

How RenewAire Energy Recovery Anchors Net-Zero Performance in Demanding Climate

AT A GLANCE

OVERVIEW:

- ♦ **Project:** Botanical Garden Education Center in Maine
- ♦ **Building size:** 8,200 sq. ft.
- ♦ **RenewAire ERVs installed:**
 - (1) HE1X unit
 - (3) EV450 units

RESULTS:

- ♦ LEED[®] NV v2009 Platinum, 2012
- ♦ Green Building Award, 2012
- ♦ Designed for and achieving net zero energy performance

OVERVIEW

The [Bosarge Family Education Center](#) at the [Coastal Maine Botanical Gardens](#) is an 8,200-square-foot landmark of sustainable industry. Featured in the Spring 2014 edition of [High Performing Buildings](#) magazine, the facility serves as an active teaching tool for sustainability. Since its July 2011 occupancy, the Center has maintained [LEED[®] Platinum Certification](#) and net-zero energy performance.

THE NET-ZERO CHALLENGE

Success required the building to achieve a net-zero energy balance. To reach this goal, the team applied fundamental industry best practices for sustainable design, as championed by the [U.S. Green Building Council \(USGBC\)](#) and the [Whole Building Design Guide \(WBDG\)](#):

- ♦ **Reduction-First Methodology:** Minimizing demand-side loads through high-performance envelopes and efficient mechanical equipment before implementing renewable energy.
- ♦ **Energy Balance Modeling:** Offsetting every unit of energy consumed on-site with a unit of locally generated renewable energy.
- ♦ **Carbon Footprint Mitigation:** Emphasizing high-efficiency systems that reduce or eliminate on-site fossil fuel combustion.

In Maine's demanding climate, designing a high-traffic public building to these standards is a significant engineering challenge. The facility required an HVAC strategy that could provide increased ventilation for up to 200 daily visitors without exhausting the energy budget needed to maintain its net-zero status.

THE RENEWAIRE SOLUTION

To meet these rigorous requirements, the project team of [Allied Engineering Inc. \(now part of Salas Engineering\)](#) and HP Cummings reached out to [RST Thermal](#). As a well-respected manufacturers' representative firm specializing in high-efficiency heating, cooling, and ventilation systems, RST Thermal identified [RenewAire energy recovery ventilators \(ERVs\)](#) as the critical mechanical link for the facility's ventilation strategy.

By utilizing energy recovery, the units provided the necessary increased ventilation for high occupant density while exceeding energy efficiency standards. This ensured the HVAC system remained within the building's tight energy "envelope," allowing the overall design to focus on achieving its ambitious net-zero goals.

Operational data from a full year (Nov 2012–Oct 2013) highlights the effectiveness of this solution:

- ♦ **Total Electricity Consumed:** Approximately 45,700 kWh.
- ♦ **Ventilation Efficiency:** RenewAire ERV units accounted for only 4% of the total energy use.
- ♦ **Net-Zero Surplus:** The solar electric system produced 55,900 kWh, creating a significant energy surplus.

This efficiency enabled the facility to surpass the net zero threshold and operate as a net exporter of clean energy back to the local utility grid.

EVOLVING STANDARDS: LOOKING AHEAD

While the Bosarge project remains a landmark in the "net zero" community, standards for sustainable building continue to advance. Today, the USGBC is expanding its focus toward Net Zero Carbon to account for a building's full lifecycle emissions. In contrast, the Department of Energy (DOE) is shifting toward a [more relaxed definition of net zero building](#) to encourage private-sector innovation. Regardless of these shifting benchmarks, the core requirement of net-zero building remains the same: highly efficient, adaptable technologies and expert technical partnerships are essential for reaching the next generation of sustainability standards.



RenewAire ERVs were key to Coastal Maine Botanical Gardens's net zero strategy.