

Can microgrids save LI?

by Gregory Zeller

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Much about [NYIT's](#) budding "microgrid" initiative suggests the diminutive.

The [miniature energy system](#) will generate relatively low levels of electricity – a modest 100 kilowatts – and its projected \$1.27 million sticker price is a pittance, at least as power plants go.

The word "microgrid" speaks for itself.

Thinking small, however, is apparently a big deal.

The proposal has piqued the interest of technology and energy experts from here to

Albany, including Tom Congdon, the state's energy czar, and Mark Torpey, who heads R&D for the [New York State Energy Research and Development Authority](#).

The immediate goal is to keep the lights on at NYIT's John J. Theobald Hall when something like Hurricane Sandy zaps the main power grid, providing a base for first responders and a refuge for storm victims.

The bigger idea: test the technologies that make microgrids possible, so long-term outages never threaten Long Island again.

Unlike most solar-power systems, microgrids aren't limited to immediately dispersing their watts – they can store electricity for future use, creating what Greg Sachs, chief operating officer at Island Parks' [EmPower Solar](#), called "a small autonomous network ... a microcosm of the larger grid."

Such self-reliant systems have risen recently in Africa, Haiti and other Third World regions lacking reliable electrical grids. Others are under construction in domestic settings like Fort Bliss, a U.S. Army base in Texas, and the Food and Drug Administration's White Oak research facility in Maryland, where grid power is available but the risk of an outage is high enough to justify the expense of creating a self-sufficient power source.

At Theobald Hall, the science building on NYIT's Old Westbury campus, 100 kilowatts could go a long way.

Nada Anid, dean of the college's engineering and computer science school, described it as a "distributed energy system" involving rooftop panels, two-way inverters and power-management systems that "island" the panels, allowing controllers to either feed their energy to the main grid or store it.

Until now, hoarding power has been a practical challenge – too much juice was lost in the transfer and storage to make the process work on smaller scales. But EmPower CEO David Schieren said breakthroughs in hydrogen systems, compressed-air technologies and electrochemical storage – aka batteries – are mainstreaming small-scale electricity storage.

"There's a convergence happening now where you have a lot of technologies that communicate well with each other," Schieren said. "Finally, we have storage and transfer technologies that are commercially viable for various markets."

EmPower, a solar engineering and installation company that employs about 50, focuses primarily on corporate and residential solar installations, but boasts an extensive energy-storage background. Among other projects, EmPower developed a data-acquisition system to analyze performance at the Town of Hempstead's hydrogen and compressed-natural-gas fueling station.

Schieren has also created other Long Island microgrids, albeit for residential use, including one in his Hewlett Harbor home.

"That's a narrow definition of a microgrid," the CEO noted. "The intent of NYIT is to demonstrate this on a larger scale."

At NYIT, EmPower will contribute expertise in hydrogen and lithium-ion storage.

"For our first five years, we focused on hydrogen and battery storage," said Schieren, who launched the company in 2003. "It was through that experience that we came to focus on solar as the primary energy input, with the intention of utilizing energy storage as the technology improved."

In addition to keeping Theobald Hall energized, the NYIT microgrid will allow experts to test emerging technologies. Anid cited opportunities to study an array of generation and storage methods and to test the efficiency of battery systems: the project could even create a fleet of electric-powered vehicles to service the Old Westbury campus.

"We would start with one or two cars for a demonstration, but we could have a fleet of hybrid vehicles or fully electric vehicles," Anid said. "And we'll be able to test new vehicle-to-grid transfer systems that could allow the vehicles themselves to be an electrical source in an emergency."

Sachs, the EmPower COO, sees the NYIT microgrid as a textbook "test bed" – a chance for next-level producers to get in on the ground floor of a project with wide-ranging possibilities.

"There's definitely a lot of value garnered from being part of a demonstration project," Sachs said. "You can say, 'Hey, this inverter has been used in a practical scenario,' and that helps you make the very business case that's so hard to make at this stage of development."

1 2

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Anid said the idea for an autonomous NYIT grid came from a June 2012 conference with New York Battery and Energy Storage, a battery-focused technology consortium. Attendees discussed creating an NYIT microgrid and developing courses to train students to run it. That's a critical add-on, according to the dean, who cited microgrid advancements in tech-heavy regions like Connecticut, where 27 colleges and municipal government groups are vying for \$15 million in state funding.

"I must say, if you look at Connecticut, we're falling behind," Anid said.

To catch up, NYIT has rallied an impressive Long Island tech posse. In addition to EmPower,

the group includes the Bethpage-based engineering firm Power Management Concepts; Ronkonkoma electric- and hybrid-vehicle inventor ElectroMotive Designs; and Ronkonkoma's Retlif Testing Laboratories, an electromagnetic interference and environmental simulation specialist.

Also plugged in: the New Jersey power-conversion manufacturer Princeton Power Systems, a gaggle of state and local power officials and an NYIT team ranging from senior technicians to business-development specialists.



Greg Sachs

The consortium assembled at a June 7 organizational meeting at NYIT, finalizing a plan to file for funding with the Long Island Development Council this month. The application will then go to the state for review, according to Anid, who hopes the Empire State Development Corp. will ultimately fund 20 percent of the project.

From there, project managers will look to private investments, tax credits and government grants, with the goal of having an NYIT microgrid operating by the 2014 hurricane season. In the final analysis, funding won't be a problem, according to Sachs.

"There are a number of different government and private sources that fund these kinds of projects, and if you have to you can get creative," the EmPower COO said. "Our goal is to make a business case.

"The ultimate goal of these microgrid projects is to realize all the potential benefits waiting at the finish line."

1 2

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