Engine-Driven Chiller Keeps Campus Cool

The sixth-largest multi-campus community college in the nation, Pima Community College educates more than 84,000 credit and noncredit students each year. Each campus features modern buildings with air-conditioning – which is extremely important in an area where summer temperatures routinely breach the 100° mark.

The College's popular West Campus is the largest: a 500,000 square foot facility serving some 12,500 students. The campus keeps its cool with a 1000-ton Trane CenTraVac Model CVHF two-stage centrifugal chiller powered by a Waukesha Enginator® engine/generator unit to meet part of its needs. It's interesting to note that the other half of the cooling load is handled by an electric motor-driven chiller and that operators have the ability to select which unit to use. The combination of electric-powered and engine-powered chillers was chosen for two reasons, according to William Ward, superintendent of operations for Pima Community College.

One was that it allows the College to do some peak shaving when electricity demand charges are the highest. The other is that the college's grid system could not have handled the increased load if an all-electric system was selected. For this reason, the College has not done a comparison on which system operates cheaper. Rather, it's all factored into a system that offers greater flexibility.

"Over the years, our hours of operation have grown from original weekday-only estimates, due to the College's seven-day a week schedule and more evening classes," Ward states. "I like the option of running a chiller using natural gas or electricity depending on prices and rates. Plus, two electric chillers would have overburdened the grid.

"At the present time, the engine-powered chiller runs during the day when the plant is staffed with an operator and demand charges are highest. Then we run the electric motor powered unit overnight during off peak and when operators are only on call. Having the engine-driven unit now gives us some experience working with this type of system, should we decide to install more of this type in the future."

The Waukesha Enginator system that powers the Trane chiller uses a 12-cylinder, Waukesha VGF L36GLD engine matched to a Kato generator. The 800 hp natural gas fueled, turbocharged and inter-cooled engine is rated at at 560 kW at 1800 rpm. The Kato generator delivers power at 480 volts. The engine/generator combination has a much smaller "footprint" than the absorption chillers which it replaced, an important factor in retrofit applications.

Above: This Waukesha VGF L36GLD powers a Trane chiller to help keep classrooms comfortable at the West Campus of Pima County Community College in Tucson.

The Waukesha VGF GLD engines use lean-burn technology and do not require catalytic converters. Because they produce low emissions, there were no permitting issues with the local air resources board. The engine runs quiet enough so that noise is not an issue. The local Distributor, Stewart & Stevenson, handles engine maintenance.

"The best feature, in my opinion, about the engine-powered chiller is that it can operate like a variable frequency drive (VFD)," Ward explains. "This allows us to operate the chiller at a very low load by slowing the engine RPMs, which saves on fuel costs and wear."

The Tucson-area climate often presents another hazard to operating equipment. "We get a lot of lightning strikes in this part of the desert and they can have a tremendous impact on the availability and quality of electrical power coming off the utility grid," Coffey says. "With the engine-driven chiller this is not a concern and is one less thing I have to worry about. While an outage shuts down the electric-motor driven chiller, the Waukesha Engine unit keeps on running." ■