CASE STUDY

From Vacant Lot to Workforce Housing:
River Terrace Apartments, Washington, DC

River Terrace is a new, four-story affordable apartment building being planned to replace a vacant lot that now serves as an interim parking area. The site is located at 3450 Eads Street NE in the River Terrace neighborhood of Ward 7 in Northeast Washington, DC within a half mile of the Minnesota Avenue (orange line) metro station. Neighborhood Development Company (NDC), a DC-based real estate developer, plans to develop and own the building. For this project, NDC partnered with architecture firm Grimm + Parker to explore the feasibility of net-zero energy (NZE) for this project.

Q&A WITH MICHAEL GIULIONI, NEIGHBORHOOD DEVELOPMENT COMPANY

How did the net-zero energy goal benefit the project?

The NZE goal benefited the project in a few different ways. First, it focused the design of the building on long-term operations, not just on the final product. NZE design requires a whole-building lifecycle approach to design, ensuring that all systems integrate well with one another and will service the building well over time. Another benefit of taking the NZE approach is that it lowers costs over time. While there are added upfront costs, our modeling showed long-term capital reinvestments will be lower and operations costs will also be lower and more predictable.

The other main advantage of pursuing NZE was that it helped us demonstrate our commitment to environmentally responsible affordable housing, which galvanized community support for the project's financing and development approvals. DC residents have a strong sense of environmental awareness and advocacy, so they appreciated the commitment we made. We saw changing city regulations and decided to get ahead of them, and we viewed this project as a perfect opportunity to do that.

—KEY STATS—

Current development stage:
Schematic design (as of June 2020)

Square footage:
58,000 square feet

Unit count:
49 units

Unit size mix:
a mix of one-bedroom, two-bedroom, and family-sized three-bedroom apartments

Amenities:
tuck-under parking, bicycle storage room, on-site management office, and supportive financial, health, and wellness services in a dedicated community room

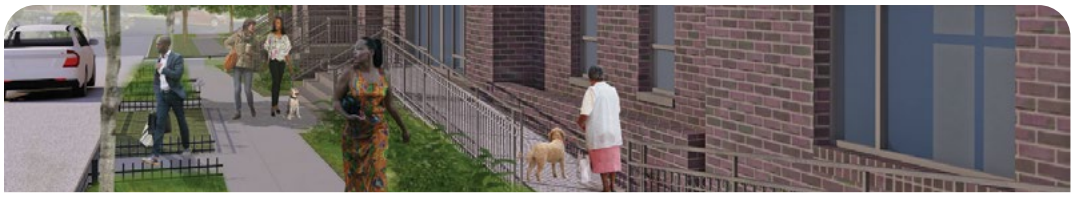
Anticipated budget:
$25,500,000

Financing mix:
short-term bonds, 4% low-income housing tax credits (LIHTC), deferred developer fee, and Housing Production Trust Fund (HPTF) gap financing; permanent financing will include LIHTC equity, permanent long-term bonds, HPTF gap financing, and deferred developer fee; short-term bonds will be repaid with LIHTC equity and term bonds.

Targeted Site Energy Use Intensity (EUI):
17.3 kBTU/sf/yr

Yearly energy consumption anticipated:
149,582 kWh

Yearly energy production anticipated:
127,500 kWh



Which NZE scenarios did you explore, and how did you choose the one you did?

We designed this building to meet the Passive House Institute U.S (PHIUS) standards for energy performance, and we intend to pursue certification. Key features include a geothermal system, rooftop solar, a high-performance building envelope and windows, ENERGY STAR appliances, and high-efficiency lighting. The solar array will provide the majority of the power for the building systems. It will also be integrated with the building's green roof, which will minimize stormwater runoff to the Anacostia watershed.

In working with the community, we went through a few different design iterations. We believe this one is the best, balancing unit mix, affordability, and greater environmental benefits. Some of our NZE approaches would not have been possible with earlier project iterations, as they were incompatible with optimal NZE building envelope proportions from a financing perspective. NZE buildings have an optimal height-to-floor-area ratio. Previous financing constraints initially drove us to consider a five-story building envelope, but our challenge was that even when we added more vertical floorspace, we had the same available rooftop area, resulting in insufficient space to fit enough solar for a five-story NZE building.

What did you learn from the challenges you faced?

On-site NZE may not be feasible in affordable housing at heights above four stories due to an envelope proportionality that won't work. We support putting as much clean energy on-site as possible, however, what's feasible is highly dependent on not just the characteristics of your site, but also the regulatory context. Zoning regulations, how you define NZE, whether you're required to provide all energy on-site, and whether there are requirements for how off-site energy is procured are all essential considerations when planning a NZE project. DC's Appendix Z in the 2017 Energy Conservation Code helps answer some of those questions. Having clear regulatory guidance like this is definitely helpful, as it removes ambiguity about what it means to achieve the NZE goal.

What are the anticipated benefits of going net-zero energy for this project?

Affordable housing has a marketplace like any other housing. These residents have choices, and it matters if you are providing a better living environment for people through something like NZE. It's important to keep your building fully leased, and comfort is a big part of that.

Utility bill savings can also be an incentive for owners to pursue NZE. For this building, we chose central systems with a master meter and will pay all the utility costs. With the utility savings from NZE, under current affordable housing rules, if we beat typical assumed energy costs, we can capture the savings as net operating income. It provides us with stability and security as the operator of the building and may generate additional cash flow. Having to foot the bill for all the building's energy use incentivizes us to share home energy-saving tips with tenants. River Terrace will be workforce housing that provides DC residents with a stepping stone toward being homeowners in the neighborhood. This means our residents will carry anything they learn about energy efficiency into their future homeownership experience.

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—PROJECT TEAM—

Neighborhood Development Company—Developer

Grimm + Parker—Architect

Communities Together, Inc.
Resident Supportive Services Provider

Hamel Builders
General Contractor

Residential One—Property Management Company

Neighborhood Development Company
Construction Manager

Solar Energy Services Inc.
Solar Provider

AMT, LLC—Engineering

Engenium Group, LLC
Engineering

GreenShape, LLC
Sustainability Consultant