

Tuesday, August 05, 2008

## **Better Batteries Charge Up**

A startup reports progress on a battery that stores more energy than lithium-ion ones.

By Tyler Hamilton

A Texas startup says that it has taken a big step toward high-volume production of an ultracapacitor-based energy-storage system that, if claims hold true, would far outperform the best lithium-ion batteries on the market.

Dick Weir, founder and chief executive of EESstor, a startup based in Cedar Park, TX, says that the company has manufactured materials that have met all certification milestones for crystallization, chemical purity, and particle-size consistency. The results suggest that the materials can be made at a high-enough grade to meet the company's performance goals, as well as withstand the extreme voltages needed for high energy storage, the company said in a press release last week.

"These advancements provide the pathway to meeting our present requirements," Weir says. "This data says we hit the home run."

EESstor claims ([http://www.technologyreview.com/read\\_article.aspx?ch=specialsections&sc=batteries&id=18086&a=](http://www.technologyreview.com/read_article.aspx?ch=specialsections&sc=batteries&id=18086&a=)) that its system, called an electrical energy storage unit (EESU), will have more than three times the energy density of the top lithium-ion batteries today. The company also says that the solid-state device will be [safer \(http://www.technologyreview.com/Energy/18762/\)](http://www.technologyreview.com/Energy/18762/) and longer lasting, and will have the ability to recharge in less than five minutes.

Toronto-based ZENN Motor, an EESstor investor and customer, says that it's developing an EESU-powered car with a top speed of 80 miles per hour and a 250-mile range. It hopes to launch the vehicle, which the company says will be inexpensive, in the fall of 2009.

But skepticism in the research community is high. At the EESU's core is a ceramic material consisting of a barium titanate powder that is coated with aluminum oxide and a type of glass material. At a materials-research conference earlier this year in San

Francisco, it was asked whether such an energy-storage device was possible. "The response was not very positive," said one engineering professor who attended the conference.

Many have questioned EESstor's claims, pointing out that the high voltages needed to approach the targeted energy storage would cause the material to break down and the storage device to short out. There would be little tolerance for impurities or imprecision--something difficult to achieve in a high-volume manufacturing setting, skeptics say.

But Weir is dismissive of such reactions. "EESstor is not hyping," he says. Representatives of the company said in a press release that certification data proves that voltage breakdown occurs at 1,100 volts per micron--nearly three times higher than EESstor's target of 350 volts. "This provides the potential for excellent protection from voltage breakdown," the company said.

Jeff Dahn, a professor of advanced materials in the chemistry and physics departments at Dalhousie University, in Nova Scotia, Canada, says the data suggests that EESstor has developed an "amazingly robust" material. "If you're going to have a one-micron dielectric, it's got to be pretty pure," he says.

Ian Clifford, CEO of ZENN Motor, says that the news "bodes well" for EESstor's next milestone: third-party verification that the powders achieve the desired high level of permittivity, which will help determine whether the materials can meet the company's energy-storage goals.

Weir says that EESstor's latest production milestones lay the foundation for what follows. It has [taken longer than originally expected](http://www.technologyreview.com/read_article.aspx?ch=specialsections&sc=batteries&id=20090&a=) ([http://www.technologyreview.com/read\\_article.aspx?ch=specialsections&sc=batteries&id=20090&a=](http://www.technologyreview.com/read_article.aspx?ch=specialsections&sc=batteries&id=20090&a=)), he says, but the company is now in a position to deploy more-advanced technologies for the production of military-grade applications, alluding to EESstor's partnership with [Lockheed Martin](http://www.lockheedmartin.com/news/press_releases/2008/010908_LockheedMartinSignsAgreement.html) ([http://www.lockheedmartin.com/news/press\\_releases/2008/010908\\_LockheedMartinSignsAgreement.html](http://www.lockheedmartin.com/news/press_releases/2008/010908_LockheedMartinSignsAgreement.html)).

Weir says that momentum is building and that he'll start coming out with information about the company's progress on a "more rapid basis." Plans are also under way for a major expansion of EESstor's production lines. "There's nothing complex in this," he says, pointing to his past engineering days at IBM. "It's nowhere near the complexity of disk-drive fabrication."

Despite its critics, EEStor has won support from some significant corners. In addition to Lockheed Martin, venture-capital firm Kleiner Perkins Caufield & Byers is an investor, and former Dell Computer chairman Morton Topfer sits on EEStor's board.

The company is also in serious talks with potential partners in the solar and wind industry, where EEStor's technology can, according to Weir, help put 45 percent more energy into the grid. He says that the company is working toward commercial production "as soon as possible in 2009," although when asked, he gave no specific date. "I'm not going to make claims on when we're going to get product out there. That's between me and the customer. I don't want to tell the industry."

Dahn says that he hopes EEStor will succeed. "I hope it works like a charm, because it will be a lot easier than fuel cells and batteries if it comes to pass."

Copyright Technology Review 2008.

---

## **Upcoming Events**

### **[EmTech08 \(http://www.technologyreview.com/emtech/08/\)](http://www.technologyreview.com/emtech/08/)**

MIT Campus, Cambridge, MA

Tuesday, September 23, 2008 - Thursday, September 25, 2008

<http://www.technologyreview.com/emtech/08/> (<http://www.technologyreview.com/emtech/08/>)

### **[Nano-Net 2008 \(http://www.nanonets.org\)](http://www.nanonets.org)**

Boston, MA

Monday, September 15, 2008 - Thursday, September 18, 2008

<http://www.nanonets.org> (<http://www.nanonets.org>)

### **[NanoMedicine Summit \(http://www.nanomedicinesummit.org\)](http://www.nanomedicinesummit.org)**

Cleveland, OH

Thursday, September 25, 2008 - Friday, September 26, 2008

<http://www.nanomedicinesummit.org> (<http://www.nanomedicinesummit.org>)

### **[WHIT 4.0 \(http://www.whitcongress.com\)](http://www.whitcongress.com)**

Washington, DC

Monday, December 08, 2008 - Wednesday, December 10, 2008

<http://www.whitcongress.com> (<http://www.whitcongress.com>)