Northwood University – Midland, MI

Background
Since its construction in the late 1960s, the athletic complex at Northwood University's Midland, Michigan, Campus has undergone numerous updates to accommodate the school's continued growth. The original 55,000-square-foot building utilized a 4000 MBH boiler for pool and space heating. The pool was eventually closed to make space for a weight room, leaving a boiler grossly oversized for the remaining heating load. The heating system's efficiency was further reduced by the non-modulating, short-cycling operation of the boiler and use of high temperature water throughout the year.

When planning began for the addition of a 50,000-square-foot turf building and 10,000-square-foot auditorium, it was determined that the aging boiler should be replaced with a more energy-efficient system to provide heat for the entire athletic complex. Consultants from Apollo Engineering recommended a retrofit using Viessmann equipment. Though intrigued by the idea of installing a state-of-the-art, high efficiency boiler system, the University had initial concerns regarding the return on investment. Using the Viessmann Commercial Project Evaluation Program to compare various boiler efficiencies, climate considerations, natural gas costs and other factors, The Dale Prentice Company provided boiler cost comparisons and projected savings for the proposed Viessmann system. University administrators were so impressed with the level of detail, in addition to the potential savings, quality and longevity of the Viessmann products, they requested special provisions from the Dean to fund the project.

The original boiler was replaced with a more efficient gas-fired hybrid heating system

The Viessmann Solution
To minimize initial investment costs, the University commissioned a hybrid system comprised of a Vitocrossal 300, CT3-57 condensing boiler and a Vitorond 200, VD2-560 sectional cast iron boiler.

Installation Details
The Vitocrossal 300 operates as the lead boiler to maximize energy savings in the shoulder seasons. During the winter heating season, the Vitorond 200 boiler is brought online to supplement the system with higher water temperatures. A low temperature package was added to the Vitorond 200 boiler to protect it from unexpectedly cooler return water temperatures or in the event that the Vitocrossal 300 boiler is temporarily out of service.


The Vitocrossal 300 serves as lead boiler during the spring and fall to maximize energy savings

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While the old boiler system was designed with a 20-degree Delta T, the new system has a 30-degree Delta T and slower flows. These parameters allow the use of smaller piping and pumps to minimize installation costs while increasing the condensing potential of the Vitocrossal boiler. To ensure adequate flow throughout the system, the engineers kept two of the original pumps and added two new pumps during the retrofit.

A Viessmann Vitoronic Gateway allows boiler plant integration with the facility's building management systems. Water temperatures can be monitored to determine a reset curve that provides optimal comfort while maximizing fuel efficiency.

The Results

The two new boilers combined are almost the same size as the single original boiler and can easily handle the heating load. At current natural gas costs, it is estimated that Northwood University will save over $50,000 in operational/gas consumption costs per year when compared to the previous heating system.

The Vitorond 200 supplements the system with higher temperature water in the winter

Project Details

Project Year	2011
Equipment	Vitocrossal 300, CT3-57 Vitorond 200, VD2-560 Vitotronic Gateway
Rated Output	2094 MBH / 614 kW (CT3) 1941 MBH / 569 kW (VD2)
Viessmann Representative	The Dale Prentice Company, Oak Park, MI
Project Engineer	Apollo Engineering Traverse City, MI
HVAC/Plumbing Design	Apollo Engineering, Traverse City, MI
Design/Build Contractor	Three Rivers Corporation Midland, MI
Boiler Installation	J.E. Johnson, Midland, MI

Northwood University will save an estimated $50,000 in operational/gas costs annually

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