

**Mechanical Contractors
Are Now Wearing**

Green

“Consultant” Hats



Quests for energy efficiency are driving changes in the mechanical contractor's role in the design process.

"With skyrocketing costs for energy, upgrading facilities is a key way school districts and other institutions can save money over the long haul. Today, more than ever, it is critical to be as energy efficient as possible," said Bob Bennett, partner in St. Louis-based Control Technology and Solutions (CTS).

And L.E.E.D. "is really getting people to focus on entire package," said Mark Bengard, senior vice president, Murphy Co. L.E.E.D., standing for Leadership in Energy and Environmental Design, is the building rating system of the U.S. Green Building Council. According to Russ Brown, national sales manager, Munters Moisture Control Services, the L.E.E.D. certification process, by reviewing every facet of a building's design, promotes an integrated process that involves all disciplines in the project from the very beginning of the design process. "It is projected that by 2010 there will be nearly 10,000 L.E.E.D. projects underway across the country," Brown said. That means there is a lot of demand from architects and general contractors for "construction partners who can help them achieve certification," he said.

Bengard said that is one reason that Murphy Co. is getting called to get involved early in the design process as a design/build contractor. That early involvement does not mean they are telling everyone to invest in more expensive heating, ventilation, or air conditioning (HVAC) systems; just the opposite, he said. "We're finding in many instances it is better not to put as much money into the HVAC as they had expected. We're showing owners in many instances that they can put in better glazing or a better roof and put in a lesser HVAC system and still get the L.E.E.D. points and efficiency under the ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) code," Bengard said.

In many retrofit projects, he said, where the owner is looking at replacing older rooftop equipment, it appears that new codes demand larger equipment, which would often require expensive structural or electrical upgrades. "We often find that if we upgrade the lighting fixtures to produce less heat, we can maintain the same tonnage for the HVAC. The owner will see a payback on the more efficient smaller HVAC system that they never would see with a larger system that required electrical or structural upgrades," he said. >

Better Glazing and a Smaller Chiller

Logan College of Chiropractic, for example, was looking to upgrade the air conditioning in its administration building by adding an additional chiller to handle the extra load that had come from converting a one-time dormitory into administrative offices. "As we got to looking at it, we found that the biggest heat loss and gain was through the glass," Bengard said. "We found that if we put new glass in, we did not have to add more chilled water capacity. So, we replaced the glass and connected the building to an existing chiller plant. What had begun as a mechanical project turned into architectural and mechanical project with Murphy as the construction manager and the glazing firm working for us. We are comfortable in that role of CM as long as the general construction side does not get very complicated," he said.

Murphy Co. has both a design/build group and an energy services group. "We look at saving money for clients holistically. We don't try to make jobs total mechanical jobs," Bengard said.

CTS takes a whole building approach to cutting energy consumption as well. CTS' comprehensive energy-saving renovations, in addition to HVAC systems, include energy efficient lighting, increased insulation R-values, new exterior doors, replacement windows, plumbing upgrades and associated repairs. The



company also installs web-based control systems to allow facilities staff to monitor and control HVAC systems via the Internet for greater operating efficiencies and responsiveness.

"We've focused from a vertical market point of view on saving energy," Bennett said. "We approach each facility with a clean canvas. We start by helping them assess the facility to determine how inefficient it is and what is the condition of equipment within the building. We look at mechanical equipment, how old it is, how it has been maintained, how efficient it is. We look at the electrical distribution, lighting systems, control systems, the building envelope, insulation, and the condition of windows and the roof. Then we prioritize improvements, which tend to center on HVAC, lighting, and windows... The savings we generate will offset the cost of improvements," he said.

Geothermal Stepping Up

At Lake Land College in Mattoon, IL, CTS is developing a comprehensive master plan to create Illinois' first sustainable community college campus over a five-year span. Among the solutions being used are geothermal heat pumps, solar hot water heating, and renewable wind-generated power.

"The campus is 40 years old with a centralized heating and cooling plant and an underground distribution loop. They were at the point where the distribution loop was failing and the terminal units were failing," Bennett said. "One approach would be to replace the existing system with a similar system. They took the opportunity to have us design a system that was much more efficient and would give them long-term benefits.

"We came in with ground source heat pumps on a single loop, one pipe system that goes around the campus instead of a dual supply and return pipe. Right now there is one well field that will accommodate up to 100 wells. As the system is built out over the next four years, there eventually will be multiple well fields. Each well is four-to-six inches wide and goes down 150 feet. The pipe goes down and then comes back out one well hole and then down and back out the next, using the Earth as a heat sink since it remains at a constant temperature. It is a very efficient system that eliminates the maintenance cost on boilers and chillers," he said.

The wind turbines are the only feature not driven by a payback in reduced energy costs. "They wanted the technology on campus as a platform to provide education in turbine maintenance to students," Bennett said. "Wind farms are huge and growing and the college is saying, 'at some point, someone will have to maintain them and we want to provide the skills to do that,'" he said.

The passive solar system on the field house at Lake Land College preheats water for showers. "Even on a cloudy day they're getting 80 degree water from the solar panels," Bennett said. "And there is not much to maintain. This unit has a little heat exchanger in the mechanical room. It pumps water through a solar panel to a traditional hot water heater."

Bennett called geothermal heat pumps "a great application for community colleges and school districts." A geothermal heat pump that CTS installed at a middle school in Warrenton, MO cut that school's heating and cooling costs by \$75,000 in its first year, he said. "And the beauty of the system is that each classroom can pick what they need when they need it, instead of a district administrator deciding when to flip heating on or off. One classroom

can pick what they need when they need it, instead of a district administrator deciding when to flip heating on or off. One classroom can pick cooling if they need it while another classroom picks heat," he said.

Geothermal systems are more expensive to install than traditional HVAC systems, Bennett said, "but the one pipe design costs about 30 percent less to install than a traditional two pipe design, so that brings installation costs closer to those of a traditional HVAC system."

In addition to a growing interest in geothermal and solar power, Bennett said the other trend he is seeing is that facilities want the capability to monitor their power use in real time. "We're doing a large project with the Office of Administration in Missouri," he said. CTS is installing meters to monitor electricity, gas, and water usage in real time in seven veterans homes. "That allows the Office of Administration to compare how each of the facilities is running," he said. "We

have embraced open source technology so that you can interoperate with multiple manufacturers components, instead of sole sourcing to Johnson Controls or Trane," he added.

This summer, 11 Missouri and Illinois school districts and two Illinois colleges engaged CTS to design and construct energy saving upgrades to their physical plants. Spoon River College tapped CTS for facility upgrades at its campuses and centers in Canton, Macomb, Rushville, and Havana, IL.