

ONE ON ONE

Charged up over cutting-edge battery

Michael Vaughan speaks to Ian Clifford, Founder and CEO of Zenn Motor Co., about why his electric car company is betting the farm on an energy-storage device no one has seen

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‘It’s all about energy storage,’ says Ian Clifford. *(Michael Vaughan for The Globe and Mail)*

He's president of the Toronto-based company that builds the all-electric ZENN Car (Zero Emissions No Noise) but he's not focusing on making many more of the little low-speed runabouts.

Says Ian Clifford: "This is nothing to do with building cars, it's all about energy storage."

There are about 500 ZENNs on the road in the 40 U.S. states where low speed cars are legal. It's a little French-built micro-car that ZENN outfits with an electric motor and enough lead acid batteries to run it about 60 kilometres (in warm weather) on an eight-hour charge.

That's useful enough for buzzing around in local neighbourhoods but it's not the disruptive technology Clifford is seeking.

He has now bet the farm on a unique energy storage device from a company in Texas. The company is EEStor and the device is an ultra capacitor that, on a five-minute charge, can supposedly hold 52 kilowatt-hours in a 136-kg unit. That would be enough power to drive an electric car about 400 kilometres. It would also be enough to send most gasoline engines to the scrap heap.

The only problem: No one has ever seen this thing.

Vaughan: Ian, you've come a long way from when I first met you and you were stuffing an electric motor and a ton of batteries in an old Renault Dauphine, which I think you called the Feel Good Car.

Clifford: Oh, I've learned a lot.

With ZENN, we've sold 500 electric cars, which makes us one of the largest electric car companies in the world if you put it in that context.

But it's a drop in the bucket — there are 250 million cars in the United States.

We have revenue, we make profit on the cars we sell, but we are totally in investment mode. It's all focused heavily on EEStor's technology.

You need a better battery.

Electric cars in huge numbers are do-able with the right battery technology.

This is nothing to do with building cars; it's all about energy storage.

Isn't the answer with the battery companies doing lithium-ion or lithium-polymer?

They don't have a clue four years out what's going to happen to their batteries. They really don't.

You know what's going to happen in a cellphone, but 50 kilowatt-hours of energy storage in a car — forget it, they don't have a clue.

Even with some of the established lithium battery companies — they don't know how to price their

technology because of all the uncertainty in the technology.

They're setting up massive government-backed trust funds to settle warranty claims on the batteries because they don't know how they'll behave.

So you're going a different way.

Back in 2002, we started looking at battery technologies seriously and that's when we met EESstor, which was developing ultra-capacitor technology.

People had taken runs at ultra capacitors, but typically the problem they hadn't been able to get over was the voltage limitations. EESstor has developed new materials that get over it.

The only capacitor that I can think of is in a flash camera.

A flash camera has a battery that dumps power into a capacitor.

Capacitors in their current form are really great at taking power very quickly and discharging it very quickly. They're not good at storing it; they lose the power very, very quickly.

Capacitors have been around for a long time and they're a buffer technology — in the case of flash photography, they're in between the flash tube and the plug in the wall.

They're able to hold a whole bunch of power and displace it really, really quickly and recharge really, really quickly.

They have not typically been able to store large amounts of energy for a long period of time and that's what EESstor is doing.

Can you show me one of these or show an investor one of these even if it doesn't power a car but maybe an electric can opener?

No. Because of the way our agreement is structured with EESstor, it's all milestone-based and the next milestone is a chemical milestone with third-party verification of the science.

The following milestone is delivery of a production prototype unit for a car and that's late next year.
**see end of article for ZENN Motor Company correction*

Who is EESstor anyway? I couldn't find much about them.

The guys who have developed this technology come from hard-disk manufacturing.

If you think of a hard drive 10 years ago — think about a one-gigabyte hard drive 10 years ago — it was [huge] and it spun up like a jet. In my BlackBerry now, I've got 16 gigabytes of information storage.

They're basically taking the best of battery technology and the best of capacitor technology to mash it into a solid-state energy storage device that doesn't have any of the limitations of a chemical battery.

You found them in 2002 and you still can't show me an example of what they do. Are they years late?

They're not years late.

Everyone keeps saying that. But they developed the technology about 12 years ago — that's when they did the patent work and the lab work. But they didn't have a facility until 2006.

Now, in Austin, Texas, they have a state-of-the-art production facility that's ready to deliver production units in 2009.

They've gone from a standing start to production in a three-year period. It's pretty extraordinary.

They sure keep a low profile.

Lockheed Martin is involved, Kleiner Perkins (venture capital behind Google) is involved. They've got heavy hitters in this thing and they're total stealth.

It's not a scam because they're not raising money and they're not talking to anybody.

We have a unique relationship with them because I got it at the angel-investor level. If I'd met them after Kleiner, we wouldn't be having this conversation.

Your deal is what?

ZENN invested \$2.5-million (U.S.) in 2007 for an equity position of 3.8 per cent of EESor plus options.

And we have a \$2.5-million technology agreement that we inked back in 2004 and we're halfway through the milestones on that.

It gives us an exclusive licence to use their technology in compact and subcompact cars.

But we don't want to be in the car-building business. We've used the Intel model — our idea is that our drive system becomes kind of ubiquitous. The Intel inside of the car.

You're more excited than even in the Feel Good days.

This kind of energy storage changes how we consider energy, period.

It displaces fossil fuel entirely. It's not just about cars; it's about energy. It's for new cars and it's for existing cars.

There are 800 million cars that are already on the planet — we can retrofit them, too.

*Michael Vaughan is co-host with **Jeremy Cato** of *Car/Business*, which appears Fridays at 8 p.m. on Business News Network and Saturdays at 2 p.m. on CTV.*

**Initial introduction of the cityZENN in is planned as late 2009 with commercial availability in 2010. A timeline for the delivery of an Electrical Energy Storage Unit (EESU) has not been announced.*