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 wheels at an acceptable cost. A primary concern was the tight space occupied by the wheels, which were placed into each unit before the initial system installation. The cabinet door of each unit 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 Airxchange 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 wheels by examining other rooftop units at Bourndale Elementary School that were functioning properly. The energy recovery wheels that were installed in the functioning units were manufactured by Airxchange, Inc. in nearby Rockland, Massachusetts.

Nelson contacted Airxchange to discuss its 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 experienced service engineers who are skilled at replacing 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 on-site supervision of the installation. Airxchange interfaces with sheet metal contractors and facility maintenance personnel to ensure a proper fit within the unit.

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 Bourne facilities staff, as well as Airxchange’s commitment to quality and personalized service.

About Airxchange

Established in the early 1980’s, Airxchange has extensive experience in the design, manufacture, sale, and support of energy recovery ventilation components to manufacturers of HVAC equipment. The company played a pioneering role in the formation of industry standards and third party performance certification programs, which validate their transformative technology. Airxchange technology is now widely available through leading HVAC manufacturers.

For more information about Airxchange, please visit www.airxchange.com.