

Solara Apartment Complex

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:

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 State

Currently, the building sector accounts for 59% of greenhouse gas emissions in New York. 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

David Bruns, of Bruns Realty Group, is working to address this challenge by designing and constructing net zero energy residential developments. Bruns, a BOE Competition winner, set out to replicate his first successful project—netZero Village, also located in Rotterdam, NY—at Solara, a larger-scale development. 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 nation.

In addition to the net zero design and low operating costs, Solara's all-in rental model includes monthly utility costs to keep tenants' monthly expenses affordable. This business model eliminates occupants' need to be directly connected to utility companies and helps reduce appliance plug load, enabling building owners to benefit from reduced energy consumption and costs.

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.

All-Electric HVAC Systems

Each apartment will have efficient ductless mini split air source heat pumps rated at a 26.1 Seasonal Energy Efficiency Ratio and 12.5 Heating Seasonal Performance Ratio. The all-electric heat pump system eliminates the need for additional fuels and significantly reduces emissions.

An energy recovery ventilation unit for each building will minimize energy losses, simplify maintenance, and reduce operating costs. This type of system reduces energy loads by recovering energy from incoming and outgoing airflow, providing optimal temperature and humidity.

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

Superior Building Envelope

To minimize energy loss, the superior building envelope is designed to be draft free and meet an airtightness of 0.3 air changes per hour or less. The buildings' continuous insulation will create a thermal barrier using an all-in-one ZIP System R-sheathing. The seams are sealed with advanced acrylic ZIP system tape and liquid flash, forming an extremely energy-efficient exterior. During the air-sealing process, buildings will be pressure tested multiple times throughout construction to confirm maximum airtightness.

Passive Solar Design

Passive design minimizes energy consumption by capturing solar energy, alleviating the need for additional heating and cooling sources. 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 heat, while in the summer, unique fixed shades reduce solar heat gain. See Figure 1.



Figure 1

High-Efficiency Lighting Fixtures and Appliances

ENERGY STAR® Home certification requires installation of high-efficiency lighting fixtures, which consume a fraction of the energy of conventional fixtures. All appliances, such as refrigerators, dishwashers, and stoves, will be ENERGY STAR-rated for maximum energy savings. In addition, innovative heat pump ventless clothes dryers will operate up to 40% more efficiently than conventional dryers.

Renewable Energy Generation

Solara's on-site energy generation will use two different mechanical systems. A 150-kW solar photovoltaic array installed on each building will support the entire electrical load—ultimately generating more than 1.6 MW overall. Secondly, rooftop solar thermal panels will heat each building's 1,200-gallon domestic water system, with air source heat pumps providing back-up generation.

Energy Consumption Monitoring

Tenant energy consumption ultimately dictates a building's load. To help residents become better informed, all apartments will have a built-in tablet that reports monthly energy use and compares the data with neighboring tenants. This monitoring system will also analyze the entire complex's energy needs and pinpoint any mechanical or electrical system problems or design flaws.

Proving it's Possible

Developments like Solara and netZero Village prove it's possible to achieve net zero multifamily housing design in a way that is replicable. With apartment construction throughout the nation at an all-time high, projects such as these serve as a significant example for reshaping the way developers design and construct future projects. Not only will this have a major impact on the fight for climate change but will also serve as a way to inform individuals how they can make a difference.

Ready to get started?

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