



VOCATIONAL SCHOOL EXPANSION ACHIEVES LEED SILVER WITH SOPHISTICATED PROPANE HEATING

Bay Path's renovation added 45,000 square feet of state-of-the-art educational space, while a heating system upgrade provides energy savings and more targeted comfort.

A PROPANE CASE STUDY

Bay Path's \$73 million addition and modernization will save an estimated \$130,000 annually over a baseline model with the help of high-efficiency propane boilers and furnaces.

BACKGROUND

Opened in 1972 in rural Charlton, Massachusetts, 60 miles southwest of Boston, Bay Path Regional Vocational Technical High School offers 22 vocational programs for 1,120 central Massachusetts students. The school was originally designed to serve 200 students, and as enrollment has grown, the school recognized it needed to expand and modernize its facilities.

The school undertook a major \$73 million addition and modernization that would provide 45,000 square feet of new state-of-the-art educational space and upgrade the existing building's 205,000 square feet of aging infrastructure.

CHALLENGE

Bay Path sits atop Muggett Hill, one of the highest points in the area, where it's windy 300 days a year. The original system in the school provided uneven heat, and occupants reported frequent comfort issues with the school's supplemental electric heaters. "Nobody performs at their peak unless they're comfortable," says Anthony Fulginiti, the building superintendent.

With an inefficient building envelope, the electric heat was also expensive to operate. "Certainly in the Northeast, electric resistance heating is really the most expensive type of heating," says Greg Van Deusen, PE, senior vice president of BVH Integrated Services, the engineer of record for the project. "And we are quite a cold climate."

The renovation project made energy conservation a priority. In addition to achieving budget savings, the project had a goal of achieving LEED Silver certification, which would qualify the school for an additional reimbursement of 2 percent of the project's construction costs. "It was a huge financial incentive," says Dean Iacobucci, the school's business manager.

SOLUTION

To achieve the project's ambitious energy performance goals, the design team implemented a comprehensive package of energy efficiency improvements. Central to that effort was replacing the old electric heating with hydronic heating fed by two new 93 percent efficient, 1.2-million-Btu/hour propane boilers. The school's existing propane rooftop units were upgraded to higher-efficiency

ORGANIZATION

Bay Path Regional Vocational Technical High School
Charlton, Massachusetts

CHALLENGE & SOLUTION

In need of a modernization, Bay Path undertook a \$73 million addition and renovation. The building's old electric supplemental heat was expensive to operate and caused frequent comfort issues, so it was replaced with a modern VAV system and hydronic heat powered by two ultra-efficient propane condensing boilers.

RESULT

- **Propane enhances building comfort.** Together with new building controls and zoning, the propane-fueled VAV system provides localized reheat so that each classroom can be heated to the ideal temperature. The result? A major reduction in occupant complaints.
- **High-efficiency heating provides electric and propane savings.** Along with upgrades to the building envelope and lighting, the propane heating system upgrades contribute to a projected \$130,000 annual energy cost reduction over a baseline building. In the first year of operation, the school spent less on both electricity and propane — while adding 45,000 square feet of space.

CASE STUDY
BAY PATH REGIONAL VOCATIONAL
TECHNICAL HIGH SCHOOL
MASSACHUSETTS

systems, and the air handling equipment was replaced with modern variable air volume [VAV] systems.

Bay Path had a strong, 20-year relationship with its propane supplier, Osterman Propane, and had already switched its domestic water heating systems from electric to high-efficiency condensing propane boilers 10 years earlier.

The school's Hilltop Restaurant, managed and run by students in the culinary arts and baking program, also received a total redesign and renovation. The architects selected new equipment, including a propane combi-oven, ranges, and fryers, to offer a wide variety of teaching opportunities and the latest cooking technology. Several appliances earned the Energy Star label for commercial food service products.

RESULTS

Propane hits the comfort bullseye.

Together with new building controls and zoning, the upgraded HVAC system can provide much more targeted comfort. The original school's odd shape and hilltop location results in lots of sun on the south



The redesigned kitchen includes a propane combi-oven, ranges, and fryers to offer a wide variety of teaching opportunities.

side and lots of wind on the north side, creating temperature swings from room to room, says Greg Joynt, Assoc. AIA, project administrator from Kaestle Boos Associates, the project's architect. Unlike the old electric heat, the propane-fueled VAV system provides localized reheat so that each classroom can be conditioned to the ideal temperature.

"Now that we have high-efficiency heating, each room has a heater in that space," Fulginiti says. "The individual thermostat in that room allows us to maintain a comfort zone that's well within the acceptable range for our occupants. I have experienced considerably fewer complaints from the occupants of our classrooms."

High-efficiency heating provides electric and propane savings.

The renovation project achieved LEED Silver certification in part by reducing energy costs by 22.9 percent over an ASHRAE standard baseline building. BVH's energy analysis found that the propane heating upgrades would be responsible for more than half of the savings, which would amount to a projected \$130,000 annually.

Iacobucci was pleasantly surprised to find that in the system's first winter of operation, the heating upgrades and major efficiency improvements to the lighting and building envelope were enough to lower the school's electric and propane bills — despite adding new classroom space. "Even though we added 45,000 square feet, we do appear to be using less electricity," he says. "That's natural, because we're not heating



The original school's odd shape and hilltop location created temperature swings from room to room, making localized reheat a more comfortable option.

with electric. But we used 30,000 fewer gallons of propane while adding load."

Those energy savings are critical for a school district with a set annual budget. "The less money I have to spend on fixed costs, such as utilities, directly translates dollar for dollar into increased spending in the classroom."

Vocational training grooms the industry's future workforce.

At a time when many construction and facilities firms are desperate for talent, vocational schools like Bay Path meet a vital need for a highly trained workforce. Career paths offered at Bay Path include building and property maintenance, heating and air conditioning, and plumbing. Today, employers are seeking co-op students faster than the school can supply them, Iacobucci says.

Plumbing program lead instructor Bob Ceminski, who teaches propane systems in his curriculum, says students got a valuable firsthand look at the real-life work being performed in their building. "We got more out of it than just a new building."

FOR MORE INFORMATION

To learn more about propane-powered appliances and the Propane Education & Research Council, visit www.buildwithpropane.com.

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The Propane Education & Research Council was authorized by the U.S. Congress with the passage of Public Law 104-284, the Propane Education and Research Act (PERA), signed into law on October 11, 1996. The mission of the Propane Education & Research Council is to promote the safe, efficient use of odorized propane gas as a preferred energy source.