It’s Not Easy Being Green

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Being Smart About Co2

Techniques for making your restaurant smarter, greener and more energy efficient

For the last few years, RFMA members have read about changes to their local fire codes that will require monitoring carbon dioxide systems for possible leaks in and around stored CO2 cylinders and bulk tanks.

There is good reason for these changes. With the increased use of stored CO2, there has been a small but steady rise in the number of employees and customers overcome by CO2 gas indoors. The updated International Fire Code (IFC), the National Fire Protection Association (NFPA) code and the National Board Inspection Code (NBIC) all require CO2 monitors wherever gas is stored.

Even if your local codes haven’t changed yet, stored CO2 alarms are good for business. Beyond the potential tragedy, liability, fines and loss of income that accompany an incident, no one wants to see ambulances and first responders in HAZMAT suits outside their building with the headline “Dangerous Gas Leak” on the local news. The potential loss of business alone could be disastrous.

Of course, not everyone uses bulk carbon dioxide. But you should still monitor CO2 levels in your facilities for two important reasons: energy efficiency and cost savings. Going green isn’t only about the environment. It can offer significant cost savings, too.

The Origins of ‘Green’

For those of us old enough to remember, the “green building” trend was a response to the energy crisis back in the 1970s. As heating and cooling costs rose, facility managers began to look for ways to cut their fuel bills. It wasn’t uncommon for the heating, ventilation and air conditioning (HVAC) system to be on a timer. For example, furnaces and air conditioners turned on at 7 a.m. and turned off at 9 p.m. daily, even if no one was in the building. Malls built in the 1950s and 1960s only had two HVAC settings—hot or cold—which they changed each spring and fall.

As expensive as energy was in the United States, it was more expensive in the rest of the world. To solve the challenge, European scientists developed a low-cost CO2 sensor as a means of identification and control. These small devices measured the amount of carbon dioxide in a room. The theory is simple: The more people in a room, the more carbon dioxide is exhaled and more fresh air is needed. Conversely, if CO2 levels are normal, the HVAC system can be set on standby until needed. When combined with a demand control ventilation (DCV) system, CO2 sensors can reduce energy costs by up to 50 percent. That’s not pocket change to anyone.

In the LEED

Ultimately, the use of DCV systems controlled by CO2 sensors was codified in the Leadership in Energy and Environmental Design (LEED) standards developed by the U.S. Green Building Council in 2000. Silver, Gold and Platinum certifications all require CO2 monitoring. The Platinum standard even requires the monitoring of CO2 both indoors and outdoors to compare the numbers.

Why LEED? With LEED certification, facilities benefit not only from energy savings, but in some cases also enjoy tax credits. For example, an internationally recognized coffee chain is installing CO2 sensors inside their stores to ensure they receive the LEED credit associated with monitoring. Over time, the use of a $250 CO2 sensor will net thousands of dollars per year in energy savings per store.

The Role of CO2 Transmitters

While building a new LEED-certified facility or retrofitting to the standard is a truly lofty goal, most facility managers have to play with the cards they were dealt. That's where the newest generation of CO2 transmitters comes in.

A CO2 transmitter looks like a typical wall-mounted thermostat. One transmitter should be installed in each zone controlled by the HVAC control system and then programmed to adjust the temperature and fresh air depending on the CO2 levels. For example, a facility with an area not normally used throughout the day (e.g., a conference room or workout area) depends on staff to manually adjust the heating or air conditioning when the room is empty. Adding a CO2 transmitter makes this task automatic, ensuring maximum energy savings.

In addition to energy savings, an extra benefit of monitoring CO2 is that it ensures the right amount of fresh air in a room. CO2 levels above 800 parts per million are generally the result of an improperly configured HVAC system. Above 1,000 ppm, employees and guests not only become tired and lethargic, but begin to complain about odors in the room. If your HVAC system solves these problems by simply increasing the fresh air exchange rate, you're wasting energy.

Conversely, if in an effort to save energy dollars, your company lowers the fresh air exchange rate, "sick building syndrome" can occur. OSHA gets thousands of calls per year from employees who believe their workplace is impacting their health. They complain about headaches, drowsiness, shortness of breath and even nausea. To no one's surprise, these are the same symptoms an average adult feels when exposed to elevated levels of CO2. Consequently, CO2 buildup is one of the first items OSHA inspectors have on their checklists when they investigate sick buildings. Using simple CO2 monitors, investigators know within seconds if a facility has excess CO2.

Indoor air-quality studies have proven that properly ventilated facilities ensure higher worker performance and productivity, fewer sick days and higher customer satisfaction. All are huge wins in the restaurant industry.

For new construction, you should engage your architect early in the process to include CO2 sensors. Building in the costs of devices up-front will save on retrofit costs down the line. Retrofit costs can be included in your HVAC contractor's budget as well.

Whether you're starting with a new building or retrofitting an old one, a CO2-controlled HVAC system can make a huge difference in employee and customer satisfaction—and your bottom line. If you haven't asked your HVAC system installer to review your building lately, now may be the time.

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