

Project Profile

A Zero Energy Building



Photo Courtesy of Omega Institute, Rhinebeck, New York

Overview

Site Details

- Location: Rhinebeck, NY
- Building type(s): Interpretive Center, Laboratory
- 6,200 ft²
- Completed May 2009

OMEGA CENTER FOR SUSTAINABLE LIVING

Founded in 1977, the Omega Institute is the nation's largest holistic learning center. Their mission: "To look everywhere for the most effective strategies and inspiring traditions that might help people bring more meaning and vitality into their lives." In 2006 they set out to develop a new and highly sustainable wastewater filtration facility for their 195-acre campus, which is located within one of the most important watersheds in the world, the 13,400 square-mile Hudson River basin.

Energy

Achieving net-zero energy required a design that eliminated waste and maximized the use of renewable energy resources. The building is purposely compact, organized to harvest daylight, solar energy, and cooling breezes to reduce energy needs. The insulated thermal mass of the building and the thermal mass of the water (55°F) passing through the treatment cycle are instrumental in reducing demands upon mechanical systems. During summer months the cool laboratory water has both a cooling and drying effect on the hot humid air entering the building. Efficient geothermal wells and heat pumps provide heat for all spaces. Cooling is only provided for the classroom.

Sunlight is the primary lighting source. The shape of the building is designed to harvest sunlight via windows, skylights, and shading devices to produce appropriate, comfortable lighting without adversely affecting air temperatures. Electric lighting systems are extremely efficient and controlled to be used only when conditions mandate supplemental light.

over

Photovoltaic panels generate more energy than the building utilizes annually, making the OCSL a net-zero energy building.



Omega Center for Sustainable Living
Photo credit: © Assassi

Photovoltaic panels generate more energy than the building utilizes annually, making the OCSL a net-zero energy building. The excess energy is sold to the local utility. During evenings and certain winter periods energy is provided by the electric utility.

Efficiency Strategies

Ground-coupled Systems. Use ground-source heat pumps as a source for heating and cooling.

Solar Cooling Loads. Orient the building properly. Use reflective shades or blinds.

Daylighting for Energy Efficiency. Orient the floor plan on an east-west axis for best use of daylighting. Use large exterior windows and high ceilings to increase daylighting. Use north/south roof monitors and/or clerestories for daylighting.

Non-Solar Cooling Loads. Provide high-low openings to remove unwanted heat by stack ventilation. Use operable windows.

Photovoltaics. Use a photovoltaic (PV) system to generate electricity on-site.

Heating Systems. Use direct-gain passive solar heating.

For an in-depth case study, visit:

buildings.newbuildings.org/overview.cfm?projectid=1691

New Buildings Institute

New Buildings Institute (NBI) is a nonprofit organization working collaboratively with commercial building professionals and the energy industry to improve the energy performance of commercial buildings.