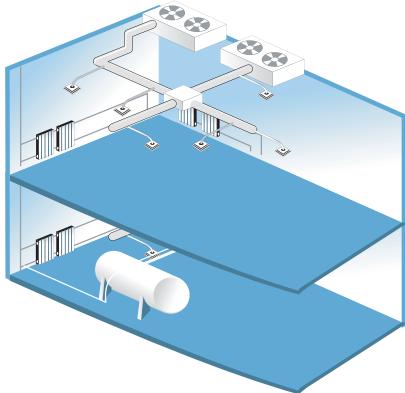




DEMAND CONTROL VENTILATION

It is possible to regulate the amount of ventilation required just by creating awareness in the system of the occupancy level in a building.



Buildings with high levels of fluctuating occupancy, vacation periods, or ever changing uses, create an environment where savings can be achieved just by managing the building based upon the actual load.

Tools like CO₂ sensors and motion detection sensors in the building can provide a means, when combined with variable speed control equipment, to reduce the ventilation, or heating and cooling loads by providing only the capacity needed to meet the needs of occupants.

With the reduction of one load, many other loads may also be reduced, given the interconnected systems in a building. This ultimately reduces the overall energy demand.



Leon Hawkins is the automation and controls business leader with Trane Canada in Burnaby, B.C. He can be reached at leon.hawkins@trane.com

Designing for conservation

The face of energy has changed in recent years. With many technological advances and policy changes in energy management, the way we think about and deal with energy has to evolve as well.

With the advent of smart electricity meters, and smart natural gas and water meters not far off, utilities have now begun to implement time of use charges to their bills, where the energy consumed overnight and on weekends costs less than the energy consumed during the day. Sometimes the cost difference between day and night is double, or even triple! In some jurisdictions in the U.S., utilities have adopted real-time pricing for consumers, who are now charged based on rates that can change every hour.

While new pricing strategies may appear to be another opportunity for the utility to take more money from our wallets, it is a means to change behavior and encourage energy reduction to reduce the strain on the electrical grid and ensure system stability during times of high demand.

Regardless whether your customers' utility providers use flat-rate, tiered-rate, time-of-use, or real-time pricing, there is an opportunity to engage building owners with new strategies to support better management of energy costs.

And we really don't have to look far as we plan out opportunities for customers to cut energy costs in the changing environment. Many energy savings strategies we currently use can support savings in consumption, peak usage and time of use.

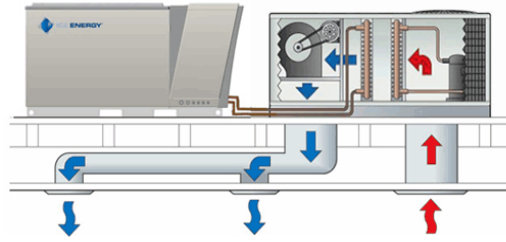
Did you know?

Most electricity bills include something called the demand charge, which is the cost for the highest instantaneous load in the building over a month. This can amount to a large cost which is not generally controlled.

DID YOU KNOW? Studies have shown that awareness of energy demand is more likely to drive conservation behavior.

ENERGY STORAGE

Complex systems that are currently being implemented in response to time-of-use pricing include chilled water and hot water storage, ice storage, and other such energy storage tactics. These systems are becoming more widespread, but they do require complex engineering and are typically at a high capital cost. They tend to provide significant returns to building owners, however.



One of these systems, the thermal energy storage system at the University of Southern California, creates chilled water at night when energy prices are low, stores it in a three million gallon tank, and then distributes the chilled water during the day when energy pricing is at its peak. The nice thing about these systems is that the energy cost savings generally support the construction of the facilities required, and the storage system (the tank) can be sized to suit the application.

Traditional control strategies can be implemented to support a similar effect on a much smaller scale, and at minimal costs. These include night purge, pre-heating and pre-cooling.

Each of these approaches is used to prepare the building for normal usage by introducing fresh air, leveraging free cooling opportunities and bringing the temperature to normal occupant level.

By managing in accordance with time-of-use pricing, a building engineer can adjust the pre-cool or pre-heat temperature to a level that is two or three degrees beyond the traditional setpoint to capture the savings by not providing this heating and cooling during normal occupied hours.

Other strategies, like adjusting setpoints during high demand pricing scenarios or shifting work hours, can also provide opportunities for savings. While not appealing initially, creating awareness and providing challenges to building occupants provides an engagement level and will support energy reduction strategies.

VARIABLE SPEED CONTROL

Using variable speed drives to control mechanical equipment provides many levels of savings for the building owner. Just by reducing the speed of the fan or pump there can be a significant effect on the energy required to power equipment.

A 10 per cent drop in fan or pump speed will result in a 27 per cent reduction in power required. A 50 per cent drop in speed will reduce the energy required by 87 per cent.

The ability to control equipment to better match the needs of the building users gives the building owner better operation without sacrificing comfort. It also reduces the wear and tear on the equipment while reaping great energy savings, and that's good news for the owner's pocketbook on several levels.

Variable speed drives have come down in price significantly in recent years, and the installation and setup costs have also lowered because of widespread use.



SHOW YOUR WORK

The use of energy dashboards for public consumption in lobbies and in energy management information systems is becoming quite popular, and can be useful in engaging building occupants. This also provides an opportunity to engage building owner customers to become their trusted advisor for energy.

Expect to be drawn into the conversation and be prepared with the tools and knowledge of the simple (and complex) solutions that will make a noticeable impact on their audience.
