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"EcoGreenHotel believes hotels and resorts benefit financially by continually improving their management of energy resources, and the environment benefits from reduced levels of related pollution. We are proud to offer services and products that can assist businesses who have committed to the goals of ENERGY STAR."

Sustainable Refrigeration for Green Hotels

By Chris Lewis

We all know how challenging it can be making the budgeted GOP in the green hotel industry, especially in the Food & Beverage department, right? We are constantly measuring food costs, beverage costs, and labor costs knowing that controlling these costs is imperative to delivering very fragile margins. At one point in my career, we were using a food cost tracking program that was providing a food cost percentage in real time. Now some may argue paralysis by analysis kicks in at some point and I tend to agree. But what if you could reduce one particular expense line every month with no effort at all?

Take the heat off the expense line

I'm talking about the refrigeration systems in your hotel. Whether you are a select service hotel with one freezer or a convention property with multiple walk-in coolers and freezers, they are an essential piece of equipment. Since they are a necessary item, you figure that you'll pay whatever you have to pay in order to operate and maintain them because you can't function without one. So, what if you could reduce this "fixed" expense. And not only reduce the expense, but be an energy efficient hotel.

Take a minute to think about the process of cooling and maintaining that cold temperature in your unit: when the thermostat senses an increased inner temperature, an electronic valve opens and refrigerant begins to flow through the evaporator coil. The evaporator fans, which run constantly, pull the air through the coils. These coils take the heat out of that air and push the newly chilled air into the cooler or freezer.

What creates the energy to run that process? Motors. Typically, commercial grade coolers and freezers use shaded pole or PSC (permanent split capacity) motors. The electricity used by these motors, and the resulting heat generated, is an area that can be improved upon for savings.

Putting costs on ice

Gaining popularity in the hotel sustainability movement is the Electronically Commutated (EC) motor. If you were to replace your current shaded pole or PSC motor with an EC motor, you can boost energy efficiency by as much as 80%. How does that happen? Bear with me while I get a little technical: An EC motor is a brushless motor that uses interacting magnetic fields to generate motion. By relying on semiconductor switches (also called electronic switches or transistors) to turn the stator windings on and off at appropriate times, the power in an EC motor is pulsed on and off through three or more circuits, or coil groups, within the motor. This variable speed technology controls speed and maintains high torque at the start.

In a research study conducted by Washington State University, EC motors improved unit cooler performance. Test data showed a 51-60% increase over shaded pole motors and a 30-40% increase over PSC motors.

Beat the heat

Under normal operation, fans operate continuously, even when the evaporator is not actively cooling. This results in additional heat being added to the space that then has to be removed by the evaporator. If your unit is using an EC motor, it will use a third of the energy, per fan, than that of a shaded pole motor. When measured against the initial purchase cost, the ROI is shorter and the annual savings can be $100 or more per fan motor. And since EC motors use significantly less electricity than a PSC or shaded pole motor, less heat is generated in the cooled space. An added perk - without this extra heat, the motor and fan aren't working unnecessarily, thus minimizing sound.

EC motors boast maintenance free quality and exceptionally high service lives. Their general standard size, mountings and accessories make for easy drop-in retrofits of your current motors. Today and for some time, all of the electronics are enclosed within the motor case. These features can also bring additional savings.

Upping your cool factor

To maximize the savings, an EC Motor Controller, is imperative. This controls the speed of the EC motors. When the thermostat set-point is reached, the controller will shift the evaporator fans to low speed, usually about 40% of high speed but the energy consumption drops to about 8% of that consumed at high speed. Since each watt amounts to 3.415 Btu of heat, compressor run time is substantially shortened. Actual tests indicate this combination of savings, evaporators plus compressor is greater than the original operating cost of the shaded pole motors. In other words the simple payback period is often less than 1 year.

Other energy efficient strategies to think about could be a reduction in suction pressure, installing an adjustable speed drive on the compressor or condenser fan motor, or additional insulation. These measures will cause the compressor to run less often and will increase the effectiveness of the EC motor and controller combination.

The Big Picture

Changing out the motor on your freezer system might not seem like a significant step now, but small changes like that add to the big picture. As environment protection campaigns increase, travelers are savvier and often discriminatory when it comes to choosing a hotel for their stay. It's not enough to only wash towels when necessary or change to energy efficient light bulbs. Hotels must continuously implement sustainability practices that will make their property more appealing to guests. Your property might boast a "farm to plate" menu (food that is locally grown or raised, and arrives fresh to the chef), but if that food is stored in a cooler or freezer that consumes more energy than is necessary, the carbon footprint left behind is greater than the conservation effort. The switch to EC motors and controller might not be apparent to your guest, but the environment, and your hotel bottom line, will reap the benefits.

About the Author

CHRIS LEWIS, EcoGreenHotel DIRECTOR OF ENERGY SOLUTIONS *with over 17 years in the hospitality industry both in the U.S. and abroad managing and directing all departments including hotel operations, food and beverage, renovation and construction. Lewis brings broad experience with full and select service hotels, facility management, property improvement, environmental initiatives, openings and multi-property management to the team. He previously served as Development and Construction Manager at OTO Development. Lewis's expertise includes mechanical systems, equipment specs, purchasing habits, standard operating procedures and project management. Lewis was responsible for the "green initiatives" for several properties that successfully qualified to achieve Florida Green Lodging, EcoRooms and EcoSuites, California Green Lodging and Irvine Build Green certifications.*

About EcoGreenHotel

EcoGreenHotel LLC (Knoxville, TN), is a privately held company dedicated to helping lodging facilities address a broad spectrum of sustainability issues. EcoGreenHotel provides customized consulting services tailored to the needs of the hospitality industry in the areas of energy efficiency and certifications, including LEED, Green Seal and Energy Star. For those properties that have reached certified levels of sustainability, For further information, email info@EcoGreenHotel.com or call 888-229-0213.

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