CLIMATEMASTER®

Metro Career Academy
Oklahoma City, OK

Commercial Case Study

ClimateMaster Helps Metro Tech Achieve Energy Savings Goals

Metro Technology Centers (Metro Tech), a five-campus career and technology education district serving the greater Oklahoma City area, supports a wide scope of curriculum opportunities for high school students, adults, and the business and industrial communities.

Design and construction of Metro Tech's latest building, a 54,000 square foot facility housing its Metro Career Academy (MCA) for at-risk high school students, incorporated a host of sustainable building and renewable energy aspects that resulted in its becoming Oklahoma's first LEED®-certified CareerTech building by the U.S. Green Building Council (USGBC). Features such as an Exterior Insulation and Finish System (EIFS), a green roof, low and non-VOC paints and coatings, maximized daylighting, a cistern-driven rainwater reclamation system, sustainable landscape design, and light pollution-reducing outdoor illumination underscore Metro Tech's commitment to sustainable building.

A primary feature in promoting energy cost savings, the building includes a state-of-the art high-efficiency HVAC system with an integrated 223-ton geothermal heat pump system from ClimateMaster. The system is comprised of 49 ClimateMaster units, including Tranquility® Rooftop (TRE) package units, TS Horizontal units, and TMW units, all of which include the new environmentally-friendly 410A refrigerant technology.

Dehart Air Conditioning & Mechanical, a long-time proponent of incorporating the latest in geothermal and other renewable energy technology, served as the project's mechanical contracting firm, while also overseeing all testing, balancing and controls integration. The company additionally served as the LEED® commissioning liaison for the project's mechanical aspects.

"Our business has been on the cutting edge of installing the latest HVAC systems, including geothermal, since it was founded by my grandfather in 1920," said Mark Dehart, general manager of operations at Dehart Air Conditioning. "We see a great deal of opportunity in furthering our geothermal business with companies like ClimateMaster, who are providing the kind of high-quality, reliable and affordable renewable energy solutions that contractors are seeking for their sustainable building projects."

The 49 ClimateMaster units include 40 smaller-tonnage rooftop systems to deliver heating and air conditioning to each individual classroom, and larger rooftop units to accommodate heating and cooling needs for the facility's common areas and kitchen. All ClimateMaster rooftop units also feature enthalpy-controlled economizers and exhaust fans. In addition, seven ClimateMaster Tranquility® 20 horizontal package units were used for the facility's data/communications and computer rooms. Installed above the ceiling of these rooms, the units provide individual climate control capabilities to accommodate the critical temperature needs of the sensitive equipment. In addition, two ClimateMaster Tranquility® TMW 360 and TMW 170 modular water-to-water series hot water generators complete the HVAC system configuration.

To link the ClimateMaster units to the building's state-of-the-art energy management controls system, Dehart Mechanical employed ClimateMaster's factory-installed DDC control. "These allow building operations management staff to monitor the functionality of each and every unit, including remotely from any computer or mobile device that has an internet connection," Dehart explained.

Dehart Mechanical also coordinated with B&H Mechanical on the design and installation of the ground loop well field, including all external well drilling and internal connections to the mechanical room. The 300

foot-deep, 121 vertical well bore system includes a 610-foot vertical loop and approximately 80,000 feet of 1-, 1¼-, 1½-, 2-, 3-, 4- and 6-inch high-density polyethylene (HDPE) pipe buried at a 48-inch depth. Overall, the well field was designed to accommodate the 175-ton capacity of the building's HVAC system, as well as 17 tons of hot water heating.

To house the majority of the connecting pipes and allow for easy access to circuit flow control valves and system monitoring equipment, B&H Mechanical also developed an innovative poured-in-place, steel-lined concrete vault built to custom dimensions on site. "The vault was custom built in a 15-by-10-by-15 foot area, and constructed of approximately 15 yards of concrete and 1,500 feet of steel rebar," said Scott Munday, drilling operations at B&H Mechanical.

The interior HVAC system is tied to the vault via two 6-in. polybutylene supply and return pipes, which feed into the heating and air conditioning units via a variable frequency drive (VFD) pump. The pump automatically recognizes the required number of supply gallons required for the current HVAC operating tonnage, and can adjust the water supply as the units come on and offline. "The VFD enables the pump to change speeds and adjust water flow to the individual units as demand increases or decreases," Munday explained. "This results in significant cost savings by

reducing the amount of water being pumped to only that which is needed, and thus also reducing energy costs associated with heating and cooling the building."

Construction of the Metro Career Academy was officially completed in the spring of 2011, and all systems are now in full operation. According to Melanie Stinnett, Metro Tech Chief Officer, Environmental Safety and Regulatory Affairs, ClimateMaster's system is expected to make the new building a "star performer" among all the existing Metro Tech educational buildings in respect to energy savings.

TMW unit in the mechanical room off of the cafeteria provides heating and cooling, plus hot water.

"So much of this building's energy efficiency goal depends on the geothermal energy source itself, and we anticipate being pleasantly surprised when we review the heating and cooling costs following our baseline year," Stinnett said.

Stinnett also shares her excitement to authentically expose students at Metro Career Academy to the latest in sustainable and energy-efficient building design. "We have sections of the walls that are plexi-glass, allowing students and visitors to witness the 'behind-the-scenes' interworkings of our green building. It's a great way to show our students that sustainable building concepts

A kiosk in the lobby demonstrates to students the different aspects of Green Buildings.

can be real, everyday practices, and to even encourage them to consider the potential career opportunities of this discipline."

According to Dehart, ClimateMaster's support throughout the project, coupled with the quality of the company's products, resulted in a streamlined process from the specification phase through installation and unit start-up.

"ClimateMaster has designed units that are well laid out, contributing not only to the overall quality of the product, but also to the ease of the technician in working on it," said Dehart. "The controls are easy to get to, the geothermal connections can accommodate a wrench, the wires are color-coded, and these and other attributes made our first experience with this particular package unit a very positive one."

Metro Career Academy
Oklahoma City, OK

Contractor:
Dehart Mechanical Chickasha, OK

Driller:
B&H Construction Goldsby, OK

LEED® Gold Certified

Equipment:
40 Tranquility® (TRE) Roof Top Units
7 Tranquility® 20 (TS) Horizontal Units
2 Tranquility® Medium Water to Water (TMW) Units

ClimateMaster is the world's largest and most progressive manufacturer of geothermal heat pumps. The company is committed to innovation and dedicated to environmentally clean, economically sound and superbly comfortable home and business environments.

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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