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This Issues Contents:

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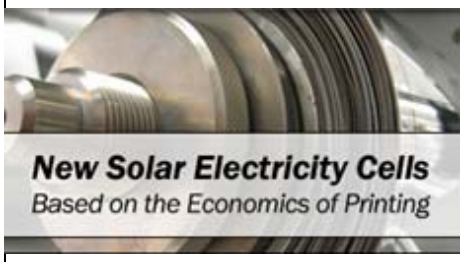
http://news-service.stanford.edu/news/2008/january9/nanowire-010908.html



http://www.nanosolar.com/

Tesla's sleek roadster uses 6,831 laptop cells to power it for more than 200 miles on a charge.
http://www.teslamotors.com/

Next Issue: February 2008
Editor: Robert Weekley
email: editor@evsociety.ca

Electric-Car Maker Touts 10-Minute Fill-up

1 November 2007 By Peter Fairley

Skeptics say substation-scale power levels needed are unrealistic

Thanks to an uncommonly stable lithium chemistry and high-surface-area nanopatterned electrodes, Altair Nanotechnologies' lithium-ion batteries for electric vehicles (EVs) charge up fast. Very fast. One of the Reno, Nev.–based battery developer's 35-kilowatt-hour packs, capable of propelling an EV pickup truck for 160 kilometers, can fully charge in just 10 minutes—a feat that would be downright dangerous with most lithium batteries. What remains to be seen is whether such rapid charging will prove practical on the street. Although some EV developers, battery experts, and utilities see a breakthrough that will take battery-powered

NanoSafe™ battery cell

Continued on Page 2: **Fast Charging**

Nano Titanate Batteries May Resurrect the Electric Car

December 11, 2007: Design News

In January 2007, a member of our Design News staff claimed responsibility for a murder; see "I Killed the Electric Car" by Chuck Murray.

Chuck's article presented simple calculations to illustrate that for standard American drivers, conventional electric cars make no sense due to long charge time and low mileage-per-charge. Nonetheless, Chuck elicited some angry reader feedback including a post, "What about the Chevy Volt, Chuck!?", by our Editor-In-Chief, John Dodge, who apparently likes to wait 6 hours every time he needs to fuel his car.

After almost a year of staring one another down from their respective cubicles and periodically firing ethanol and bio-diesel spitballs at each other across the office, Chuck and John can finally put their debate to rest.

Advances in battery technology originally aimed at lap top computers piggybacked atop zero-emission vehicle regulations established to entice development of hydrogen fuel cell vehicles may be breathing new life into the electric car.

Who's Resurrecting the Electric Car?" by David Schneider appeared in the October edition of American Scientist Magazine. According to this article, lithium-ion batteries first used in lap top computers are now being successfully integrated into street-legal cars such as the high-end Roadster by Tesla Motors. Powered by computer batteries, this car boasts the performance, speed, and

Continued on Page 4 - **Resurrect EV**

Editors Year End notes.

In the EV Surge this year, 2007, since I have been given the opportunity to Serve the Membership of the Electric Vehicle Society of Canada, we have published 1 article on the worlds first Air Car, 12 articles on Batteries, 5 articles on Energy, printed two articles on Explaining the EV, included 7 articles on Homebuilt EV's, 9 on Hybrids, 2 on Limited Production EV's, 8 pieces on Production EV's, 2 on Solar Electric Developments, and included 5 timeline clips. We have also displayed a total of 5 Advertisements.

I hope you have had a chance to enjoy them all, and that this issue can be a very useful culmination to the 2007 years issues of EV Surge. I believe this might be the first year that the EV Surge has had a full Six Issues produced, and we have greater plans for the new year - 2008. Stay Tuned, Plugged in, and Wired up! - Ed.

Fast Charging, from pg. 1

EVs mainstream, others see a technological dead end [See "California to Rule on Fate of EVs", IEEE Spectrum, November 2007.

PHOTO: RAPIDCHARGE: ALTAIR NANOTECHNOLOGIES

At issue are the awesome power levels required. To charge a 35-kWh battery in 10 minutes requires 250 kilowatts of power—five times as much as the average office building consumes at its peak.

That rules out rapid charging at home. Even rapid-charge "filling stations" stretch the imagination, as you'd need a megawatt power feed—generally available only at electrical substations—to simultaneously operate four power pumps. That is a stretch too far for even some staunch EV proponents. "I look at 10-minute charging as a gimmick because of the power requirements," says Andrew Burke, an EV engineering pioneer at the University of California, Davis.

Altair CEO Alan Gotcher acknowledges these difficulties, saying installation of equipment to rapidly charge and discharge modules has slowed Altair's own R&D program. "It's just a lot of power to manage," says Gotcher.

But what critics see as barriers, Gotcher sees as challenges that can be overcome. He predicts that rapid charging will likely take off first in fleets of delivery vans and other commercial vehicles—a controlled environment where trained personnel will be familiar with each battery and where EVs can be scheduled to minimize the strain on the electrical service. In fact, Gotcher says that Altair is working with an undisclosed energy company considering a rapid-charge station at San Jose (Calif.) International Airport to service EV cabs. (A local cab firm has already ordered 20 five-passenger EV pickups from Rancho Cucamonga, Calif.–based EV start-up Phoenix Motorcars, which uses Altair batteries.)

Meanwhile, officials at San Francisco–based utility PG&E Corp., which has ordered four of Phoenix's rapid-chargeable EV trucks, are excited by the concept of a rapid-charge station. Sven Thesen, supervisor of PG&E's Clean Air Transportation group, stresses that the utility is still evaluating the business case for rapid charging. But it is safe to say he is undeterred by the power flows required. PG&E has plenty of experience with power and plenty of substations—31 in San Francisco alone.

Thesen says one idea PG&E is exploring is the installation of battery storage at its substations to support rapid charging. The batteries would be charged overnight, thus easing the need to bring in electricity over congested power lines during peak midday hours. Thesen points out that such super-substations present more than a new business opportunity for utilities such as PG&E. The battery banks could do double duty, providing bulk power for rapid charging while simultaneously helping stabilize local power lines. PG&E will be putting some of these ideas to the test in 2008 when it plans to install an EV charging station capable of rapid charging at its Davis, Calif., facility thanks to a US $170 000 grant from the California Air Resources Board.

Looking further out into an EV-rich future, utilities imagine that the EV's batteries could themselves become a stabilizing force for the grid. PG&E has partnered with EV start-up Tesla Motors to test so-called vehicle-to-

Continued on Page 3: **Vehicle-to-grid**

A Word from Our President—Howard Hutt

Canada's position in the world is suffering.
We are not respected by many countries because of our Green House Gas (GHG) position. Harper and Baird and the US influence. We need an Al Gore and the closest we have is Dionne or Suzuki.

Quebec has just done a nice move in adopting the California Emission Rules.

Twenty years ago conversions of a gas powered vehicle to electric were a neat idea, as they still are. The problem was you had to make your own. However, to obtain a good motor was both very expensive and very hard to find. Thirty-six volt aircraft generators were a choice many took including myself. A 36 volt system plus two battery packs to power the system. Rick Lane of Ottawa did mine for me.

Later the Original Equipment Manufacturers (OEM's) were showing how great they were with their purpose built vehicles, (Government mandated I think) EV1, RAV4, Ford Ranger etc. The trick we were all exposed to was they were not selling just showing and leasing.

In the meantime the aftermarket has produced good motors, controllers, and all other electronics so that a skilled mechanic can produce a fine electric vehicle (EV). We are just now with the cry for plug EV's directed at the hybrid industry to get back to EV's as they should be. The chargers have always been able to keep up. I think that in the near future (after 2008) we will be able to buy what we want.

Until then it is conversions still and more power to whom ever takes the conversion method to get a custom designed and safe vehicle. We must soldier on and we will. The ZENN is to be available soon (so we are told). Randy Holmquist and his Mighty Truck are also to be made available.

Perhaps we will see the beurocrats that are running the show held back long enough to clear some badly needed laws to promote EV's overriding the lobbyist that are holding such ideas back.

I wish you Seasons Greetings and Merry Christmas to all. **Howard**

EV Timeline Watch this Space

1968: - See Issue #5, 2007

1972: First Annual EAA EV rally.

1974: CitiCar debut at Electric Vehicle Symposium in Washington , DC. Full production also ramps up. By 1975, Vanguard-Sebring, maker of the CitiCar is the 6th largest auto maker in the US. EAA member Roger Hedlund sets first world speed record for EVs at Bonneville Salt Flats.

1976: EAA members assist US Congress in creating the Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976.

1977: EAA member Frank Willey developed a transistorized speed controller and earned the IEEE Outstanding Engineering Award. First named the Willey-9 controller, later became the Curtis 1221C.

1983: A fleet of EVs drove from San Jose, CA to San Francisco, CA, 100 mile round trip, on a single charge.

From: www.eaaev.org/

Vehicle-to-grid, from pg. 2

grid power controllers by which utilities can draw on the energy stored in EVs plugged into the grid. "If there's a power outage, you have energy right there," says Thesen.

Ironically, such distributed energy storage could also support grid nodes strained by rapid-charge stations, in which case hundreds or thousands of grid-connected commuter vehicles might sell back surplus power to rapid-charge an EV battery that's on empty.

Ultimately, the challenge for rapid charging may be the notion that something as mundane as power grids—largely ignored by the public and politicians alike—can be catalysts for a radically altered view of power and personal transportation.

PG&E demoed vehicle-to-grid technology at the Society of Environmental Journalists' annual conference this September, showing how power from a modified Toyota Prius could be shifted to the Palo Alto, Calif., grid, in the process running a conventional electrical meter backward. "It's nothing sexy," Thesen admits, "but it has huge ramifications for society."

Source: IEEE Spectrum
URL:
http://spectrum.ieee.org/nov07/5685

Mexico EV —*From Page 4*

(NASDAQ: ALTI) lithium-titanate battery, which they have demonstrated can be recharged in less than 10 minutes and has a battery pack with a life claimed to be greater than 250,000 miles.

While the full life range has yet to be proven, the fast charge aspect has, as reported in this issue of the EV Surge.

By: Robert Weekley, Editor
With Sources from PhoenixMotorCars News Release, Dated November 19, 2007
URL: http://www.phoenixmotorcars.com/news/2007/pr_071119.html

Resurrect EV—*From Page 1*

range of its gas-fired sports car cousins. While consumers may need to take out a second mortgage to buy a Tesla Roadster (base price $98,000 before upgrades), the company has already filled all available reservations for the 2008 model year, and they will soon be taking orders for their 2009 model. While a cursory search failed to reveal any data on this company's financial viability, Tesla's growing product wait list seems to denote a company in no danger of going under.

When Chuck Murray killed the electric car in January 2007, his calculations considered the time required to traverse various distances in excess of the EV1's 70- to 100-mile-per-charge range. Key to this analysis was the inconvenient five-hour charge time associated with lead-acid or nickel-metal-hydride batteries. With four charge stops at five hours per stop between Chicago and Detroit, Chuck's regular 5-hour jaunt increased to a 25 hour exercise in patience.

To eliminate long charge times, the new generation of electric vehicles will be powered by lithium-based batteries related to the cells used to power laptops, but with a twist. Historically, the challenge with scaling-up lithium batteries was their tendency to release oxygen if they overheated, causing fires and explosions. However, by switching the battery's carbon chemistry for titanate nanoparticles, the fire hazard is eliminated. Although this switch reduces energy density with respect to carbon-based lithium-ion batteries, it enables scale-up of lithium technology competent for safe use in electric cars.

Nano-titanate-based lithium batteries have greater energy density than the lead-acid or nickel-metal-hydride batteries of the old EV1. Plus, they have an even more desirable attribute: the ability to recharge in about 10 minutes as opposed to hours. For rapid charging, the Altairnano lithium titanate battery is the leading power source for automotive applications. The uncanny 10-minute recharge time is enabled by nanomaterials that dramatically reduce ion travel distance while increasing the surface area available to the ions.

Another startup electric car manufacturer, Phoenix Motorcars, is using this new battery technology in their zero-emission fleet vehicles. Rapid recharge time and 100+ mile range may qualify vehicles from Phoenix Motorcars for the highest zero emission vehicle category established by the California Air Resources Board. This category, originally slated for hydrogen fuel cell vehicles, may provide Phoenix substantial credit for each vehicle they put on the road.

Driving a Phoenix automobile powered by Altairnano batteries, even Chuck Murray, the great murder of electric vehicles, could comfortably get from Chicago to Detroit in about 5 hours and 30 minutes without burning a drop of gasoline. John Dodge could make it in 5.5 hours too, if he was willing to give up those six-hour pit stops.

Source: DesignNews.Com
URL: http://www.designnews.com/blog/460000246/post/470018647.html

Phoenix Motorcars Signs Letter of Intent to Produce Cars in Mexico

ONTARIO, CA - November 19, 2007

In a brief Statement, that indicates Phoenix Motorcars of California, will be beginning their production of their All Electric Sport Utility Truck (SUT) in a Newly constructed plant in Puebla, Mexico, approximately a distance of 90 km West of Monterrey, Mexico, with the support of Mario Marin Torres, Puebla's Governor, who assisted in the securing of the land.

Their announcement stated that they have signed a Letter of Intent (LOI) to enter into a joint venture with Pristine International SAdeSV to build all electric vehicles for shipment within Mexico, other regions in Latin America and to the Indian subcontinent. Also named in the announcement, but without indicating any terms, was another participant in the joint venture - Volkswagen of Mexico.

Phoenix Motorcars states that it has taken orders for over 500 fleet-ready vehicles for 2008 delivery and continues to target United States premier fleet operators with an all electric mid-size Sport Utility Truck and SUV.

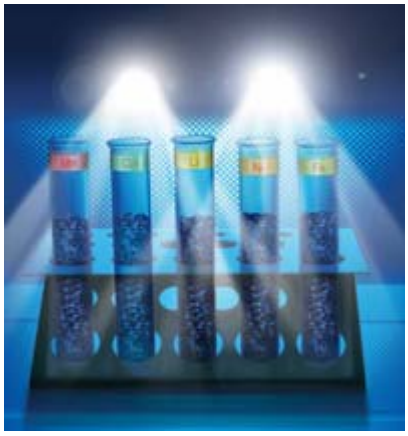
In defining the vehicles performance - Phoenix claims the advanced battery-electric, zero-emission Sports Utility Truck can travel at freeway-speeds while carrying five passengers and a full payload. They state the vehicle exceeds all specifications for a Type III ZEV, having a driving range of over 100 miles, and that it is equipped with a non-toxic, revolutionary Altairnano NanoSafe™

Continued on Page 3: **Mexico EV**

Portable power: New lithium-ion battery chemistries allow designers to trade off energy capacity and power

By Margery Conner, Technical Editor -- EDN, 11/22/2007

Just two years ago, lithium-ion cells may not have met your system's power requirements. But take another look; with new batteries featuring iron-phosphate cathodes, you might be pleasantly surprised by what's available now.



Things are changing in the usually stodgy world of lithium-ion batteries. Two years ago, the laptop-battery market was the driving force in energy- and power-usage profiles for lithium-ion-battery packs (Reference 1). Now, cordless power tools rival laptops in lithium-ion-battery-market share. In 2005, judging by laptop features, laptop-computer vendors ranked the four main characteristics of a lithium-ion battery in descending order: energy storage, speed of power delivery, cost, and safety. A fifth, environmental impact, or "greenness," didn't even make the cut.

The most important energy requirement for laptops and other consumer-electronics products, such as cell phones and MP3 players, is energy-storage capacity. At a minimum, users want to be able to watch a feature movie on their laptops during cross-country flights. Second is the ability to quickly charge the device; laptop users are an impatient bunch. Third is cost: Users see battery packs as commodities rather than features that vendors can charge for. Granted, a laptop user will pay more for increased battery-powered work time, but this increased cost is often the result of clever circuit design and component selection rather than the inclusion of a battery pack with a higher energy capacity. Safety comes next. Although a basic level of safety is a given, some level of failure is acceptable. Manufacturers signaled their acceptance of a certain failure level when they began designing with lithium-ion cells, whose failure mode can be catastrophic.

Standard lithium-ion batteries use a cobalt oxide for the cathode. There are several permutations of this cobalt alloy, such as nickel-manganese cobalt, but the key ingredient is cobalt, which makes for the highest energy storage in the battery. Unfortunately, it also goes hand in hand with a volatile chemistry. Lithium-cobalt chemistries are highly combustible, and cell puncture or drawing too much current can trigger thermal runaway or even a fire. Although uncommon, lithium-ion-cell failures were the cause for the massive recall of products from Dell, Apple, and others.

Battery manufacturers recognize, however, that applications other than consumer devices, such as laptops and cell phones, have different profiles, and these applications have driven different features requiring different battery chemistries. The first challengers to laptops as drivers for battery technology were cordless-power tools. Power tools still require adequate energy capacity, but they also need large bursts of power at a high current rate. Power-tool users will pay a premium for eliminating the need for an extension cord annoyingly following them all over their work sites or shops. In the past, power-tool designers could get by with battery chemistry such as nickel cadmium, which is adequate for energy storage and can sustain large currents. But Europe's recently enacted ROHS (restriction-of-hazardous-substances) regulations ban most electronic equipment using heavy metals, such as cadmium. So, manufacturers can no longer sell

BUZZ! DRILL! RRRIP!: Three A123 execs wield DeWalt's potent new line of tools, which pack the company's lithium-ion cells. From left: CTO Bart Riley, CEO David Vieau, and Ric Fulop, VP of business development.

products with "nongreen" nickel-cadmium-battery packs. A new requirement for cordless power is also battery-charge- and discharge-cycle life, because users discard most consumer-electronics battery packs after three years, whereas power-tool users keep their equipment longer.

Battery companies A123 Systems, Valence Technology, Altair Nano, and E-One Moli Energy have each developed a lithium-ion chemistry that uses an iron-phosphate-based cathode. By eliminating the use of cobalt,

Continued on Page 6: **Capacity**

Capacity —*From Page 5*

iron-phosphate batteries sacrifice high energy density, but they gain the ability to support higher current and, thus, greater power. They also have no thermal-runaway problems. So, lithium-iron-phosphate batteries became available just as ROHS regulations went into effect. Power tools introduced a new power-usage profile into battery options and enabled other applications. Robin Tichy, PhD, technical-marketing manager at battery-pack-design house Micro Power, gives this example of how applications with common power-usage profiles can leverage battery technology: "Applications that have motors tend to fit the same high-power/high-current capability of power tools. Now, engineers can make a battery-powered version of a motorized application." For example, Valence's lithium-iron-phosphate-battery packs power new versions of the motorized Segway personal-mobility device.

All battery manufacturers are eyeing the enormous market potential of EVs (electric vehicles), HEVs (hybrid EVs), and PHEVs (plug-in HEVs). Unlike laptops, the No. 1 battery characteristic for any vehicle is safety. Although consumers will tolerate cell-phone or laptop battery packs' overheating and the—rarely—ensuing fire, they won't accept the potential explosion of tens of kilowatts and the resulting disaster in an EV.

So, although lithium-ion-cobalt batteries are attractive for their energy-storage capability, their tendency to have thermal runaway has all but ruled them out for mainstream EVs and HEVs. An exception is the Tesla Motors' Roadster, which has a range of more than 200 miles and an acceleration of 0 to 60 mph in 4 seconds. Although it will use a lithium-ion-cell battery pack, the pack has elaborate power-control and -monitoring electronics. In addition, the high-end-performance car selling for more than $95,000 doesn't target typical consumers (Reference 2).

EVs rely completely on their batteries to store energy and use it to power their motor-driven wheels. HEVs rely on a combination of an internal combustion engine and a battery-powered motor. With the need to rapidly charge and discharge the battery, HEVs and PHEVs are closer in many ways to power tools than to laptops. PHEVs' energy requirements need to meet only a minimum energy capacity, in contrast with laptops, in which more is always better. PHEVs put energy density at the bottom, rather than the top, of their battery-features list.

General Motors' PHEV concept car, the Chevy Volt, will have an all-electric range of 40 miles. Most daily trips in the United States fall within this range, meaning that much of the car's travel will be all-electric. To support this 40-mile range, the Volt will have a 16-kWh lithium-iron-phosphate battery. Like most other batteries, lithium-ion batteries operate best within a state-of-charge window: Rather than charge the battery to its theoretical maximum charge and then run it down to a total discharge, the Volt will charge each night from its ac outlet plug to 80% of its theoretical maximum and then discharge down to 30% of its maximum, resulting in a 40-mile range.

Once the battery discharges to 30%, then the car's 1-liter internal combustion engine starts, but, rather than directly powering the wheels, the engine generates electricity to keep the battery charged at its 30% level (Reference 3). Lithium-iron-phosphate batteries provide "good-enough" energy capacity and have thousands of cycles of rapid charge and discharge currents, making them an enabling technology for PHEVs. For these vehicles, power capacity trumps energy.

Similarly, the battery for an HEV needs to provide power at the expense of energy storage. In city traffic, a battery is constantly charging or discharging, and reliance on the battery for an extended range is rare. A familiar example of an HEV is the Toyota Prius, which debuted in 2004 and is the most common hybrid on the road today. The Prius uses a parallel-hybrid configuration, meaning that either the battery or the internal combustion engine can power the wheels. In practice, the battery mainly acts as a power assistant and harvester for the Prius' acceleration/deceleration: It can power the car in EV-only mode for only about two miles. The battery-use profile of such a hybrid places a premium on power, rather than energy, because the car uses the battery to frequently and quickly charge and discharge, rather than to fully charge and then power the car for a long trip. The Prius uses a nickel-metal-hydride battery, which in 2004 was the optimum battery chemistry for repeated rapid charge and discharge cycles.

Toyota is not standing still regarding new battery technologies, but it doesn't appear nearly as confident about lithium-ion-battery development as GM is. Toyota announced this year that it would introduce a hybrid with lithium-ion batteries in 2009, but later said that safety concerns about lithium ion would delay the introduction until 2011.

Continued on Page 7: **Vendors**

Vendors —*From Page 6*

Although Toyota has not provided any details about the type of lithium-ion-battery chemistry it's working on, the safety concerns seem to imply that lithium-ion cobalt is at least one of the chemistries it is investigating. This chemistry is also a strength of Toyota's current hybrid-battery-pack supplier, Panasonic. However, lithium-ion-cobalt batteries' strength is energy storage rather than power storage, so Toyota may lag behind GM in its PHEV-battery development.

Vendors of lithium-iron-phosphate batteries recognize this variation in power-versus-energy-capacity needs of EVs and HEVs. For example, A123 has introduced two battery types rather than a one-size-fits-all device. The 32113 M1 Ultra high-power cell targets HEVs, and the 32157 M1 HD cell uses a higher-energy-electrode design that provides greater battery-only range for PHEVs. Both battery types will deliver more than 10 years and 150,000 miles in engineered automotive-battery packs. A123 is providing batteries for the GM Saturn Vue PHEV-development program, which may reach production status as early as 2009. Users will be able to plug in the PHEV-version Vue at night, but the EV range is only approximately 10 miles.

New battery chemistries and capabilities are not the only changes in portable power; the surrounding electronics are also improving and becoming more complex. Accurate fuel gauging has for years been the Achilles' heel of lithium-ion batteries. Lithium ion has an unpredictable discharge profile: You don't know how much charge remains because it varies, depending on the discharge rate, temperature, and life of the cell (Figure 1).

Addressing that problem, Texas Instruments recently introduced a the bq27500 battery-fuel-gauge IC incorporating the company's Impedance Track technology, which directly measures the effects of discharge rate, temperature, age, and other factors on cell impedance. The technology, which TI claims offers 99% accuracy, uses these parameters to calculate the remaining battery capacity and full-charge capacity (Reference 4).

Battery-fuel-gauge accuracy is more important in medical devices than in any other application. Portable medical devices require a series of warning flags indicating a countdown to when the battery will discharge, with a highly accurate countdown beginning at 30 minutes before the battery will die.

In the past, portable medical devices have used sealed-lead-acid backup batteries because they have a predictable constant-slope discharge. However, Micro Power puts lithium-ion-battery packs into medical devices because the Impedance Track technology allows a highly accurate gauging of the battery.

The bq27500 system-side battery-fuel gauge from Texas Instruments uses the company's Impedance Track technology to accurately predict battery life.

Alastair Johnson, vice president of marketing and sales for Valence, cautions that designers often overlook the broader issue of battery-management electronics. "For one hybrid-bus manufacturer that we work with, the batteries are as much as 25% of the total cost of the vehicle, which puts battery costs second only to the drive-system costs. Designers need to protect the battery system from any kind of stress. The better your battery-management system is at monitoring and carrying out small adjustments on your pack, the better your extension of the life of the battery, and the better the protection of the customer's ROI [return on investment]."

Even as laptops cease to be the single dominant driver of battery requirements, the laptop itself is changing. Take, for example, the OLPC (One Laptop Per Child) organization's design effort. Its developers initially conceived the idea to provide $100 laptops to children in Third World countries, and the project has had to overcome an almost-overwhelming array of technical challenges. For example, how do you power a laptop in areas without reliable power utilities? The designers have come up with several options, both solar- and human-powered, which the OLPC's XO laptop makes feasible (Figure 2). It consumes 2W of nominal power—a tenth of today's standard laptop, according to the OLPC organization. OLPC asserts that the first alternative-energy source for the XO will be flexible thin-film solar panels from ECD Ovonics, rather than the more efficient but less rugged and more expensive silicon/crystalline-based solar panels. OLPC uses the phrase "virtually indestructible" when describing the panels, always a desirable feature for equipment that children use. The laptops will come with a manual crank from Freeplay and a lithium-iron-phosphate-battery pack from Gold Peak and BYD Batteries.

What's ahead for batteries? Lithium derivatives may not be the final word on energy density and safety. ZPower,

Continued on Page 8: **Derivatives**

The Electric Vehicle Society of Canada

Who we are - What we do

We are a non-profit group of Electric Vehicle (EV) Enthusiasts, Environmentalists and Engineers. We are, vitally concerned with clean electric transportation.

We meet at Centennial College, Scarborough, Ashtonbee Campus, 7:30pm, room B204- the third Thursday of the month, excluding July and August.

We display EVs at the Toronto Auto Show, Skills Canada, Molson Indy, The Independent Power Producers Society of Ontario (IPPSO) and The Electric Distributors Association (EDA).

We encourage vehicle conversions from gasoline to electric by Canadian automotive students and we are available to offer a seminar to assist the students. To purchase an EV we will try to offer information on make and availability.

Individual $30.00, senior $20.00, business $100.00 that includes a bi-monthly, 8-page, newsletter, the "EV Surge". Forward to: Electric Vehicle Society, 21 Burritt Rd, Toronto, ON. M1R 3S5.

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Member # _____

Derivatives —*From Page 7*

which is developing a silver-zinc battery for the consumer market, demonstrated a prototype version powering a laptop at the recent Intel Developer Forum in the all-day section on computing. ZPower claims that its batteries will have an energy density of 200 Whr/kg and be completely nonflammable, with no nasty ingredients to end up in landfills.

But silver is one of the most expensive battery materials. To offer these batteries at only a 20% or so premium over lithium ion, the company will establish a trade-in policy for its batteries and effectively recycle all of the silver, according to ZPower President Ross Dueber, PhD.

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Source: EDN
URL: http://www.edn.com/article/CA6501082.html

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