

North Miller Multifamily Property

As part of the State's effort to achieve a carbon-neutral economy, NYSERDA initiated the Buildings of Excellence (BOE) Competition in early 2019. The competition recognizes and rewards the design, construction, and operation of very low- or zero-carbon emitting multifamily buildings.



Project Details

Location:

Newburgh, New York

Project Area:

3,972 sq. ft

Number of Buildings:

1

Number of Stories

Per Building:

3

Number of Units:

3

Project Cost:

\$325,000

Cost per Gross Square Foot:

\$81.82

Market Sector:

Low-Rise Multifamily Residential

Construction Type:

Gut Rehabilitation

Construction Start Date:

2017

Completion Date:

April 2020

REDC Region:

Mid-Hudson

Developer:

Steven Taya
Property Development

Design Team Lead:

Northeast Projects LLC

Architect of Record:

The Figure Ground Studio

Technologies Used:

Electrified building with air source heat pumps for HVAC and domestic hot water, energy recovery ventilator, smart building controls, and exceptionally low-cost gut rehabilitation

Low- to moderate-income net zero housing brought to life in Newburgh, New York

Going Carbon Neutral in New York

Currently, the building sector accounts for 59% of greenhouse gas emissions in New York State. Transitioning to a low-carbon building stock lowers energy and fuel use while reducing overall consumer demand for fossil fuels—improving the quality of life for all New Yorkers.

Background

Robinson's main goal for the North Miller property, a BOE Competition winner, was to alleviate a critical pressure for low- to moderate-income residents—utility costs. In addition to the net zero energy design and low operating costs, North Miller's all-in rental model includes monthly utility costs to keep tenants' monthly expenses affordable. This business model reduces appliance plug load enabling building owners to benefit from reduced energy consumption. To reduce project expenses, Robinson explored retrofitting condemned buildings, which can be bought for under \$20,000—an attractive investment for developers looking to take on this type of project. Despite potential challenges, this approach provides learning opportunities and new creative ways to apply passive house design to future gut rehabilitation jobs.

Energy-Efficient Design

North Miller's design achieves net zero energy goals primarily by implementing energy-efficient technologies, materials, and techniques outlined in the PHIUS+ 2018 (Passive House Institute US) guidelines. PHIUS certification also encompasses the energy efficiency criteria required for Zero Energy Ready Homes, ENERGY STAR® Homes V3.1, EPA AirPlus, and EPA WaterSense certifications.

North Miller's passive designs use the building's orientation to capture solar energy by using high-efficiency windows to retain heat in the winter, reducing the heating load. During the summer, the exterior shading blocks the sun from causing heat gains, reducing the cooling load. For this project, the south-facing side was previously attached to the building next door. Although it has been torn down, the possibility of a new building constructed in that same location eliminated the opportunity for solar heating and cooling. Instead, they used key PHIUS design recommendations.

Predicted Site Energy Use Intensity (EUI): Unknown
Site Solar Renewable Production Intensity (RPI): 9.93 kBtu/SF/yr
Net Site Energy Use Intensity (EUI): Unknown
Energy Code Baseline: 2019 NYS Energy Conservation Construction Code (ECCC)

Performance Path: Passive House Institute US (PHIUS)
Certification: PHIUS+ 2018, PHIUS Source Zero, EPA Indoor AirPlus and WaterSense, DOE Net Zero Energy Ready Homes, ENERGY STAR® Homes V3.1

All Electric HVAC Systems

The building’s HVAC system was converted to all electric by installing high-efficiency heat pumps, eliminating the need and reducing the building’s overall carbon emissions—lowering North Miller’s energy use by almost 10,000 kWh annually. All three units are tied into a central energy recovery ventilation unit to minimize energy losses from the ventilation process, simplify maintenance, and reduce operating costs. The system reduces energy loads by recovering energy from incoming and outgoing airflow, providing fresh air to the occupants at the optimal temperature and humidity.

Superior Building Envelope

PHIUS air sealing guidelines are stringent. To ensure minimal energy losses due to air leakage, the building’s design is draft free and meets an airtightness of 0.06 cubic feet per minute (CFM50) per square foot, which can reduce heating demand by 75%. North Miller’s existing walls required unique insulation solutions, including INTELLO smart air-barrier for interior vapor control and processes like lime plastering brick. Exterior walls have insulation values ranging from R-28 to R-70, shown in Figure 1.

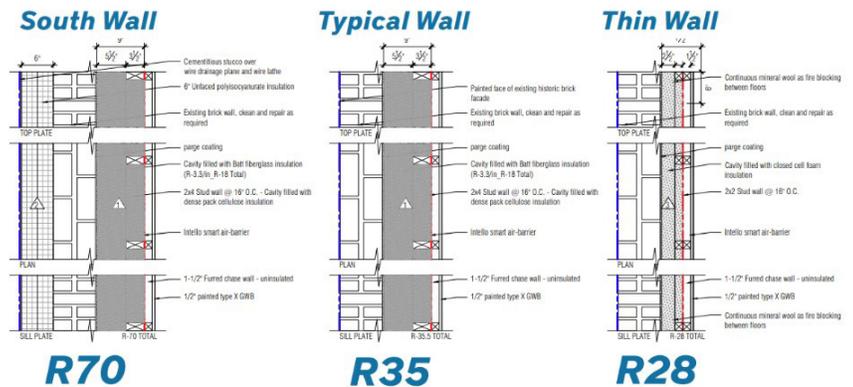


Figure 1

Renewable Energy Generation

North Miller uses both on-site and off-site renewable energy generation. The on-site system is a 9-kW solar photovoltaic array on the roof of the building and the off-site solar photovoltaic system offsets the balance of the electrical load. It has a net annual electric demand of 0 kWh and is anticipated to achieve the PHIUS Source Zero Badge.

High-Efficiency Lighting and Appliances

The LED lighting installed throughout uses a fraction of the energy of conventional fixtures and is designed to last five to 10 years. The high-efficiency windows optimize natural light during the day, further minimizing energy use. All appliances in the apartments including refrigerators, dishwashers, and stoves are ENERGY STAR® rated for maximum energy efficiency.

Energy Consumption Monitoring

Tenant energy consumption will ultimately dictate the building’s load. The SiteSage Energy Management System analyzes occupant energy needs and pinpoints any mechanical or electrical system problems or design flaws. Five wall sensors were installed to measure relative humidity and temperature in the building for maximum comfort.

Proving it's Possible

North Miller proves net zero and passive house design is possible for existing buildings and available to tenants of all financial means.

Ready to get started?

Visit nyscrda.ny.gov/lrnc or call **1-866-NYSERDA** to learn how you can reduce energy consumption and costs.