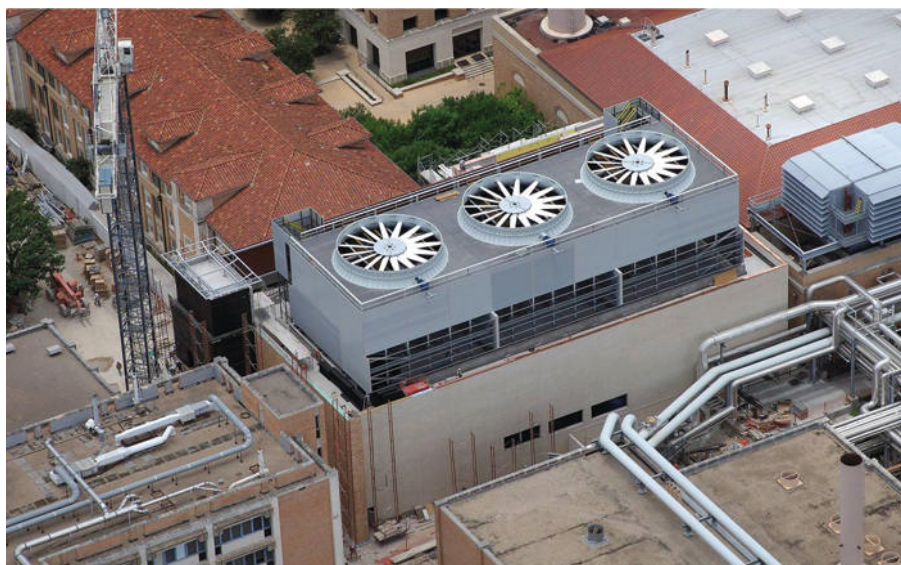


# Cool Costs and Hot Savings

With a dismal economy showing few signs of a major turnaround, innovations in HVAC systems are providing budget-minded building owners with exactly what they need.

BY DAN RAFTER



University of Texas at Austin

There are days during the Texas summer, those days when it's so hot and humid, that, says the University of Texas at Austin's Kevin Kuretich, "you just wish someone would shoot you."

On these days, it's nearly impossible to cut back on the amount of energy that the university spends on heating its campus buildings. That's because all of the chilling stations are running full bore, says Kuretich, associate director of utilities with the university.

There are other days, though, most of them coming long after Texas' famed summer heat dissipates, on which the university's chilling stations can run more efficiently, days on which the university can generate big savings in the

amount of money it spends to cool its buildings.

"There are savings to be had here," says Kuretich. "We spend an incredible amount of money to cool the campus' buildings."

The university took a step toward realizing some of these savings in October of 2009. That's when Optimum Energy, a Seattle-based provider of heating, ventilating and air-conditioning software products, completed its installation of new software designed to run the Texas school's Chilling Station 6 far more efficiently.

After just the first 30 days of relying on this new software, the university was on pace to save 6 million kWh during the year. That would equal a dollar savings of about \$500,000.

The good news is that the University of Texas at Austin story is just one of many taking place across the country. Universities, government buildings, and hospitals are all slashing their heating and air-conditioning costs through new software and HVAC equipment.

These savings are more important than ever. With a dismal economy showing few signs of a major turnaround, building owners are searching for cost savings wherever they can find them. As officials at the University of Texas at Austin can confirm, one of the best places to hunt for these savings is in their buildings' HVAC systems.

With a just a few tweaks, building owners can save hundreds of thousands of dollars from their bottom lines.

## Slashing Costs

Kuretich, from the University of Texas at Austin, says that by using the software from Optimum, OptimumHVAC, the university was able to run its Chilling Station 6 below 0.4 kW per ton during the winter months of November, December, and January. Before installing the software, the station ran at 0.7 kW per ton during the same months.

This reduction in kilowatts per ton saved the university about \$250,000 during those three months.

Saving money has always been important to the university. But today, when everyone's budgets are squeezed, it's an even more important task. Officials at the University of Texas wanted to make sure that they were spending

money on a software program that would help them shave dollars off the university's operating budget.

"We had predicted some savings from the software, but it saved more than we had predicted," says Kuretich. "That's really important, especially when you've sold the university on the project, when you've asked the university to give you funding for something. If you can beat what your predicted payback was, you might get even more money when you ask again."

Optimum Energy's OptimumHVAC software continuously adjusts the all-variable-speed chillers, pumps, and tower fans in the University of Texas at Austin's Chilling Station 6. This allows the station to cool the university's buildings while consuming the least amount of energy possible.

The software also provides Web-based monitoring services that allow the university's plant operators to track both historical and real-time HVAC system performance. This gives them an opportunity to verify that the energy savings from the system will last over time.

The University of Texas project is far from the only one that Optimum Energy has tackled. The company has provided its software to facilities across the country.

Chilling stations, though, seem to be the most common end users of the software, says Ian Dempster, applications development manager with Optimum.

"Chiller plants are our sweet spots," says Dempster.

Because the software comes with monitoring capabilities, the operators of buildings can quickly make changes to boost the energy efficiency of their HVAC systems, Dempster says. They can also quickly see when their HVAC system's performance is leaving rooms either too cold or too hot.

"In the past when there have been performance problems, they were only detectable when the occupants of a building complained about the temperature," says Dempster. "With our quick detection, we know very quickly when something is not right, and we can correct the problem very quickly."

The University of Texas is happy enough with the software that plant managers are working on a three-year system to equip other chilling stations at

the campus with versions of Optimum's software.

It's important for the university to reduce the amount of chilled water it uses. For the months of July and August, the university used about 42 million ton-hours of chilled water to cool the campus. Throughout an average year, the university relies on about 150 million ton-hours of chilled water to keep buildings at their proper temperatures.

"We have long been trying to reduce our kilowatt consumption in our chilled-water plants," says Kuretich. "It is enormous, as you can imagine, especially in the hot and humid summer. Chilled water is critical for everyone, and we use a lot of it."

For his part, Kuretich says, he appreciates that the Optimum solution is a software-based one. This means it costs less. And in budgetary times such as this, a lower initial cost is important, he says.

"Sometimes when you're dealing with software, the investment isn't as huge for the benefits you receive," says Kuretich. "To retrofit chillers with variable-speed drives, you'd have a huge investment. But making an investment in software rather than costly equipment, if it works, is a lot cheaper. It just makes financial sense."

### **Relying on Ice in Florida**

HVAC innovations aren't limited to Texas. In Florida, Fair Lawn, NJ-based CALMAC, a provider of energy storage systems, in early 2010 installed 16 of the company's IceBank energy storage tanks for a new high school campus and its neighboring kindergarten-through-eight-grade campus in Weeki Wachee, FL.

The energy storage tanks will not only help the new Hernando High School EEE campus and the adjacent elementary school campus reduce their yearly energy costs, they will also help the school facilities earn Leadership in Energy & Environmental Design (LEED) Silver certification from the US Green Building Council.

A central energy plant relies on the IceBank energy storage system to cool the buildings on both campuses. Chillers work with the storage tanks to make ice at night when energy costs are significantly lower. The low-cost stored energy then helps the chiller the following day

provide cool air to buildings during periods of peak demand.

It's important for this air to be delivered as efficiently as possible; the two campuses require a total of 2,200 total tons of cooling capacity. By combining the two central cooling plants into one facility and adding ice storage, the designer of the system, Matern Professional Engineering, Orlando, FL, was able to reduce the purchased chiller capacity to 1,200 tons, a significant savings.

The new cooling system has not only reduced the amount of refrigerant and equipment required to cool campus buildings, it has also reduced its peak energy consumption. This will result in an expected savings in energy costs of 10% every year.

As in Texas, this is important, because school districts in Florida are being asked to find every bit of savings as possible in reaction to a statewide budget crunch.

Ryan Strandquest, vice president at Matern, says that goal of the new system was to provide consistent cooling for both campuses while reducing energy costs. This isn't always the easiest task in hot-and-muggy Florida.

But the CALMAC system has met the challenge, Strandquest says.

"We had to feed a high school and a K-through-8 campus. We used two different design teams for this project. We then had to figure out how to make that into a cohesive plant for both schools," says Strandquest. "By using the CALMAC ice storage system, we were able to keep the tonnage of the air chillers at a minimum. The system has worked so far on a very consistent basis. It has allowed the cooling at both schools to operate properly. It has kept rooms very comfortable."

This isn't the first time that Matern has worked with ice storage systems. In fact, Strandquest says, he prefers working with such systems because of their many benefits.

"These systems allow us to use a lower tonnage in HVAC systems," he says. "It shaves off the peak tonnage requirements throughout the day. That's the biggest perk. In Florida, if you are using the chiller at night, you'll get a lower ambient temperature. That makes the machines more efficient."

The ice storage system also made

sense, because the Hernando school wanted a campus that could be classified as green. By using the ice storage system, Matern was able to provide the school district with a chilling solution that consumed less energy. This, of course, is a big plus for any district seeking LEED Silver designation.

The ice storage system has also helped school district officials make good on their plans for a “high school as a small town” design concept. The new campus includes three academic neighborhoods, an administration and media civic center, athletic and dining facilities, and a performing arts town center all clustered around a central landscaped courtyard.

The ice storage system is able to provide cooling to all these decentralized buildings, making the design a possibility.

“I’m pleased that our IceBank tanks will help another school save money, while reducing the impact of peak energy usage on the environment,” says Mark MacCracken, chief executive officer of CALMAC, in a statement. “Storing energy at night makes more efficient use of energy resources, and there is little energy required to run the cooling system during the day. This is an immense benefit for a school system in Florida that runs air-conditioning year-round.”

### **Innovation Not in Short Supply**

Building owners and power equipment manufacturers are teaming up to create high-efficiency HVAC systems across the country. Innovative projects are hardly in short supply.

Halifax Health, a medical center with care centers in Daytona Beach and Port Orange, FL, is yet one more example. The medical center, which boasts 944 beds and 500 physicians, has steadily grown since its founding as a small community hospital in 1928. As part of this growth, Halifax Health opened the 10-story France Tower in the summer of 2009. This new facility provides both inpatient and emergency medical treatment.

It’s also supported by a standby power system from Florida Detroit Diesel-Allison, a distributor for the national MTU Onsite Energy. The 4.5-MW power system is important not just because of its efficiency, but because of its reliability. The system will operate the facility’s generators, boilers, and chillers,

even if severe hurricanes and thunderstorms sweep through the area and disrupt the public power grid.

Officials with the medical center knew that having a reliable standby power system was always a necessity for the France Tower.

“Summertime thunderstorms regularly wreak havoc with our local utility due to lightning strikes,” says James Sawyer, electrical supervisor with Halifax Health in a statement. “There’s always the threat of bigger storms.”

In 2004, for example, Hurricane Charley, a Category 4 storm, took out the region’s entire public power grid. That forced the medical center to run on standby power systems in parts of the campus from midnight until about 6 a.m. the following day.

The new MTU onsite energy standby system will be able to keep the France Tower running smoothly even if the public power grid does go out.

Sometimes it’s not even the power equipment itself that results in a more efficient HVAC system. School districts, medical centers, and municipal facilities can save a significant amount of money by improving the way they manage the HVAC systems in their buildings.

Such is the case in Alberta, Canada. In April of 2010, Minneapolis, MN-based Honeywell finalized a \$78-million contract with B2L Partnership (standing for Build 2 Learn), an organization charged with building 10 new kindergarten-through-ninth-grade schools in the Canadian cities of Calgary and Edmonton. Under the arrangement, Honeywell will be responsible for the performance and maintenance of all the facilities over the next three decades.

Honeywell will maintain and install HVAC, security, and fire systems in the schools, all of which will be built to meet LEED Silver certification requirements.

This new contract serves as an extension on an existing Total Asset Management agreement between Honeywell and B2L for the construction and upkeep of 18 new LEED Silver-certified schools in Alberta. This initial agreement marked the first social infrastructure public-private partnership in Alberta.

The goal, of course, is to reduce the costs associated with the schools’ HVAC and other systems, thanks to having Honeywell oversee all of the buildings.

It’s an example of taking steps to achieve energy efficiency that doesn’t necessarily require the installation of new equipment, though new, more efficient systems might be required.

Jim Keesling, vice president and Americas Service Leader with Honeywell, says that such arrangements allow school districts to focus on the matters that are most important to them, while companies such as Honeywell can concentrate on the maintenance and installation of HVAC and other systems.

“This kind of partnership allows the school to focus on its core competency, providing education for children,” says Keesling. “School districts don’t have to worry about the facilities and ensuring that they are operating as efficiently as they need to be. The facilities’ operations become a fixed cost to the school districts. They won’t have variable costs when it comes to operating their buildings. That’s always an important benefit.”

Honeywell is just one part of a consortium tied to the Alberta schools through the agreement. Other members of the consortium include B2L Partnership, the company providing the financing for the new schools, and builder Bird-Graham Schools.

Honeywell was responsible for designing and installing the HVAC, fire, and security systems in each new school. Honeywell ties all these systems together with its Enterprise Buildings Integrator platform, a system that will help the schools operate as efficiently as possible. This is a necessity to help the schools obtain their LEED silver certification.

Honeywell will, for the next 30 years, service all mechanical and automation equipment at the schools, handle repairs, upgrade infrastructure, and replace outdated parts and equipment. During the three decades it works with the Alberta schools, Honeywell will also look for ways to improve the energy efficiency of the buildings’ HVAC and other systems.

The Alberta schools benefit because Honeywell is operating under a fixed-price monthly contract. The fixed price is lower than what the schools have traditionally paid to operate their facilities. Having the fixed-price contract also prevents any surprise cost increases for the schools.

Brian Ast, P3 Business Development Manager for Western Canada for Honeywell, says that Honeywell will hand control of the school's HVAC, security, and fire systems back to the Alberta schools after the 30-year agreement ends. Honeywell, though, must meet certain standards when handing control back to the schools.

The contract requires Honeywell to maintain the schools' HVAC facilities to industry standards during the 30 years. If a piece of equipment has a life cycle of 10 years, Honeywell must make sure that it changed it out the right number of times during the partnership's lifespan.

"The agreement is like a 30-year warranty," says Ast. "There are definite parameters around the conditions in which the equipment and facilities have to be in when we hand them back."

"This is part of what makes this arrangement such a positive one. The replacements have to be made at the proper time," says Keesling. "It prevents a situation in which you are running into deferred maintenance and old equipment."

Keesling and Ast both see public-private partnerships, such as the one with the Alberta schools, as a growing trend.

"Demand is certainly increasing in Canada for these partnerships," says Keesling. "We first saw these start on a provincial model in Canada. Now they are being done on the federal, national side of the country. From a user perspective, allowing users to concentrate on core competencies is really critical. There is a realization now on the part of users that they are not experts in some of these areas. They can work with other people who can do this over the life cycle of their equipment. I anticipate that a lot more end users will pick up on this kind of model."

Cost savings are what will ultimately drive more users to embrace the public-private partnership model of HVAC maintenance and operations, Ast says.

"We are now seeing each individual province in Canada adopting this method," says Ast. "The model is now being used widely across Canada. So far,

it's been very successful. The provinces are getting good value for their money. I think this is definitely a method that is finding traction."

Whether it's through a partnership model as in Alberta, through innovative design as in Weeki Wachee, or through new software, building owners and managers aren't shy about searching for new ways to reduce their energy consumption.

It's a challenge that end users expect their onsite power and HVAC system providers to meet.

"The drivers of every project we work on are energy reduction and cost savings," says Dempster. "It's all about providing highly efficient HVAC performance solutions. That's what people want. They want to spend less on their HVAC systems." DE

Dan Rafter is a technical writer based in Illinois.

## Online extras

Feeling a bit like Goldilocks? Discover how to get your indoor temps "just right."

[www.distributedenergy.com/HVAC](http://www.distributedenergy.com/HVAC)

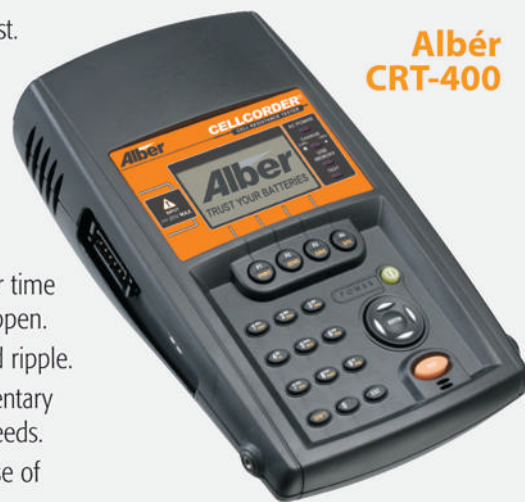
**Day Time**

**Night Time**

**Down Time**

**It's Cellcorder® Time.**  
Avoid downtime with Alber.

- Fast battery test results you can trust.
- Measures 3 Critical Parameters: Voltage, Resistance, Internal Cell Resistance
- The Alber Cellcorder CRT-400 uses the patented DC Internal Cell Resistance test method.
- The Cellcorder allows trending over time to detect problems before they happen.
- Results are unaffected by noise and ripple.
- Software has versatility to be elementary or advanced depending on your needs.
- Many connection options allow ease of use for any battery configuration.
- Bluetooth option relays voice test status to speed up testing.
- Streamlined design makes carrying easy.
- Custom carrying case holds accessories such as lighted probes, different jaw options, Bluetooth headset and printer.
- Optional hydrometer sends data to Cellcorder software for easy exporting to Excel.



**Alber  
CRT-400**

**Alber**  
Trust Your Batteries™

Contact Jennifer Stryker at Alber for more info [jennifer.stryker@alber.com](mailto:jennifer.stryker@alber.com)  
+1-954-623-6660 or 800-851-4632

sales@alber.com | www.alber.com | 3103 N Andrews Ave. Ext Pompano Beach, FL 33064