



Bowling Green State University
Bowling Green, Ohio



Commercial Case Study

ClimateMaster Water-Source Heat Pumps' Ease of Installation Helps BGSU Dorm Project Stay on Time and on Target

Officially opened in time to welcome students for the 2011 fall semester, Bowling Green State University's (BGSU) newest residential communities, Centennial Hall and Falcon Heights, provide much more than housing for an additional 1,318 students.

The \$81 million dollar campus residence project was completed over the course of just a single school year. The new project provides modern, comfortable and amenity-rich living for BGSU students while incorporating the latest in energy-saving building materials and technologies.

Construction began in June 2010 on both the 667-bed Centennial Hall and 651-bed Falcon Heights dorms, which were designed by architects from the Design Group and the Design Collective. Birmingham, Ala.-based Capstone Development Corp. managed the development of both buildings. Capstone also manages the dorms' operations and markets them to students and off-semester conference business prospects.

"We were selected in a national competition held by the university to both develop and manage the properties, with our record of keeping the construction portion of a project like this on schedule as one of the key deciding factors," said Bruce McKee, executive vice president of Capstone Development.

With a goal of staying on track with the construction timeline, Capstone Development enlisted the services of MEP firm Heapy Engineering to design and oversee installation of both buildings' mechanical systems. "One of the first things that we did out of the gate was establish a life-cycle cost for different types of mechanical systems," said David Madden, project manager at Heapy Engineering.



Madden and his team examined overall energy performance and ease of installation across several HVAC system options, with a keen focus. They devoted a lot of effort to what could be procured, installed and running prior to students returning for the following year's fall semester. "The deadline could not be missed," said Madden.

Heapy sought further expertise from the project's appointed mechanical contracting firm, Toledo-based Dimech Services, Inc. According to the firm's partner Robert "Turk" Sheahan, "We looked at what we could do to give them plumbing and heating amenities in each room. And, given the layout of the room, what would be the cheapest pricewise, yet the highest in serviceability for them."

Upon thorough evaluation, the mechanical engineering and contracting team decided on a water-source heat pump system from ClimateMaster. "We looked at a number of brands and it came down to the ClimateMaster, which had the best bang for the buck," said Sheahan.

The ClimateMaster water-source heat pump-driven system would make use of a readily available supply of steam on the BGSU campus.

"The system uses steam to heat the water that is running through the ClimateMaster units, and there's a closed-cell cooling tower on the roof that maintains the water at a certain temperature," explained Sheahan. "This allows the ClimateMaster units to do whatever it is they need to do, depending on the heating or cooling demand of the building occupants."



Tranquility Vertical Stack (TRM) units installed in Centennial Hall were finished with attractive return air panels

Working as a mechanical contract for nearly three decades, Sheahan states this project by far incorporated the largest volume of water-to-water heat pumps he'd ever installed. Despite the large scope of the project at-large, the experience was seamless and smooth, particularly due to the ease of mobility, installation and startup of the ClimateMaster equipment.

A total of 215 ClimateMaster heat pump units were specified for the Falcon Heights residence building. This includes 13 3.5-ton Tranquility® 20 Single-Stage (TS) Series vertical units, 44 0.5- to 5-ton Tranquility 16 Compact (TC) Series horizontal units and 158 1- to 2-ton Tranquility Vertical Stack (TRM) Series units.

The units also feature a "dummy-proof" temperature control system that allow students to move the thermostat within a pre-programmed set point. All units were installed upright in locations where four individual rooms shared a common area.

In Centennial Hall, the contractors installed 381 ClimateMaster heat pump units, including 21 1.5- and 3-ton Tranquility Vertical Stack (TRM) Series units and 360 Tranquility 0.5- to 5-ton 16 Compact (TC) Series horizontal units.

The latter were particularly advantageous when managing the tighter space limitations of the building itself. "We had specific space constraints in the smaller building, so we were able to find a horizontal heat pump unit that could be installed above the closets in the



One of the Tranquility® 16 Compact Series horizontal units installed in Centennial Hall

individual dorm rooms," said Madden. "The heat pumps provided a solution that was unitized."

According to Madden, one of the big selling points for both buildings was that they would provide simultaneous heating and cooling capabilities.

"You have a lot of days in Ohio where, say, the southwest portion of the building could become hotter on a 70 degree day, but maybe the northeast portion of the building is much cooler," Madden said. "The people on the southwest may want cooling and the northeast might want no cooling or might want to bump their heat."

Madden said that the project team was able to achieve this in the most energy-efficient way possible, particularly to meet the developer's desire for a system that could perform to efficiency targets of 20 percent better than code. According to Madden, the mechanical systems installed in both buildings are nearly 30 percent more energy efficient than code.

"You don't get to have a relatively energy efficient project without buy-in from all the stakeholders," Madden said. "The building envelope was probably 10 to 20 percent better than code; the windows were better than code. The developer didn't even think of skimping. It was about finding the right balance for the space."

When construction was complete in time for the fall 2011 semester, Bowling Green State University had successfully expanded the amount of comfortable housing available to students, while achieving aggressive goals for the energy efficient operation of the buildings over the long-term.

The complete team agreed that ClimateMaster's support and delivery of reliable heat pump equipment undoubtedly contributed to the project's success. As David Madden stated, the ClimateMaster heat pump solutions were "the right-sized units for the right-sized space," and helped the team complete the project on time and on-target.

In addition, Brian Robinson of Toledo, Ohio-based ClimateMaster manufacturers' representative firm Sandy's & Associates shared that "completing two dormitories simultaneously was definitely a challenge, and to do so in only 14 months was virtually unheard of.

Critical to the success of this project was ClimateMaster's ability to begin shipping equipment in less than 8 weeks' time, and provide all units for the entire project within three months of officially placing

the order."

"As a result of the stellar team effort among BGSU,



One of the Tranquility 20 Single-Stage (TS) units installed in Falcon Heights

Heapy Engineering, Dimech Services, Capstone Development Corp. and our internal staff, we were able to successfully deliver flexibility, energy savings and comfort to the residential communities," said Raj Hiremath, director of marketing at ClimateMaster. "We are fortunate to have strong partners who help us find the most appropriate solutions to deliver the lowest operating costs without compromising on initial cost. Based on our strength in providing comfort solutions to residential high rise communities, we expect the BGSU project to help further the growth of water-source heat pumps in such applications."



Bowling Green State University

Architect:

DesignGroup and Design Collective Inc.

Building Development/Management:

Capstone Development Corp.

Mechanical Engineer:

Heapy Engineering

Mechanical Contractor:

Dimech Services Inc.

Manufacturer's Representative:

Sandy's & Associates

ClimateMaster Equipment:

Falcon Heights - 13 3.5-ton Tranquility® 20 Single-Stage (TS) Series vertical units, 44 0.5- to 5-ton Tranquility® 16 Compact (TC) Series horizontal units and 158 1- to 2-ton Tranquility® Vertical Stack (TRM) Series units

Centennial Hall - 21 1.5- and 3-ton Tranquility Vertical Stack (TRM) Series units and 360 Tranquility 0.5- to 5-ton 16 Compact (TC) Series horizontal units

Project Website:

<http://www.bgsu.edu/residence-life/housing-options.html>



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ClimateMaster has been designing and building equipment that enhances the environments we live and work in every day for more than 50 years. In addition to geothermal heat pumps, ClimateMaster offers the most extensive product line of water-source heat pumps for use in a wide variety of applications. ClimateMaster products are proudly built in the U.S.A.



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