



Photo courtesy of Related Hudson Yards

Using power and technology to deliver resilience in Hudson Yards

Hudson Yards is a 28-acre, mixed-use neighborhood on the west side of Manhattan. Outfitting it with sustainable power and technology solutions was no easy feat—but well worth the effort.



Jay Cross

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Real-estate developers have a responsibility to create resilient and environmentally sustainable buildings that not only enhance the cities in which they are built but also safeguard their inhabitants from unknown environmental and social futures. Such socially responsible urban development is not simply good practice—it's good business. The validity of that maxim is evident in Hudson Yards, our just-now-opening major project on Manhattan's far west side. This building complex will ultimately include 18 million square feet of development over seven city blocks and is the largest private real-estate development in New York City since Rockefeller Center.

Early in the planning process, our development team considered the enormous task of building a project of this scale: 28 acres of mixed-used development, to be constructed largely above the Long Island Rail Road's active West Side Yard. Almost immediately, we recognized that in addition to the standard zoning, financing, and construction challenges developers face in most projects, we had to deal with two other extraordinary considerations. First, the need to bring half the project online at roughly the same time—an infrastructure test for any city, let alone one as mature as New York. And second, the need to attract commercial tenants, retailers, restaurateurs, and residents to a relatively remote area of Manhattan notably lacking in all four. By resolving the first problem with a focus on resilience and sustainability, we made significant steps toward solving the second.

Developing a sustainable approach

We were determined that the Hudson Yards platform, buildings, and other structures be resilient, sustainable, and technologically advanced. Moreover, such lofty goals had to be accomplished in commercially and economically sustainable ways. Before we could worry about attracting tenants, we

had to consider not only how to sustainably and reliably power the entire development but also how to bring technology to the space.

Power

Since the September 11th attacks, Manhattan has experienced several blackouts, and energy experts project that climate change, cyberterrorism, and an aging utility infrastructure will increase the frequency of these occurrences. Accordingly, we had one burning question: What would happen to the many thousands of employees, residents, and visitors of Hudson Yards if New York City's power grid failed?

From the outset, providing large commercial tenants with auxiliary on-site power to support business continuity during an extended power outage was both a priority and a proposed point of differentiation for the development. Natural gas-fired cogeneration—or “cogen,” the simultaneous generation of power and useful heat—is the clear choice for providing that auxiliary power source. Cogen is twice as efficient as utility-scale power generation because it not only generates electricity but also uses the heat byproduct to produce hot and chilled water that buildings can then use. Such on-site generation also avoids the transmission and distribution losses associated with utility-scale generation.

Nearly every Eastern Rail Yard (ERY) building was planned with the intention of installing cogen to help meet high-level LEED requirements. But the plants would have been small because each building's individual demand for hot and chilled water varies greatly over the course of the day or week. So, we consolidated the power and thermal demands of the buildings, establishing a microgrid and connecting the buildings to a thermal loop. We also established one larger plant instead of

four smaller ones, making more than four times as much cogen capacity economically rational. This single-plant solution capitalizes on the mixed-used program of Hudson Yards: commercial buildings peak in the afternoon, residential buildings peak in the morning and evening, and the retail and cultural facilities are busiest over the weekend when the commercial buildings are nearly empty.

Just as crucially, Related did not have to build out a costly electrical distribution network to effectuate the microgrid. Instead, the cogen plant delivers power directly to the Con Edison grid, and Con Edison offsets this power from the ERY buildings' electricity bills. In the event that Con Edison's grid fails, breakers open to isolate Hudson Yards from the rest of the grid, and cogen power will be delivered directly to the buildings.

All told, our 13.3-MW cogen plant, thermal loop, and Con Edison interconnection cost nearly \$200 million. To recoup some of this cost, Hudson Yards sells various forms of power to the ERY buildings and tenants through a subsidiary set up for its power business. This setup allows Hudson Yards to cover ongoing operating costs and the facilities' mortgage payments and comes with a binding commitment that rates will be no higher than they would be if the microgrid did not exist.

Technology

Our approach to power generation greatly influenced our approach to technology, including security, turnstiles, elevators, building-management systems, access control systems, telephone, and Wi-Fi. We believed it was both socially responsible and commercially viable to wire Hudson Yards with a focus on data and connectivity—despite a \$40 million price tag. First, this move was socially responsible because cities will ultimately need adoption at scale of these kinds of data-producing systems if urban areas are to expand

healthily. And second, it was commercially viable because it will take time before such systems become code, so smart-city investments, at minimum, boost operating efficiencies and ideally generate revenue.

We realized early on that we were uniquely positioned to attempt to solve the always-nettlesome problem of systems integration. Converging disparate systems generally requires a spaghetti-work of software and hardware solutions to cohere in just one building. Because we were creating an entire multistructure neighborhood from whole cloth, real estate included, we were able to create a cohesive conversation on a single-software platform fed by a unified fiber-optic network running up buildings and around the campus.

Over time, we expect the benefits of this converged network to be myriad. Chief among those benefits are ongoing data-based insights about humans and machines; integrated outcomes across campus, including frictionless building entry for tenants and visitors; and sizable cost-savings and revenue opportunities. Furthermore, some of those opportunities include advertising and sponsorship revenue across screens, from residential tenant smart-home apps to dozens of wayfinding and informational kiosks and vitrines that dot our campus.



To be sure, much of these hoped-for outcomes from our technology and power investments are just that: hopes. But this strategy, while ambitious, has not dissuaded tenants from the highest echelons of the city's commercial, legal, and financial businesses. The three commercial office buildings at Hudson Yards that are occupied—or soon will be—are for all intents and purposes fully committed, at rates per square foot among the highest in New York City. A fourth building (50 Hudson Yards) in the early

stages of construction is already 50 percent leased. And we've experienced similar demand in the one residential building open to purchasers, which is 60 percent sold.

Our success in luring tenants strongly suggests that resilient and sustainable development is both good for society and good business. Indeed, we believe that the development community in general must stop thinking about raising one building at a time and start thinking about how to create blocks, neighborhoods, and cities that can withstand the tests of resiliency that are sure to come. ■

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