

Solara Apartment Complex



Project Details

Location:

Rotterdam, New York

Site Area:

20 Acres

Project Area:

340,000 sq. ft

Number of Buildings:

11

**Number of Stories
Per Building:**

3

Number of Units:

248

Project Cost:

\$8,950,000

Cost per Gross Square Foot:

\$96.77

Market Sector:

Low-Rise Multifamily Residential

Construction Type:

New Construction

Construction Start Date:

2018

Estimated Completion Date:

2022

Developer:

Bruns Realty Group

Design Team Lead:

Black Mountain Architecture

Architect of Record:

Harris Sanders Architects

Technologies Used:

- Passive Solar Design
- Energy Efficient Appliances
- LED Fixtures
- 150 kW Solar PV system
- 1,200-Gallon Solar Water Heating System Per Building

One of the largest market-rate net zero apartment complexes in the U.S.

Carbon Neutrality in New York

New York State has the most aggressive climate change agenda in the nation to reduce emissions from major sources across several sectors. To assist with this goal, the New York State Energy Research and Development Authority (NYSERDA) initiated the Buildings of Excellence (BOE) Competition in early 2019. Currently, the building sector presents the biggest challenge, consuming nearly half of the energy in the United States. BOE is intended to accelerate the design, development, construction, and operation of low- or zero-carbon emitting buildings, bringing New York State to economy-wide carbon neutrality.

Background

In 2016, developer David Bruns of Bruns Realty Group had already started addressing these challenges. Bruns worked with Black Mountain Architecture and Ballston Mourningkill Associates to design and construct the State's first-ever net zero energy multifamily development, netZero Village, located in Rotterdam, NY. The design focus was to achieve net zero energy using cost-effective construction methods and materials.

Bruns, a BOE Competition winner, set out to replicate netZero Village's design at Solara, a larger-scale community, also located in Rotterdam. Once complete in 2022, Solara will be an 11-building, 248-unit multifamily housing community—one of the largest net zero energy complexes in the United States.

Bruns Realty Group is leading the way in showing that carbon neutrality in the State is possible with the use of simple, cost-effective design methods. With almost 50% of Americans renting, developments like Solara and netZero Village are crucial for New York residents to make a difference in the environment while better understanding and educating themselves about energy-efficient technologies and practices.

Energy-Efficient Design

Solara's design will achieve net zero energy goals primarily by harnessing solar energy in conjunction with the following energy-efficient technologies and techniques.



Predicted Site Energy Use Intensity (EUI): 16.9
Site Solar Renewable Production Intensity (RPI): 20.5
Net Site Energy Use Intensity (EUI): -3.6
Energy Code Baseline: ASHRAE 90.1 2013

Performance Path: Passive House Institute US (PHIUS)
Energy Modeling Software: REM/Rate v 15.8 and PHPP v9.8 IP
Certification: ENERGY STAR® for Homes

All Electric HVAC Systems

The superior insulation and air tightness significantly reduces the need for an exterior heating and cooling source. Each apartment will have efficient ductless, mini split air source heat pumps (ASHP) rated at a 26.1 Seasonal Energy Efficiency Ratio and 12.5 Heating Seasonal Performance Ratio. The heat pumps allow the buildings to be all electric, eliminating carbon emissions and the need for additional fuels.

Each building has an energy recovery ventilation unit to minimize energy losses from the ventilation process. The system reduces energy loads by recovering energy from incoming and outgoing airflow to provide fresh air at the optimal temperature and humidity.

Superior Building Envelope

To ensure minimal energy losses due to air leakage, the buildings are designed to be ultra-tight, draft free, and meet an airtightness of 0.3 Air Changes per Hour or less. Continuously insulating the building, including the foundation, creates a thermal barrier. The exterior walls use a ZIP System R-sheathing, which is an all-in-one, structural panel with built-in exterior insulation. The seams are sealed with advanced acrylic ZIP system tape and liquid flash, forming extremely energy-efficient exterior. During the air sealing process, buildings were pressure tested multiple times throughout construction to confirm maximum airtightness.

Passive Solar Design

The buildings use passive design to capture solar energy with no requirement for other devices to reduce the heating and cooling needs of the apartments. The south-facing, double-paned, single-hung windows are cost effective and efficient with a Solar Heat Gain Coefficient of 0.52. In the winter, they retain energy, and in the summer, the solar heat gain is minimized with unique fixed shades, shown in Figure 1.



Figure 1

High-Efficiency Lighting Fixtures and Appliances

ENERGY STAR® Home certifications require both common area and residential spaces to use ENERGY STAR listed light fixtures, which consume a fraction of the energy of conventional fixtures. The windows will provide optimal natural lighting during the day to further minimize energy use. In addition, an innovative heat pump condensing clothes dryer operates up to 40% more efficiently than a continental dryer. All appliances in the apartments, such as refrigerators, dishwashers, and stoves, will be high-efficiency or ENERGY STAR for maximum energy savings.

Renewable Energy Generation

Solara's on-site energy generation will use two different mechanical systems. The first is a 150-kW solar photovoltaic array on each building, which supports the entire electrical load. Once fully complete, Solara will have a solar generation capacity of more than 1.6 MW. The second method will utilize solar thermal panels mounted on the roof to heat the 1,200-gallon domestic water system in each building with ASHPs to provide back-up generation.

Energy Consumption Feedback

Solara will be using the all-in rent model, which includes utility expenses in the monthly rent payment. The carbon-neutral design and low-operating costs allowed Solara to use this model and offer affordable rates.

The all-in rental model is a critical element to the project's success because it contributes to how the net zero performance is executed. The business model physically reduces plug load appliances within the building and eliminates occupants' relationship with utility companies, while the building owner benefits from less energy consumed.

Tenant energy consumption will ultimately dictate whether the design will achieve net zero. To help residents become better informed, each apartment has a built-in tablet that reports their monthly energy use and how it compares to neighboring tenants. This feedback system also allows for overall analysis of the entire complex to better understand tenants' energy needs and pinpoint any mechanical or electrical system problems or design flaws.

Ready to get started?

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