



AIRCHANGE

Cape Cod School Reduces Costs and Increases Comfort by Updating ERV System

CASE STUDY

A Need for Replacement ERV Components

In early 2014, the school board and town government of Bourne, Massachusetts became concerned at the unusually high utility bills for Bournedale Elementary School, which opened in 2009. Jonathan Nelson, town facilities director for the past two years, investigated the school's heating, ventilation, and air-conditioning (HVAC) system, and quickly focused on two large rooftop units with inoperable energy recovery ventilation (ERV) wheels that required replacement.

The rooftop units were running at nearly peak capacity to compensate for the missing load reduction from the ERV components. In addition to poor efficiency, the two units were affecting comfort inside the school. The system was able to properly heat the school during the winter months, but unable to adequately cool the portions of the building that were utilized during the summer months.

Energy recovery wheels recycle energy from building exhaust to pre-treat fresh air prior to conditioning by an HVAC unit. When properly designed, a system featuring energy recovery allows engineers to specify smaller and more efficient heating and cooling units, with the balance of the required air load provided by the energy recovery device[s]. Due to the missing ERV load, the two rooftop units at Bournedale Elementary School were working harder and using more energy than what was intended in the system design.

A Tight Space

Nelson faced multiple challenges in replacing the inoperable energy recovery concern tight space occupied



by each of the failed energy recovery wheels, which were placed into the units before the initial system installation. The cabinet door was significantly smaller than the wheel itself, making the removal of the existing wheel and the installation of a replacement more difficult. The small door also blocked “slide out” access that enables a technician to remove the wheel from the cabinet to easily perform inspections, cleaning, or repairs.

The Airchange Advantage

Nelson came to this project with prior knowledge of the value of energy recovery wheels from his previous employment as a facilities manager in the healthcare industry. During his research of replacement solutions he was mindful of the need for his maintenance staff to easily access the wheel once it was installed.

“I came at this problem from an economic and maintenance perspective,” he says. “I wanted an affordable replacement option for this unique physical space and I wanted to be able to rely on the new wheel for years to come.”

He began his search for a more durable replacement for the two inoperable wheels by examining other rooftop units at Bournedale Elementary school that were functioning properly. The energy recovery wheels that were installed in those functioning units were manufactured by Airxchange Inc. in nearby Rockland, Massachusetts. Nelson contacted Airxchange to discuss their line of energy recovery cassettes—which include a wheel, frame, motor, bearing, belt, and a pulley system. He was given quick and personal guidance, including detailed specifications of the design load for each cassette, from service engineers experienced at assisting with the replacement of existing energy recovery wheels. Nelson was also presented with a custom solution for installing the replacement cassette inside each unit WITHOUT destructive altering of the cabinet walls or doors.

While the energy recovery cassettes could be assembled inside the cabinet of each rooftop unit, Nelson was concerned that a lack of “slide out” access would prevent his maintenance staff from performing routine inspection or service; he considered converting the rooftop units to a slide-out-cassette design. The service engineers convinced Nelson that altering the cabinet would be an unnecessary expense because Airxchange’s segmented design enables access to all serviceable components, even if the entire cassette can not be removed. With a focus on both short term installation costs and long term operating costs, Airxchange presented value propositions that surpassed the other competitive bids for the replacement project:

- Each cassette comes with a 5 year warranty and an expected lifespan of 20+ years, depending on application and conditions.

- Each cassette comes with personal onsite supervision of the installation. Airxchange interfaces with sheet metal contractors and facility maintenance personnel to ensure a proper fit within the unit.



Value of New Energy Recovery Wheels at Bournedale Elementary School

Location: Bournedale, MA
 Project Date: 2014
 Project Scope: 2 Unit School Retrofit

Value of Energy Recovery Wheels

Measurement	With Working ERV Wheels*	Without Working ERV Wheels*
Total Outdoor Air (CFM)	12,000	12,000
Mechanical Load - Cooling (tons)	10	36
Mechanical Load - Heating (BTU/Hour)	332,700	1,127,000
Annual Operating Cost	\$2,475*	\$8,840*

**Example calculation assumes a 10 month school year (closed in July and August), operating each weekday from 6am to 6pm. For more details, see the file Bournedale_Submittal.pdf that is attached to the digital version of this document. To study the impact of energy recovery wheels in any space, visit airxchange.com for a variety of simulation and design software tools.*

A Supervised Installation

The Airxchange service engineers arrived after the existing wheels and surrounding sheet metal structure were dismantled and removed from the rooftop units. They worked with the building maintenance staff and the sheet metal contractor to ensure that the replacement cassettes were properly placed and secured. The cassettes were assembled inside of each cabinet and tested for functionality. An Airxchange team member returned the next day to ensure that the newly fabricated sheet metal was properly directing the counterflowing airstreams through the cassette. The school maintenance staff was also given training on how to operate and maintain the cassettes. The ERV wheel replacement was a success thanks to careful planning by the Bournedale facilities staff, as well as Airxchange’s commitment to quality and personalized service.

About Airxchange

Airxchange has 35 years of extensive experience in the energy recovery industry. Our mission is to design and manufacture high quality products that perform reliably and effectively for the life of the HVAC system, reduce energy consumption, and improve indoor air quality. The addition of high-tech materials and innovative designs to a technology based on fundamental scientific principles has earned us the trust of our valued OEM customers. We will continue to innovate and support our customers to meet evolving market demands for energy recovery ventilation technology. Visit airxchange.com for more info.