



Brooklyn's Marcus Garvey Apartments generate and store electricity on-site while offering demand-response services to utility Con Ed. Photo: Enel X

Enel X conjures the future at Brooklyn microgrid

IN DEPTH | With on-site generation, a four-hour battery system and an intelligent control system, New York City apartment complex highlights Enel X's ideas about where the electricity market is going

by **Karl-Erik Stromsta in Brooklyn**

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On the outskirts of Brooklyn, in a neighborhood with a reputation for crime and urban blight, Enel is quietly running a microgrid whose lessons may one day sit at the center of its multi-billion-dollar global electricity empire.

A little more than a year ago, Enel X began operating a state-of-the-art microgrid combining solar panels, a fuel cell, and New York City's largest lithium-ion battery system for the Marcus Garvey Apartments – a 625-unit complex in the low-income neighborhood of Brownsville.

The Brooklyn microgrid is “a pilot of what we’re going to see around the world over the next two to three years”, Francesco Venturini, chief executive at Enel X, tells *Recharge*.

“We’re not talking about anything visionary,” Venturini says. “All this technology is already out there. You can go into a store and buy most of the required equipment off the shelf right now.”

“The difference with the Brooklyn project is everything has been implemented and integrated. It's the intelligence behind it that allows all these different parts to work together efficiently for the final customer.”

Enel X, the advanced services division of the Italian energy giant, was launched last year with high expectations. Its focus is on three business pillars: urban infrastructure (like electric-vehicle charging stations); energy as a service (or helping customers cut their bills by adding products like



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PV and storage); and flexibility (or allowing customers to make money by occasionally reducing their power consumption at a utility's request, known as demand response).

It's an assortment of ideas, technologies and buzzwords that needs real-world examples to fully come into focus, and the Marcus Garvey complex represented an ideal opportunity to breathe life into Enel X's vision.

The apartment complex and the surrounding area of Brooklyn face unique challenges in their electricity supply.

The local grid, operated by utility Consolidated Edison, is stretched to its limit during peak-demand hours. New York state has ambitious renewables targets, but building new transmission lines or substations within population centers is difficult and expensive. Meanwhile, 2012's Hurricane Sandy and the resultant blackouts put a spotlight on the need for more resiliency.

In the face of such challenges, Con Ed two years ago launched its Brooklyn-Queens Demand Management (BQDM) program. BQDM is among the highest-profile examples of the so-called non-wires alternatives initiatives being embraced by a growing number of US utilities, which seek to defer or avoid new transmission lines through the adoption of battery storage and demand response.

Marcus Garvey was an ideal candidate for BQDM, says Nick Lombardi, a business development manager at Enel X, who speaks over hip-hop music blaring from parked cars as he strolls through the complex.

Its "very peaky" load is substantial even in the context of New York City, topping out around 3MW during winter due to the electrically heated apartments. The entire complex, which is owned by a private developer, runs through a "master meter", meaning it has a single account with Con Ed.

Enel X owns the 300kW/1.2MWh battery facility, and its DEN.OS software – acquired last year when Enel bought US storage specialist Demand Energy – acts as the system's brain, looping in the 400kW PV installation and 400kW fuel cell that were installed by other vendors.



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For Marcus Garvey's owner, L+M Development Partners, the savings come from a few directions.

First, Enel X helps shave-down the amount of power the property draws from the grid during times of peak demand, by discharging the battery. That reduces the property's demand charge, a levy that many big US power consumers face based on their peak monthly consumption.

The property also gets paid by Con Ed for offering demand-response services during peak hours. In an extreme scenario, the complex may even go as far as temporarily shutting down elevators or lights to curb demand, Lombardi says.

For its part, Enel X gets a cut based on how much savings it delivers. "We balance out the whole system," Lombardi says. "At the end of the year, we settle up and say, 'This is what your bill would have been without all these offsets, and this is what your bill is now.'"

"The delta is what we share."

How big can the business model for such microgrids scale? Pretty big, in the eyes of Enel X.

For the foreseeable future, incentives will play an important role in the economics of such microgrid projects – meaning the support programs in place in various cities, states and countries will affect the market’s timeline. But the concept, or at least parts of it, is widely applicable, from single-family homes to entire cities. Smaller projects may require aggregation, making them more challenging.

Among other near-term markets like California and Italy, Enel X is also investing in places like South Korea and Australia.

Ultimately, urban microgrids will need to work not only for their customers, but also for the utilities and broader grid operators with which they overlap. Con Ed is happy with how things are going, Lombardi says, with the Marcus Garvey project helping to shrink the peak-demand window in that part of Brooklyn.

Maintaining the grid in a place like New York is like “trying to repair the plane while you’re flying”, he says. “You fix one thing, and then you can focus on another thing.”