

FeatureTechnology

Cooler Control

Convenience store chains can slash operating costs by as much as 10% with sound maintenance and general improvements to its refrigeration systems.

By Howard Riell, Associate Editor

OPERATORS LOOKING FOR GREATER energy efficiency should cast an eye on their coolers, where centralized controls, lighting adjustments, basic ongoing maintenance and employee training can save them money.

"Coolers are typically an opportunity for improvements in maintenance and operational practices," said Jerry Lawson, national manager for Energy Star Small Business and Congregations Network, a division of the U.S. Environmental Protection Agency in Washington. "With all the different types of equipment in the c-store, coolers are a key piece of the energy equation, and they are typically the most expensive to run. With the right improvements, there is an energy efficiency dollar saving opportunity."

Where to begin? Start with the obvious.

"Keeping them clean is the biggest thing," Lawson said. "Coolers have to breathe. Keeping those coils clean allows them to breathe; they take the air in and expel air out."

When taking care of monthly cooler cleaning, Lawson liked to pull off the back panel and take a cloth or other type of non-steel brush to it and clean it off, then vacuum or sweep the junk up off the floor. "That's the biggest thing to keep them running efficiently."

Matt Lauck, director of marketing for Retail Solutions in Kennesaw, Ga., a subsidiary of Emerson Electric, said that central facility management systems can be a major tool for achieving energy efficiency in coolers. Such systems give the operator the ability to optimize energy reduction by, among other things, tracking temperatures to make sure they stay within operational norms, which obviously also has implications for food safety. "Think of it as a programmable thermostat," he said.

Some set-ups permit the operator to handle the controls themselves or farm out that responsibility to manufacturers. "We can even turn the lights in the beer case off on Sundays when you can't sell it," Lauck said. "It's another way of conserving energy in the store."

Larkspur, Calif.-based Advanced Telemetry's EcoView product is another "smart energy management system" that enables business users to easily view and reduce their resource consumption, and thus utility bills, with the touch of a button. The company's system allows users to view, in real-time, temperature set-points and settings, schedules, electricity and water consumption, follow trends, track changes, identify key culprits of energy drain, set consumption goals, and directly control how resources are being used.

SEARCH FOR SAVINGS

Even retailers that have invested in refrigeration systems equipped with electronic controls can still find unexpected savings elsewhere because those controls are not designed to save energy.

When refrigeration systems are installed, controls may be set to operate continuously for worst-case conditions in order to minimize the need for operator attention or to compensate for maintenance-related problems. Portland Energy Conservation Inc. in San Diego found that floating suction pressure control (FSPC) and floating head pressure control (FHPC) strategies can save an annual average of 30,000 to 60,000 kWh from FSPC and 75,000 to 150,000 kWh from FHPC in a typical Southern California convenience store. In cooler climates, even more savings can be achieved through FHPC. Controls to implement FSPC and FHPC may be added as a retrofit and set to adapt automatically to variable conditions.



With operations costs rising, retailers are pretty willing to try anything that has a reasonable entry fee.

"One of the first things we tried was a roof-top central rack unit that runs all of our refrigeration in our travel center," said Rocky Trail, a multi-unit operator and owner of Trail's TA Travel Center in Albert Lea, Minn. Energy costs, he added, have been going nowhere but up. "In the last two years we have experienced about a 26% increase in our electricity costs."

Trail's travel center setup was more expensive on the install, "but the

energy efficiency, obviously, comes from the fact that you don't have compressors and every little cooler and freezer going off and on all the time," he said.

Instead, the facility has a single rack that "takes care of the whole thing," Trail said. "Of course if the thing goes down the whole refrigeration goes down, so you have to make sure you have a good support system in place to get your system up and running quickly."

The rack system was put in place just over a decade ago when the Travel Centers of America franchise opened. The 28,000-square-foot campus sits on 31 acres and includes about 7,000 square feet of retail space. There are 14 reach-in cooler doors. "We are actually looking to expand that because we have some stand-alone coolers and we want to get them, again, all into one main walk-in cooler," Trail said. That change could add four to six more doors.

"The other thing we are looking at doing that which we haven't done yet—I have not researched all of the energy efficiency parts of it yet—is go to LED lighting around the perimeters of the cooler doors," Trail said. "I'm doing it mainly for the appearance factor, but I think a byproduct of that, hopefully, will be some energy-savings because the LEDs use a lot less energy."

Having the light closer to the door frame allows it to shine more on the product. "When you're using fluorescents the bulb tends to be past the facing of the product unless you pull the racks back further," Trail said.

INSPECT EQUIPMENT

Another decidedly low-tech step that nonetheless gets the job done every time is simply making sure that the doors stay shut as much as possible. Door gaskets, springs and other cooler-door hardware should be well taken care of and replaced when necessary.

"We are lucky enough to have a very good maintenance department with several mechanically oriented people who check, adjust and fix all the stuff

that can go wrong," Trail said.

According to Lawson, there is a lengthy list of general maintenance items retailers should have to maximize cooler efficiency. He recommended the following no-cost tips that are designed to help reduce operating costs, save energy consumption and prevent pollution:

Reduce door openings: Repeated fluctuations in temperature will damage food quality and will cost money.

Check temperature settings: If settings are lower than necessary, energy is being wasted. The most commonly recommended settings are between minus-14 degrees and minus-8 degrees for freezers and between 35 degrees and 38 degrees for refrigerators.

Clean cooling coils: Dirt accumulation impairs proper heat transfer and lowers the efficiency and capacity of refrigerators.

Check door seals: Tight seals and properly closing doors prevent warm air from entering the unit, which reduces cooling energy and prevents frost buildup. Use this as a rule of thumb: if you can easily slide a dollar bill into the seal, have the seal adjusted. Replace worn seals and gaskets on refrigerator and freezer doors, install automatic door closers, and use night covers on both vertical and horizontal display cases. Add strip curtains to walk-in doors.

Maintain equipment: Perform any scheduled maintenance on the units and keep evaporator coils clean and free of ice build-up.

Do your homework: Learn how other convenience stores and restaurants have saved energy on their refrigeration systems.

Reduce air leakage in refrigerated cases: Leaks and improper control regimes typically provide opportunities for savings in refrigeration systems. Refrigerant leaks are not just an emissions problem: incorrect refrigerant levels can compromise efficiency by 5-20% and raise the risk of early component failure. CSD