

SOLAR IN THE CITY

From high-rises to brownstones, new installations help quench power demand in New York City.

BY JOSHUA H. RADOFF

There's nothing like a massive blackout to spur a little energy introspection. When the lights went down across eastern Canada and the United States on Aug. 14, 2003, everyone with a theory and a voice began offering up explanations, remedies and told-you-so's. But more than a year later, a palatable explanation has yet to emerge. In New York, where the loss of light is an affront to the natural order, there's only one point that everyone can agree on: Demand for electricity keeps growing while the construction of power plants and transmission lines in the densest place in the country becomes more and more challenging.

New York's solar industry is hoping that some of this introspection will lead to the conclusion that the city should install as much solar power as possible—ready to crank out distributed, pollution-free electricity during those peak summer hours when air conditioners are set to high, electricity prices are soaring and the grid is strained to the point of browning or blacking out. And though solar power installations may be hard to imagine in a landscape of skyscrapers and shadow, more and more systems are cropping up in unexpected places all over the city.

First Solar High-Rise Takes Manhattan

The poster child for solar energy in New York City is the inventively named "Solaire" building in Battery Park City—a 27-floor luxury high-rise located only blocks away from Ground Zero in Lower Manhattan. As if on cue, the Solaire, with its 33 kilowatts (kW) of solar generating capacity—enough to meet 5 percent of the building's baseload demand—opened days after the blackout in late August 2003. It is the world's first-ever "green" residential high-rise.

"This building is huge for this city," says Anthony Pereira, president and CEO of altPOWER Inc. of New York City, the solar contractor for the project. "It's the first thing built down here since 9/11, and

Left and facing page, the Lower East Side apartment/office building stands out from the New York City skyline with its system of 22 Shell 110-watt solar modules, installed by Solar Energy Systems Inc.

SOLAR ENERGY SYSTEMS INC.

In 2002, one Brooklyn-based solar contractor installed about 40 kW of capacity. In 2003, he doubled to 80 kW, and in 2004, he expects to install over 150 kW.

it sends a message that says, 'New York is going to be a leader in sustainability.'"

The Solaire is a classic case of the public sector creating markets and monuments in the name of the public good. All of its green building features, including the solar photovoltaic (PV) installation, came about in response to a set of mandatory guidelines put forth by the Battery Park City Authority, or BPCA, the state entity that owns and administers the land. As a statement, the Solaire is hard to miss. A towering swath of telltale PV-blue runs up the front façade, facing westward over the Hudson River; a PV-embedded canopy shades the front entrance; and a rooftop rack crowns the top.

As solar contractor, Pereira worked within the larger construction timeline to design the various PV system components, draft plans for the manufacturers, ensure that each piece was properly tested and certified by a structural engineer, and oversee installation by the construction crew on the ground. By blending expertise in both the construction and solar industries, Pereira has helped to pioneer a

high-rise PV installation market that five years ago was mere wishful thinking.

Critics of the project note that the façade-embedded PV modules face west, rather than south, but that is more a function of the layout of the neighborhood, which is dictated by the path of the Hudson River, rather than the ideal solar orientation. Others lament that the 33-kW capacity pales next to the building's peak load. But Pereira seems content with taking things slow and conservative.

"This project was a learning exercise," he says. "Nothing like it had ever been done before, and everyone from Con Ed [the local utility], to the developer, to the construction company, to the unions had to get used to the idea." Since the BPCA plans to build another eight to 12

buildings over the next decade, Pereira is likely to manage even bigger and more ambitious projects in the future.

Subway Station Project is City's Largest

Another unexpected public patron for solar in New York is the city's transit agency, Metropolitan Transportation Authority (MTA), which this spring unveiled a 210-kW installation on the roof of its newly renovated Stillwell Avenue subway station. The Stillwell station is the terminal for two subway lines that run on an elevated track for the last leg of their journey through Brooklyn. Passengers exiting at Stillwell find themselves above ground, looking over the original Nathan's Famous hot dog stand to the Ferris wheel of Coney Island and the Atlantic Ocean beyond.



Solar in the City

The original plans called for a half-cylindrical glass roof, but early on in the project, one of the MTA officials had the idea to use solar. This MTA official was convinced that a large-scale, building-integrated PV installation was not only technically feasible, but totally plausible given the project's budgetary constraints.

One of the design revisions was to cut back on the amount of solar power originally proposed. The original plans called for a roof covered with PV, but "that was missing the whole point," says Tony Daniels, project manager from architects Kiss + Cathcart, Brooklyn, N.Y.

"We were going to be producing

electricity from relatively expensive PV, and then use it to produce artificial light for an otherwise dimly lit space below," he explains. "But we quickly arrived at the idea to use a combination of PV and clear glass." The result is a structure befitting a beachside terminal—full of natural light and still the largest PV installation in the city.

Broad Brooklyn Roof Ideal for PV

Not every building in New York is a skyscraper. The majority of the city's 900,000 buildings, outside of midtown and downtown Manhattan, are two- to six-story row-style residential "walk-ups" or "tenements," with warehouses and industrial facilities completing the landscape. The common element in these buildings is the flat, black roof, which from the elevated subway trains that run through Brooklyn and Queens seem to stretch out to infinity. It is no wonder then, that David Buckner of Solar Energy Systems Inc., a solar contractor based in the Greenpoint section of Brooklyn, sees in this landscape such enormous potential for solar.

Greenpoint is where pilgrims on an alternative energy hajj would come to find the city's second-largest solar installation: 59 kW of PV tiles from Berkeley, Calif.-based PowerLight Corp. on the expansive flat roof of the Greenpoint Manufacturing and Design Center (GMDC). Like the high-rises, GMDC represents a project type for which there is little local experience, but great potential for widespread replicability. And the emergence of a solar product that is adapted for precisely this kind of building—PowerLight's beveled-edge PV tile—indicates an awareness of this potential.

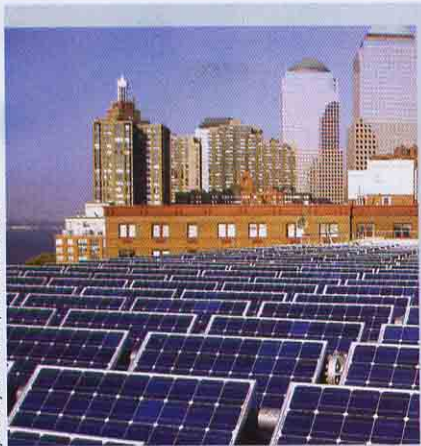
"It costs a little more for the equipment," says Buckner, who, along with Pereira, worked on the GMDC job. "But with no probing into the roof, no brackets and no angling of the PV to face the sun, you save on time and labor, so that for the bigger jobs it ends up being cheaper."

PowerLight has enjoyed great success in California, where net metering is allowed for on-site generation from PV, wind, landfill gas and anaerobic digesters up to 1 megawatt in size. In New York, net metering is allowed only for solar generators, and then only for residential installations under 10 kW in size. That is an obvious deterrent for large commercial projects, since, like the GMDC, they are ineligible for net

metering under the current law. A bill to change the law is before the state legislature.

Residential Installations Booming

In the meantime, installers continue to seek out markets ripe to yield business. While Pereira is carving a market out of the high-rises, Buckner has found a well-spring on the roofs of residential brownstones and tenement buildings. The first thing any potential residential customer wants to know: How much of my electrical load can I generate with PV? How long will it take to see payback? Residential installations therefore require an ability to paint the numbers into a clear, palatable picture.



JANNA JOHANSSON, ALTPOWER.COM

Sustainability at Heart of Addition

When the Museum of Jewish Heritage added a wing dedicated as a symbol of renewal, solar power was a key element. As the first construction begun in Lower Manhattan after the Sept. 11 attacks and whose core exhibit is a Holocaust memorial, the 82,000-square-foot Morgenthau Wing has been called a symbol of endurance. Highlights follow.

- Four-story wing built for \$60 million
- In response to local mandates, includes a 3,500-square-foot photovoltaic (PV) system (36.5 kilowatts peak capacity)
- System comprises 330 110-watt PV modules with two 20-kW, three-phase inverters
- Turnkey system supplied by altPOWER Inc., New York City
- Completed in June



RUOYU LI, KISS+CATHCART, ARCHITECTS

Highlights of Stillwell Avenue Subway Station

Located at Coney Island, Brooklyn

- The largest terminal in New York City's transit system
- 80,000-square-foot arched canopy includes 55,000 square feet of photovoltaic (PV) modules and 42,000 square feet of thin-film PV material. The 2,730 custom PV modules are fabricated of PV material from RWE Schott Solar, Billerica, Mass., and two layers of glass. The PV/skylight subcontractor was Pittsburgh-based TRACO
- On the brightest summer days, the system provides 165 kilowatts, or approximately 65 percent of the station's projected daytime demand. The array does not provide power for moving trains
- First phase completed in May, with project completion slated for early 2005

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—Anthony Pereira, *altPOWER Inc.*

Buckner, an eight-year veteran of the financial industry, rattles off figures like the ticker board at the stock exchange. “If we’re talking about a two- to four-story, single-family brownstone with an unshaded, 20-by-40-foot roof, you can probably meet the entire load with a 4-kW system.”

When it comes to cost, he skips the sugarcoating. “For a 2- to 10-kW system, depending on the electrical work, you’re looking at an average of \$8 per watt.” That means that even a system on the smaller end of that range will cost a minimum of \$16,000. Incentives, which in New York state include loan buy-downs and cash rebates of \$4 to \$5 per watt, can reduce a PV installation’s final price tag by as much as 40 percent to 70 percent.

Even so, Buckner says, “You’re still talking about a payback period of 10 to 20 years, so if you’re looking for a cost-effective alternative to buying your power from the utility, solar isn’t the answer.”

But the insistence on looking at solar as a financial investment, on par with mutual funds or real estate, clearly ruffles his feathers. “Since when do people care about doing what’s cost-effective?” Buckner

argues. “You ever hear someone ask if a Lexus was cost-effective? People buy solar because they want it and because they feel good about it.”

Buckner’s three-year-old business, Solar Energy Systems, recently installed a 2.4-kW system at a six-story tenement building in the Lower East Side. He’s also done PV systems on brownstones and single-family homes in Brooklyn and the Bronx. In 2002, he installed about 40 kW of capacity. In 2003, he doubled to 80 kW, and in 2004, he expects to install over 150 kW. “Projections for 2005 are at least 250 kW. I don’t know what to expect after that. ... I’m just keeping my fingers crossed.”

Ahead, Empire of the Sun?

Though installations on the scale of the Stillwell Avenue subway terminal will ease pressure on the local distribution system, its 210 kW are a drop in the bucket next to the city’s peak load of 11 gigawatts. To make a dent on a city-wide level, the rate of new installations would have to ramp from hundreds of kilowatts per year to hundreds of megawatts, and that would likely require a far more aggressive public policy approach.

But for New York solar professionals, there’s plenty to be optimistic about. On June 4, the New York State Department of Public Service recommended that clean energy portfolio standards be increased in the state from 19 percent today to 25 percent by 2013. Sustainability, it seems, is in vogue, and for those markets that espouse its tenets, business is booming.

Demand is only half the picture, though. The understanding of how to make solar work in an urban environment is orders of magnitude greater than it was only a few years ago. And there’s no reason to believe that with patrons like BPCA and enthusiastic citizens leading the charge, this adapted expertise won’t advance even further—even to the point where the New York solar industry may be as sustainable as the products it installs. ●

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