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## **PowerGenix non-toxic batteries coming to market**

By David Ehrlich

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San Diego, Calif.-based PowerGenix is ready to hit the stores with its non-toxic batteries, announcing today that its rechargeable nickel-zinc batteries have met the European Union's requirements for the Reduction of Hazardous Substances as well as the union's 2006 Battery Directive.

The company's batteries contain no lead, cadmium or mercury, which it said offers a cleaner environmental alternative to lead-acid and nickel-cadmium, or NiCd, batteries.

"The first customers of ours are coming from the power tool and lawn and garden segment, and that's about a \$600 million market," Dan Squiller, CEO of PowerGenix, told Cleantech.com.

PowerGenix said its line of rechargeables serve as replacements for existing technologies, including nickel-cadmium which it said is being phased out by manufacturers and retailers in North America, the EU and Asia due to toxicity concerns.

"We're within 30 to 45 days of high-volume shipment," said Squiller.

Backed by investors including the Angeleno Group, Advent International, Braemar Energy Ventures, Granite Ventures, OnPoint Technologies and Technology Partners, PowerGenix has taken in \$30.8 million in three funding rounds, which Squiller said is not a lot of money for a battery company.

"We basically developed the technology, developed the battery design, and put it into high-volume production in China, and we've done all of that for \$30 million and, arguably, over about four or five years."

He said they were able scale up by designing the batteries to use existing NiCd manufacturing processes and equipment.

[Take a look inside the Chinese manufacturing facility here >>](#)

The EU's Reduction of Hazardous Substances, or RoHS, directive bans new electrical and electronic equipment containing high levels of toxic heavy metals such as lead, cadmium, mercury, and hexavalent chromium from the EU market.

The Battery Directive puts even more restrictions on the use of cadmium and mercury.

PowerGenix said the general RoHS directive became mandatory in the EU in 2006, and is being adopted in California and is under consideration in parts of Asia.

"Especially in Europe, they have a sensitivity to toxicity and environmental issues that we don't quite yet have here," said Squiller.

"When we look at the customers that we're talking to in Europe, they desperately want some kind of alternative to nickel-cadmium."

He said technologies like nickel-metal hydride have been used, but that there's never been a really good alternative until nickel-zinc.

"Nickel-zinc outperforms nickel-metal hydride in every dimension by up to 30 percent and it's 20 percent less expensive."

Squiller pointed out that 30 million pounds of cadmium a year ends up in landfills from people throwing away their batteries and from the manufacturing processes associated with nickel-cadmium batteries.

Many makers of nickel-cadmium batteries in the U.S. pay licensing fees to the non-profit Rechargeable Battery Recycling Corporation, underwriting its recycling program for nickel-cadmium and other chemistry batteries.

"For nickel-zinc, our recycling or remediation cost is one-tenth what it is for NiCd," Squiller said.

Some advanced battery companies, like Reno, Nev.-based [Altair Nanotechnologies](#) (Nasdaq: [ALTI](#)), and Boise, Idaho's [M2E Power](#), are looking into military applications for their products.

Earlier this year, Altair Nanotechnologies, known as Altairnano, signed a \$2.5 million contract to develop battery systems for the U.S. Navy (see [Altairnano gets contract with U.S. Navy](#)).

Last November, M2E Power, which pulled in \$8 million in funding for its kinetic energy-powered battery, said it was working on a D-cell battery sized solution for the military (see [M2E captures \\$8M with kinetic energy](#)).

Squiller said PowerGenix is working with the U.S. Army, but sees the consumer market as the major target.

"We don't think that the military business will ever be able to really fuel the company," he said. "The military business is not going to make nickel-zinc a mainstream, everyday chemistry, and it has the potential to be exactly that."

The potential market for the batteries is large across Asia, the EU and North America, said Squiller, with transportation a big target in the EU and North America.

"A nickel-zinc powered Prius, the battery pack in that Prius would be 30 percent smaller and lighter," he said, adding that it would "actually have more power than the nickel-metal hydride."

Squiller said the "killer application" would be consumer double-A and triple-A batteries.

"Just as people are buying more green products and there's a sensitivity that's increasing, the consumer has the option of buying a green battery that is completely non-toxic, recyclable, and they can use it 200 times versus throwaway batteries."

The first products using PowerGenix batteries are set to hit the market in Asia.

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