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Nextek hopes to spark electronics revolution

By [Tom Henderson](#)

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A small Detroit company will launch a product this week that it hopes will lead to \$4 million in revenue in the next year and eventually change the way offices and electronic devices are powered.

Nextek Power Systems Inc., which grew out of research at **BrookhavenNational Laboratory** in New York, plans to be at the forefront of a movement to convert office and home power systems from alternating current to direct current.

In the process, it hopes to prove — after more than 100 years — that Thomas Edison was at least partly right.

Nextek may be tiny, with just 15 employees, 12 hired in the past two years. It has been incubating at Detroit's **NextEnergy** since 2005, but it has formed an alliance with *Fortune* 500 heavyweights that say Nextek's technology will be key to a major green advance in the way offices are powered.

The company is taking on the way electric vehicles will be charged, too.

As a recipient of about \$400,000 of a Phase I \$2.5 million grant to NextEnergy from the **U.S. Department of Defense** to build a variety of prototype recharging stations for military use, Nextek has built two prototype charging stations in the parking lot at NextEnergy.

The stations convert AC power to high-voltage DC power, which sharply cuts recharging time for electric vehicles.

NATHAN SKID/CRAIN'S DETROIT BUSINESS



Paul Savage, CEO of Nextek Power Systems Inc., shows off his company's new 1,600-watt power server, which converts AC power to DC power for home or office use at a proposed energy savings of 10 percent to 40 percent.

Electrical systems have a lot of switching going on

In the 1880s, George Westinghouse and Thomas Edison became bitter adversaries over the best way to transmit electricity — direct or alternating current.

Edison backed DC, the standard in the early days (and the one on which he held patents).

But as demand grew, it became impossible to carry enough power using DC transmission, and AC took over.

Today, electricity transmitted by power lines enters the home or office in AC form and is converted to DC by individual electronic devices, such as computers and televisions. Each conversion results in energy loss.

Nextek's power server performs the conversion before the power reaches individual devices, with less energy loss and

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NextEnergy has won a Phase 2 grant of \$2.5 million to move the prototype program to military bases, and Nextek will share that, too.

The real benefit of the DOD program to Nextek, says its CEO, Paul Savage, isn't the grant funding, but the potential for using its military recharging stations as an entrée to the potentially far larger commercial electric auto market.

"It's a big concern. Will consumers tolerate large recharge times?" said Savage, a former bond dealer at **Credit Suisse First Boston** and member of risk management at **Lehman Brothers**.

But for now, Nextek's improving fortunes lie with its new product, the 1,600-watt Nextek power server, a device that will sell for \$1,550 and convert AC power to DC power for office use, at a proposed energy savings of between 10 percent and 40 percent. Each server will power between 500 and 1,000 square feet, depending on the load.

Currently, Nextek generates revenue — about \$1 million in the last 18 months — selling small devices called ballasts that convert AC power at 30 hertz (cycles per second) to DC power and then back to AC power at 30,000 hertz, a complicated process needed to light fluorescent bulbs.

Even before the official commercial introduction of the power server, Nextek has done more than 40 installations in the U.S. and the United Kingdom, Spain, Saudi Arabia, Singapore, Japan and Canada, including the Charlottesville, Va., office of green architect William McDonough, who designed the green roof at **Ford Motor Co.**'s River Rouge plant.

Nextek will have help hitting its revenue milestones from **Armstrong World Industries Inc.**, the world's largest maker of ceiling tiles and office ceiling systems. It is a \$3 billion company, with about a third of its revenue coming from ceiling systems in commercial buildings.

Armstrong recently formed a new division, **DC FlexZone Systems**, based in Lancaster, Pa., to market office ceilings with integrated DC power.

In a typical office ceiling of tiles in a metal grid, Armstrong's FlexZone system energizes the metal grid to power overhead lights and other devices, carrying low-voltage DC power that is safe to touch.

The DC system frees lights and other devices from typical electronic cabling and allows offices to be easily reconfigured.

"We've been looking to lay the groundwork for a new system in green buildings, and we're going to make a big marketing push next year," said Susan Rhoades, the division's manager.

She declined to say what the market for Armstrong's new ceiling system might be, but said it is large.

"Nextek is very well networked for a small company in the circle that matters for green building sustainability," said Rhoades. "Their product is absolutely critical for us to sell our product."

Rhoades said a tipping point for DC-powered buildings will be the fast-growing market in LED (light-emitting diode) lighting.

a cost savings.

For homes or offices that use solar panels, the current system is even less efficient. Solar panels generate DC power, which has to be converted to AC power before it is fed to office or home electric lines, then converted back to DC by individual electronic devices.

Nextek's equipment will eliminate those conversions.

Nextek was founded in 1995, based on work by Bill Wilhelm, a division head at **Brookhaven National Laboratory** in New York who specialized in thin-film solar photovoltaics and who realized there would be a need for a DC system to avoid energy losses during DC to AC to DC conversions.

The company moved to Michigan in 2005.

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"You can get up to a 20 percent efficiency savings on LED lighting if you have DC power," she said.

Two years ago, Armstrong and Nextek were two of five founding members of a California-based nonprofit called the Emerge Alliance, to promote DC power usage. The others were Johnson Controls; **Philips Lighting**, the U.S. division of the Dutch giant **Philips Electronics**; **OsramSylvania**; and **Worthington Armstrong Venture**, a joint venture of **Worthington Industries Inc.** and Armstrong.

Today, there are 65 members. Nextek remains as one of five governing board members. **DTE Energy Co.** is joining.

"(DC is) an interesting concept. It's neat and it makes sense. It's a movement that has grown legs over the last few years," said Hawk Asgreirsson, manager of power system technologies for DTE.

"Everything runs on DC now, so there's a lot of energy loss doing the conversion from AC," Asgreirsson said. "Our customers are putting quite a bit into solar panels, and if they have a way to use that DC power directly, it'd be nice. "

While Nextek has no direct competitors in AC-to-DC devices yet, because of its strong portfolio of 12 patents, Asgreirsson said inertia will be a barrier to market.

"There's a lot of legacy infrastructure. Can you afford to make the change?" he asked. "Armstrong is a huge supplier of ceilings, and they're very excited about this, but it will take a long time to become prevalent."

Karl Johnson, on the advisory council of the Emerge Alliance and the program manager for the **California Institute for Energy and the Environment** of the **University of California**, said DC-powered offices are the wave of the future.

"It's a major trend. We're a digital world and we're going to get more digital, and digital loads mean DC power," he said.

Nextek got its first major funding in 2008, a round of \$10 million led by Paul Mitchell, founder of **Two Seven Ventures LLC**, of Aspen, Colo.

"That gave us some working capital, but we'll be back in the marketplace in a year or so for expansion capital," said Savage, who said he will target a round of \$25 million to \$50 million.

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