

Project Profile

A Zero Energy-Capable Building



Credit: South Mountain Co., Inc.

Overview

Site Details

- Location: Gay Head, MA
- Building type(s): Commercial office, Interpretive Center, Assembly
- New construction
- 8,700 ft²
- Completed January 1994

WAMPANOAG TRIBAL HEADQUARTERS

The Wampanoag Tribal Multi-Purpose Building serves as an administrative, educational, and social center for the Wampanoag tribe, which has inhabited Martha's Vineyard for hundreds of years.

This building, the first built by the tribe in hundreds of years, establishes a precedent for what may become a Wampanoag design style. Rather than imitate their traditional curved building form, which is inappropriate for today's needs, the Tribe chose a design approach that embodies the traditional Native American belief system of interdependence and respect for nature.

Energy

The building is elongated on an east-west axis with one story above grade on the north and two stories above grade on the south. Sixty-five percent of the building's glass is located on the south facade to promote solar gain in the winter, while east- and west-facing glass was minimized to prevent overheating in the summer. The glass used for the south windows also admits more solar radiation than the low-e glazings used for the other three facades, which reduce summertime heat gain while providing good visible-light transmittance.

Interior lightshelves above the south-facing windows reflect sunlight deep into the first-floor work spaces, which have an open floor plan and high ceilings to make maximum use of the natural light. A controller system adjusts the electric lighting in response daylight levels, and occupancy sensors also help to reduce lighting-energy use.

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A ventilation system that provides heat recovery from exhaust air provides excellent indoor air quality with little energy cost. Special attention was paid to airtightness because it increases comfort, reduces heating loads, and helps keep potentially damaging moisture out of the building.

Along with air infiltration, the design and construction team paid careful attention to insulation levels. The R-22 walls are 2x6 construction with blown-in blanket fiberglass, which fills wall cavities more completely than traditional batts. The vaulted ceilings are insulated to an R-value of 40.

Only the copier room has mechanical cooling. Elsewhere, cooling is provided by operable windows, which allow users to take advantage of the ocean breezes.

Efficiency Strategies

Wall Insulation. Achieve a whole-wall R-value of 15 or greater.

Daylighting for Energy Efficiency. Use south-facing windows for daylighting. Orient the floor plan on an east-west axis for best use of daylighting. Locate frequently used areas on the south side of the building. Design an open floor plan to allow exterior daylighting to penetrate the interior. Use building elements to redirect daylight and control glare.

Interior Design for Light. Use light colors for surfaces and finishes.

Water Heaters. Use waste heat from mechanical systems to heat water.

High-performance Windows and Doors. Optimize energy performance of glazing systems.

Heating Systems. Preheat intake combustion air with exhaust products. Use modular boilers that can be staged to meet varying loads.

Air Infiltration. Perform blower door testing.

Ventilation Systems. Use heat-recovery ventilation.

Lighting Controls. Use modulating photoelectric daylight sensors.

Roof Insulation. Achieve a whole-roof R-value greater than R-35.

For an in-depth case study, visit:

buildings.newbuildings.org/overview.cfm?projectid=107

New Buildings Institute

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