

# SPOTLIGHT

WaterFurnace International, Inc.

Case Study 4

## Salem Community College enhances environment and education

### Key Features

#### Donaghay Building

**Square Footage:** 32,000

**Type of System:** Vertical Closed Loop

**Number of Units:** 16

**Total Capacity (HVAC Tons):** 80

#### Science and Technology Building

**Square Footage:** 31,000

**Type of System:** Vertical Closed Loop

**Number of Units:** 16

**Total Capacity (HVAC Tons):** 80



### An investment for the future

Salem Community College, a state-supported college in Carney's Point, New Jersey, anticipates savings to exceed \$60,000 in annual energy costs with the installation of two large geothermal (also known as GeoExchange) systems. In addition to the economic and environmental investment of these comfort systems, the installation provided hands-on training experience for students enrolled in the college's 2-year Heating, Ventilation and Air Conditioning (HVAC) Mechanics course of instruction.

The GeoExchange comfort systems were selected to replace aging heating and cooling equipment in two campus locations. Installation at the 32,000 square-foot Donaghay building was completed in November of 1993. This multipurpose structure includes the library, bookstore, student union and several classrooms. Installation at the 31,000 square-foot Science and Technology building was completed in January of 1994. The HVAC Mechanics students handled the installation of the GeoExchange units and interior plumbing. The wells and ground loop system were installed by Autocon.

### An investment in quality

Each building features 16 geothermal units totaling 80 tons of capacity. Ten of the units installed in the Donaghay building are WaterFurnace Premier two-speed units, while six were purchased from a two-speed model competitor. According to Salem Community College's Bursar/Purchasing Agent Keith Duke, the competition's units just didn't measure up to the quality and value of the WaterFurnace units. Consequently, the Science and Technology building was completely furnished with WaterFurnace two-speed units.

## All this, and hot water, too

The ground loop, composed of high density polyethylene piping, consists of 50 bore holes, each 200 feet deep in a field next to the buildings. This closed loop serves as a heat exchanger, absorbing heat from the Earth in the winter and transferring heat to the Earth in the warm summer months. Three of the WaterFurnace units in the Donaghay building not only supply heating and cooling, but are also equipped with desuperheating

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coils which capture waste heat from the unit's condenser and, in turn, use it for water heating. This additional feature provides over half the facility's hot water needs using this "free" source of heat.

Further benefits and features of the college's GeoExchange comfort system include uniform temperature levels, more precise comfort control and virtually soundless operation. "This past winter, our coldest in 10 years, faculty members came to my office to thank me for the new systems," acknowledges Duke.

## Funding

As a small college with less funding available than larger institutions, the

project's mechanical contractors, Autocon and Laury Heating, allowed Salem Community College to purchase their units directly. Project funding was provided by a \$202,000 grant awarded under the Federal Institutional Conservation Program through New Jersey's Department of Environmental Protection and Energy. A previously awarded state capital renewal grant provided an additional \$16,000 and \$68,000 was provided in a rebate package from the local utility, Atlantic Electric.

Atlantic Electric's Greg Peterson states that his utility supports installations like Salem's as a means to increase revenue while reducing peak demand.

## A promising future from positive results

Although all participants are pleased with the performance of the installations, Duke had a tough time getting the go-ahead. "It was a hard-sell at first because many people are unfamiliar with the technology," he recalls. Duke persevered and made his case through a successful pilot demonstration of a 2.5 ton WaterFurnace geothermal unit serving two classrooms.

The college enjoys the outcome of this project with the economic benefits of the current installations. Actual savings from these high efficiency systems are 365,000 kilowatt hours (kwh) per year for the Donaghay building and nearly 400,000 kwh per year for the Science and Technology building. This results in a \$30,000 annual savings in operating costs for each building

while reducing annual maintenance costs by \$8,000.

Community College President Dr. Linda Jolly is very excited that Salem's students and the surrounding community can feel good about the environmental and economic impact of the geothermal installations on campus. Such installations could become more commonplace throughout the institution. Ultimately, Duke sees a geothermal future for the campus.

The upgrade to GeoExchange could be on the horizon for many educational institutions. Keith Duke says that he receives five to six calls per week from other schools and municipal projects regarding Salem's geothermal installations. Harry Roth of the New Jersey Heat Pump Council notes that the geothermal experiences of colleges such as Salem have captured the attention of other local colleges, who now have projects in the planning stage. "They see this as a way of cutting their operating costs during tight times," states Roth.

## Incremental Capital Cost

Ground Coupling	\$144,000
Less Utility Rebate	-68,000
Investment Cost	\$ 76,000
Annual O&M Savings	\$ 68,000
Payback	13.5 months

