



FINDING THE RIGHT ANSWER AT HATFIELD ELEMENTARY: ENTHALPIC CORE DOAS UNITS

PROJECT GOALS

- ▶ Energy efficiency
- ▶ Reduced HVAC maintenance
- ▶ Reliability and longevity

THE CHALLENGE

Hatfield Elementary, in the North Penn School District of Pennsylvania, faced challenges that are not uncommon for many school districts. Built in 1965 to educate 500 diverse K-6 students, by 2014 the spaces were mismatched to current teaching strategies and the mechanical, electrical, plumbing (MEP) systems were becoming obsolete. Things were even worse with the 60s vintage HVAC system. Radiant ceiling panels were leaking and dripping water due to condensation.

The North Penn community supported a complete upgrade to the learning environment, closing the school for 16 months and totally renovating the octagonal building, which included adding a new entry/administration wing, and entirely replacing the HVAC system.

The district construction manager, Don Schild, called upon a trusted team to design and supply the new HVAC system, which included the A/E firm Bonnett Associates and Myco Mechanical.



Nine Valent units grace the unique geometric roof at Hatfield Elementary School

North Penn School District; Hatfield, PA

Engineer

Bonnett Associates Incorporated

Contractor

Myco Mechanical

Valent Representative

Chase & Associates



Walter Subers, Bonnett Associates (left); Don Schild, North Penn District Construction Manager (right)

In a district firmly committed to energy efficiency, the team quickly realized a key question for them was, “What type of HVAC system and, particularly, which energy recovery technology will best meet the needs of students and the district?” Walter J. Subers, PE, of Bonnett Associates stated, “We looked at energy recovery, economics, and maintenance.” He had designed and specified units with energy recovery wheels but was seeking a technology with lower maintenance for the school district, which maintains over 20 buildings.

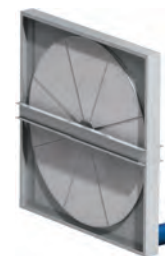
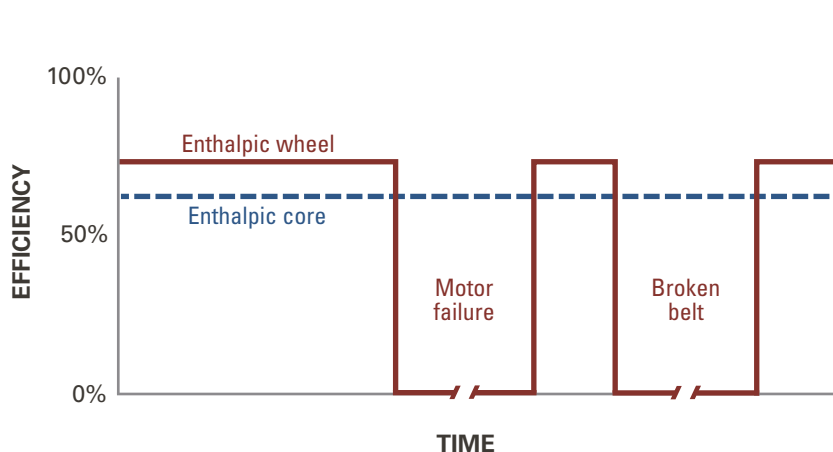
Subers was introduced to enthalpic core technology through a seminar sponsored by Chase & Associates, the Philadelphia area representative

for Valent high performance rooftop units, and dPoint, a manufacturer of energy recovery ventilator cores for the HVAC industry. The enthalpic energy recovery core transfers sensible and latent energy between exhaust air and fresh air, reducing the amount of energy needed for heating or cooling. Solveig Brandvold from dPoint said, “This design team was determined to select the right energy recovery solution.”

The district’s experience with energy recovery wheels, although highly efficient, was that they require an ongoing time commitment to cleaning, maintenance, and repair. As Schild succinctly says, “Maintenance is money.” So when Schild asked, “Is there something else out there that would reduce maintenance and still allow the district to do energy recovery,” Subers had the answer.

Figure 1:

EFFICIENCY COMPARISON OF ENERGY RECOVERY TECHNOLOGY



Enthalpic wheel.
More efficient than enthalpic core when operating properly; efficiency can drop to zero without maintenance



Enthalpic core.
No moving parts; minimal maintenance; no airstream cross-contamination

THE VALENT SOLUTION

The design team agreed on an HVAC system centered around Valent's model VPRC, which uses a dPoint enthalpic energy recovery core that has no moving parts and allows no airstream cross-contamination.

Subers sees Valent's VPRC core technology as being an optimal trade-off between maintenance and energy—slightly less efficient than a wheel but with much lower maintenance requirements. It was important to the team that the enthalpic core complied with ASHRAE's 90.1 energy standard, and with no moving parts, the enthalpic core's overall efficiency could be greater than an energy wheel (as shown in Figure 1).

The solution delivered to Hatfield Elementary includes six Valent units providing neutral ventilation air to rooms with fan coils. Additionally, three Valent rooftop units provide space comfort cooling directly to the administration area, gymnasium, cafeteria, and library.

All units can supply 100% outdoor air during occupied hours using a control sequence that modulates based on space CO₂ levels. The units are off during unoccupied hours to further save energy, and they connect to the District's central building automation system for remote monitoring and control.

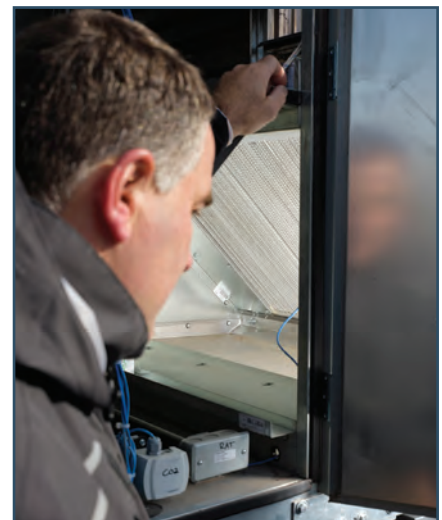
The team's search for the best HVAC solution also took them beyond energy recovery technologies and deeper into the unit construction details that enable serviceability and long useful life. Tim Moyer of Myco Mechanical, Project Manager for the Hatfield project, offered his perspective on the construction of the Valent units: "When I look at a piece of equipment I look beyond the shell. With Valent units I see quality equipment on the outside and inside."

Subers calls the Valent VPRC unit a "user-friendly machine." Schild said he appreciates that there are integral features like drain pans that allow him to better preserve the integrity of the space below. Rich Chase, of Chase & Associates, concurs that the Valent dedicated outdoor air system (DOAS) with enthalpic core is particularly well-suited for school applications. "Unlike some types of building portfolios," he said, "school districts keep their buildings a long time. So, looking at the total cost of ownership and factoring in both energy efficiency and maintenance can be extremely beneficial for long term occupants."



Don Schild is proud of the team's results, and says he considers Hatfield "the best project I've done."

"School districts keep their buildings a long time. Looking at total cost of ownership—especially energy efficiency and maintenance—can be extremely beneficial for long-term occupants."



Enthalpic cores require significantly less maintenance than wheels.

THE RESULTS

Hatfield Principal Deana Waters, principal since 2008, said the old HVAC system left many areas too hot or cold. She credits the new system with creating a more comfortable learning environment where it is “easier for kids to stay engaged.” She has also heard positive feedback from staff, and no longer sees the fans that were used to cool stuffy inner rooms.

The updated HVAC system also garnered recognition from third-party eco-friendly building award programs. It received an Energy Star rating of 96 (out of a scale of 100), and achieved Three Green Globes, a Green Building Initiative program that acknowledges leadership in applying energy, water, and environmental efficiency best practices.

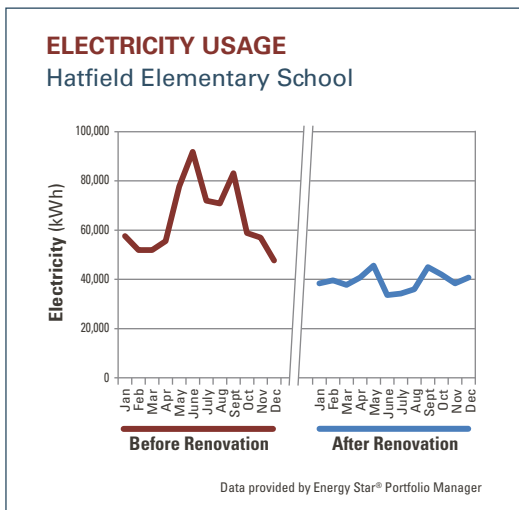
From a construction management standpoint, Schild is proud of the results and considers the Hatfield project “the best project I’ve done.” He credits Bonnett Associates, Myco Mechanical, Chase & Associates, and Valent with “making my job easier,” and says their good communication made for “a very pleasant project” despite the challenges of completing the entire renovation while the school was closed and under pressure to re-open in the fall.

Firmly committed to excellent education delivered in a comfortable and healthy environment, the North Penn School District will continue to seek the best HVAC solutions for students, staff, and taxpayers.

Energy efficiency increased dramatically after renovation at Hatfield Elementary School.



A Valent VPRC unit installed on the rooftop at Hatfield Elementary



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