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Another Campus Solution: Washtenaw Community College

GEM Energy has completed Washtenaw Community College's (WCC) first combined cooling, heat, and power (CCHP) system, which is in place at the college's United Association (UA) Great Lakes Regional Training Center. GEM also donated another microturbine to train future energy professionals in the training center.

The CCHP system will generate 130 kW of electricity, 800,000 BTU per hour of hot water, and 50 tons of chilled water for the training center. As a result, the college and training center will avoid nearly $60,000 a year in utility costs.

The natural gas-powered system, designed and built by GEM Energy, includes two Capstone C65 microturbines, an absorption chiller, and a new cooling tower. A FlexSet Distributed Generation monitoring system displays real-time operating results. The turbines generate electricity and hot water onsite for use in campus buildings. The excess heat is then captured and used to help with air conditioning of the buildings. "The main component in the CCHP system is the Capstone natural gas turbines," says Greg Steenrod, vice president, GEM Energy. "The turbines operate year around and generate electricity for the campus."

For a CCHP system to operate, the hot exhaust must be utilized. To capitalize on this in both the heating and cooling seasons, an integrated heat exchanger and a hot water absorption chiller are used. "During the heating season, the integrated heat exchanger, through the circulation of water, captures exhaust heat and circulates hot water through the facility. In the cooling season, this same hot water is directed to an absorption chiller and cooling tower to create and provide chilled water to the facility," says Steenrod.

The CCHP system operates in addition to the existing heating and cooling system at the college. "The system was engineered to fulfill the base load requirements of the building," says Steenrod. "When operating this way, the system is optimized for both energy use and dollar savings."

GEM

L-R: Shane Spring, GEM Energy project engineer; Glenn Powers, GEM Energy design engineer; and Jeremy Damstra, GEM Energy energy solutions engineer, with the CHP system

Were there any challenges along the way? "A primary intention of this system is to demonstrate the system operation and maintenance to students," he says. "The location needed to support the weight of the cooling tower and platform, and also allow students to gather, two requirements which made complex engineering necessary."

A location was selected that offered students safe access via an existing staircase. Then, with assistance from structural engineers, a platform was built to withstand the weight of 20 students. The total cost of the project was around $860,000. The UA paid for 75%. With WCC's 25% investment ($215,000), the college should be able to achieve an ROI after 4 years, and the system is expected to last for between 15 and 20 years.