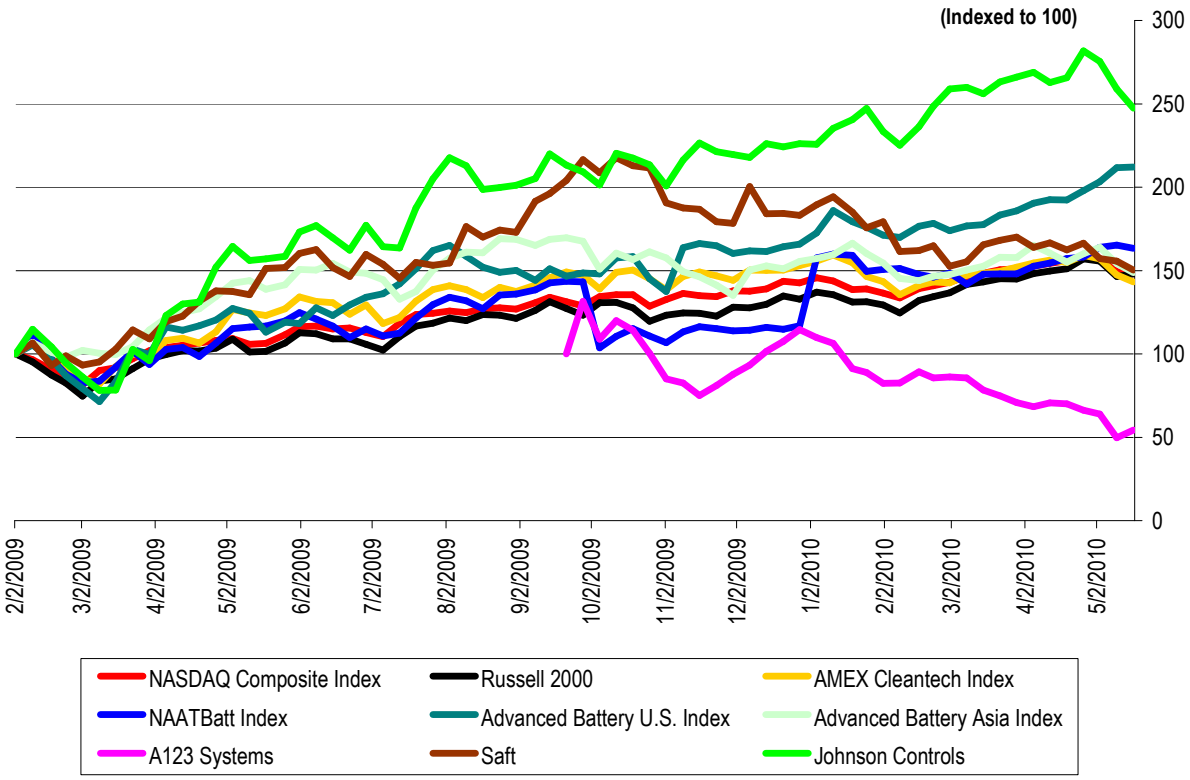
Toshiba Corp is developing li-ion batteries with multiple automakers as it seeks to benefit from growing demand for more environment-friendly cars. Toshiba has won orders from Honda Motor to supply batteries for electric motorcycles, and has stated it will supply batteries for electric cars to an unidentified automaker.
Source: Reuters

ZAP has begun shipping a light-weight lithium battery system that fits in the same space as the lead acid battery used in its vehicles. The lithium battery has 2,000 life cycles (vs. 300-500 for lead acid). The battery is equipped with a battery management system (BMS) that increases reliability and extends the range up to 100 miles on a single charge.
Source: ZAP

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

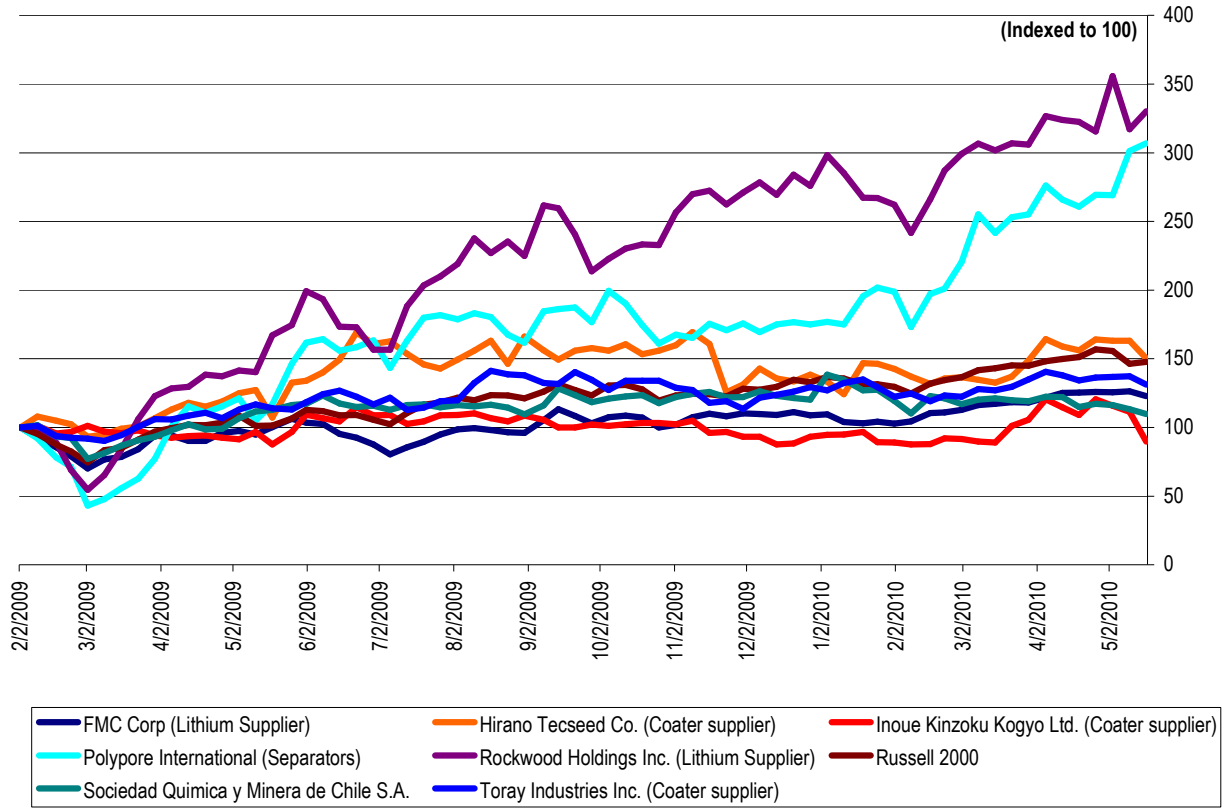


Index	Close on 5/17/2010	52-Wk High	% of 52-Wk High	Performance LTM	YTD	Week
Dow	10,625.8	11,309.0	94.0%	28.5%	1.9%	2.4%
S&P 500	1,136.9	1,219.8	93.2%	28.3%	1.8%	(2.0%)
NASDAQ	2,354.2	2,535.3	92.9%	38.7%	2.6%	(0.9%)
Russell 2000	695.7	746.0	93.3%	45.3%	10.8%	0.9%
AMEX Cleantech Index	994.5	1,112.5	89.4%	19.1%	(6.8%)	(2.9%)

Source: Bloomberg and ThomsonOne

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

Exhibit 5: Supplier Performance
(From February 2, 2009)



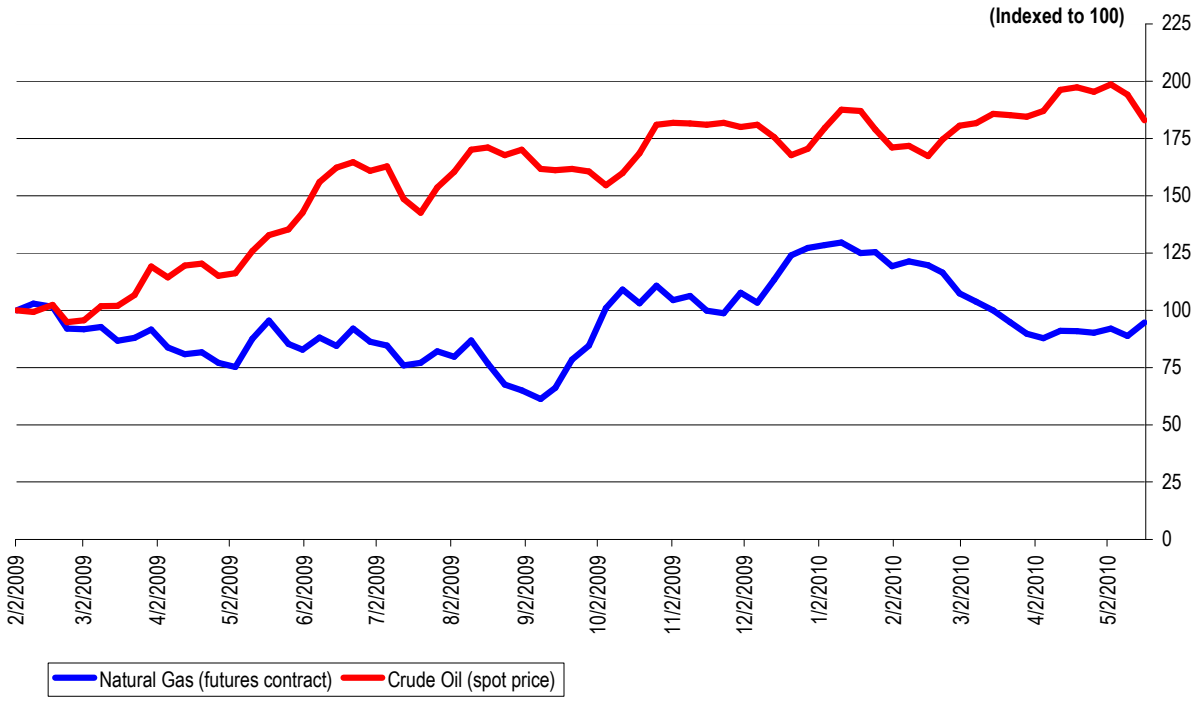
Source: Bloomberg

Exhibit 6: Commodity Prices

Commodity	Price on 5/17/2010	Price on 5/10/2010	Price on 4/19/2010	1 Week Change	1 Month Change
LME Nickel (Cash, $ per tonne)	21,025	23,155	26,400	(9.2%)	(20.4%)
LME Lead (cash, $ per tonne)	1,863	2,081	2,187	(10.5%)	(14.8%)

Source: LME

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



Source: EIA

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Executive Director's Notes

AABC CONFERENCE PROVIDES SOBERING ASSESSMENT OF THE MARKET FOR AUTOMOTIVE LI-ION BATTERIES

Among the 920 attendees at the 10th Advanced Automobile Battery & EC Capacitor Conference concluded today in Orlando there was a wide diversity of opinion concerning the best approach to Li-Ion technology. But there was unanimity in the view that Dr. Menahem Anderman puts on a very good conference and that he has a sobering outlook for the Li-Ion automotive market.

Dr. Anderman expects that the market for EV's and PHEV's will remain distinctly limited for the foreseeable future. He expects that PHEV and EV volumes for all automakers, with the possible exception of Nissan, will not exceed a few thousand units through 2015 and will constitute less than 1% of the market through 2020.

A small silver lining may be found in the HEV market. Although HEV applications require substantially less energy storage than EV/PHEV applications, Dr. Anderman predicts that by 2015 Li-Ion batteries may capture up to 35% of that market, which is expected to grow robustly in the United States through 2020. Mary Ann Wright of JCI-Saft described a two-pronged strategy for Li-Ion battery makers, with one prong aimed at the emerging EV/PHEV market and the other at the more established HEV. Ms. Wright's presentation left little doubt that JCI-Saft intends to concentrate primarily on the second prong. JCI-Saft's decision may be a bell weather for the industry.

The upshot of the presentations is that the near term market for automotive Li-Ion batteries may turn out to be much smaller than many had hoped. At least one presenter speculated that installed Li-Ion battery production capacity may soon be 200% of demand. The problem lies in the Li-Ion batteries themselves, specifically their deficiencies in price, range and reliability (all three problems being somewhat related).

Properly understood, Dr. Anderman has raised a storm warning. And we could be in for quite a storm. American taxpayers have just spent the better part of $2.4 billion to purchase Li-Ion battery manufacturing capacity. Millions more are being spent at the state and federal levels to subsidize the purchase of EV's and PHEV's by what, if Dr. Anderman's forecast proves correct, will be mostly wealthy, early adopter consumers. Television pictures of expensive new factories sitting idle and Tesla Roadsters in Beverly Hills showrooms will not play well with the average American voter during what promises to be an upcoming period of relative austerity.

The time to deal with this approaching storm is now, not after it hits. Crossing fingers and hoping to be one of the survivors is not a strategy. It is a prescription for industry-wide disaster.

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Three things must happen to prepare for the storm. First, we must be honest about the problems with Li-Ion technology and proactive in identifying the solutions. Dr. Anderman and others at the AABC Conference provided some much needed honesty this past week. The problems are not difficult to identify. But we must now also identify the solutions, or at least how we are going to get to them. The industry needs a roadmap for Li-Ion technology, so that when the general public and their elected representatives become aware of the problems in the government funded Li-Ion battery industry (which is likely to happen suddenly, dramatically and in a political context), the industry will have a specific, identified solution to point to. That solution, or roadmap, must explain exactly how the price, range and reliability problems are going to be solved, exactly when those solutions are expected to be found, and exactly who is working on what solutions.

As many know, for the past several months, NAATBatt has been trying to organize a roadmap project for Li-Ion battery technology. The going has been slow, as many in the industry continue to resist participation in a cooperative project for fear of compromising intellectual property or competitive advantage. These are legitimate concerns, and cause for structuring a roadmap project appropriately. But they must not be an excuse for inaction.

Second, we must redouble efforts to find new markets for Li-Ion production capacity so that that capacity, and the Li-Ion expertise developing with it, will not be lost if short term sales of advanced automotive batteries disappoint. One obvious new market is grid-level storage technology. Development of grid-level storage, to support renewable energy and smart grid applications, is largely dependent upon legislation and regulatory changes. Some helpful initiatives, such as The STORAGE Act, have already been proposed. But as those of you who listened to Dave Berick, Senator Wyden's senior energy adviser, at a recent NAATBatt Webinar already know, the battery industry has been AWOL in supporting those initiatives and their prospects are now questionable. Again, it is time for industry to work together through NAATBatt and get serious about addressing its problems.

Third and finally, the advanced battery industry must engage more heavily with the electric utility industry, which is a natural long term business and political ally. We must explore new business models and find new ways that energy storage can become a good business opportunity for electric utilities, not just the pointed end of a mandate. One possible model might even see utilities, rather than automobile companies, become the ultimate customers of advanced battery companies. If such a model could be developed and utilities bought into it, Dr. Anderman's pessimism might still yet prove unfounded.

The storm warnings are up, but there is still time to seek shelter. Whether the advanced battery industry does what it needs to do over the next several months to get ready will determine in large part how bad the storm will be.

James J. Greenberger
Executive Director

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North American 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.

- ***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.

- ***44th Power Sources Conference***: The 44th Power Sources Conference will be held on June 14-17 at the Riviera Hotel in Las Vegas. The conference will examine developments in a wide variety of battery chemistries. Information about the conference can be found at: https://www.powersourcesconference.com/

- ***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 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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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