

Managing Energy Costs in the Lodging Sector

Hotels and motels in the U.S. spend an average of \$1.07 on electricity and 34 cents on natural gas per square foot (ft²) annually. In a typical hotel or motel, lighting and water heating represent between 49 and 67 percent of total use depending on climate, making those systems the best targets for energy savings (see illustration, next page).

In order to better manage your building's energy costs, it helps to understand how you are charged for those costs. Most utilities charge commercial buildings for their natural gas based on the amount of energy delivered. Electricity, on the other hand, can be charged based on two measures—consumption and demand (**Figure 1**). The consumption component of the bill is based on the amount of electricity, in kilowatt-hours (kWh), that the building consumes during a month. The demand component is the peak demand (in kilowatts) occurring within the month or, for some utilities, during the previous 12 months. Demand charges can range from a few dollars per kilowatt-month to upwards of \$20 per kilowatt-month. Because it can be a considerable percentage of your bill, you should take care to reduce peak demand whenever possible. As you read the following energy cost-management recommendations, keep in mind how each one will affect both your consumption and demand.

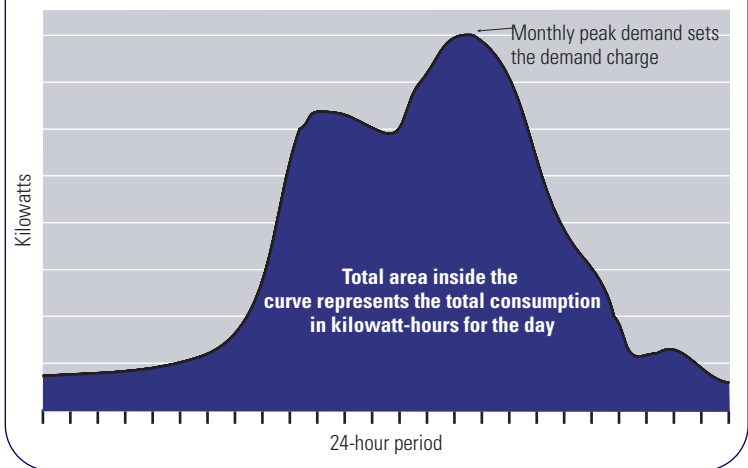
Quick Fixes

Many limited-service motels can benefit from quick, low-cost or no-cost solutions for saving energy.

Turning Things Off

Although it may seem like a simple measure to take, remember that every 1,000 kWh that you save by turning things off

Figure 1: Diagram of a hypothetical daily load shape



equals \$70 off your utility bill (assuming average electricity costs of 7 cents per kWh).

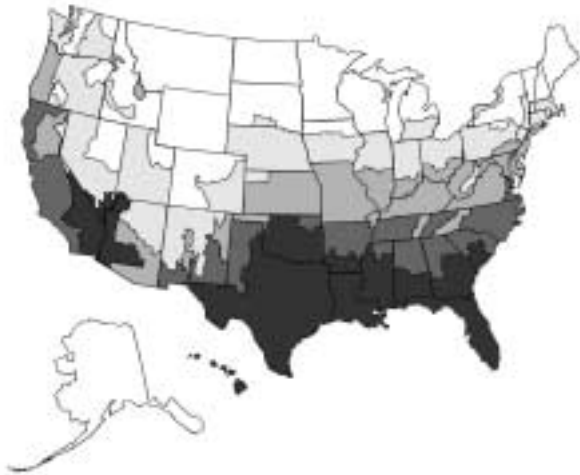
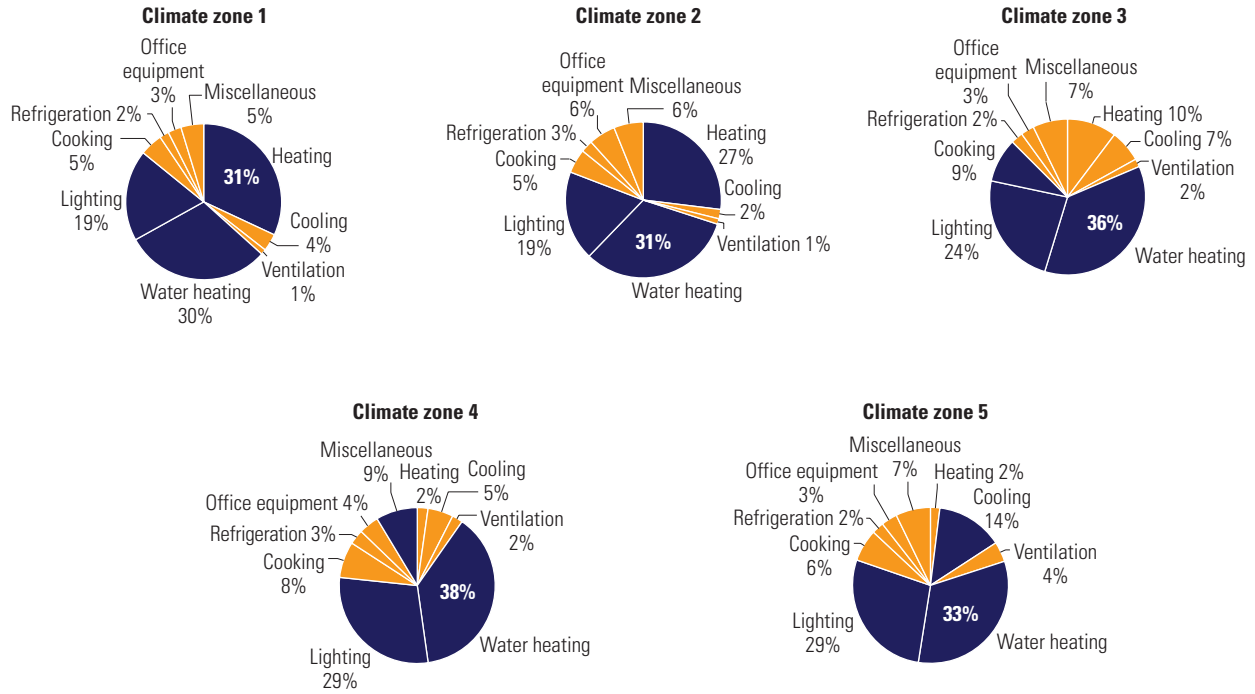
Lights. Turn off lights when they are not in use. Occupancy sensors and night-lights in guest bathrooms can help ensure that lights are only on when needed.

Computers and office equipment. The typical desktop computer, monitor, and shared printer draw about 200 watts. Most of the equipment sold today goes into a low-power sleep mode after a period of inactivity. Unfortunately, most users don't take advantage of this feature. Making sure that these energy-saving modes are enabled can produce significant energy savings. A single monitor that draws about 100 watts, left on unnecessarily overnight and on weekends, could add \$30 or more to the annual energy bill.

Turning Things Down

Some equipment cannot be turned off entirely, but turning it

Energy consumption in lodging facilities, by end use, for five U.S. climate zones



- Climate zones**
- Zone 1 is less than 2,000 CDD and greater than 7,000 HDD.
 - Zone 2 is less than 2,000 CDD and 5,500–7,000 HDD.
 - Zone 3 is less than 2,000 CDD and 4,000–5,499 HDD.
 - Zone 4 is less than 2,000 CDD and less than 4,000 HDD.
 - Zone 5 is 2,000 CDD or more and less than 4,000 HDD.

Note: CDD = cooling degree days; HDD = heating degree days

Source: U.S. Energy Information Administration

down to minimum levels where possible can save energy.

Hallway lighting. If hallways have skylights or other natural light and your lighting has dimming capabilities, dim those lights by 30 percent during daytime hours.

Peripheral and back rooms. Make sure that HVAC settings in lobbies, offices, and other such peripheral rooms are at minimum settings during hours of low use.

Employee and Guest Education

Guest service options. Some lodging facilities offer

guests the option of forgoing daily linen changes or nightly turndown service. Some guests may not perceive a need for daily sheet and towel replacement or for lights, radios, or televisions to be turned on for them when they are not in the room.

Housekeeping procedures. Encourage housekeepers to turn off all lights and set temperatures to minimum levels after cleaning each room.

Pools and hot tubs. Instruct your maintenance staff to make sure that all pools and hot tubs are covered during after hours to diminish heat loss.

Longer-Term Solutions

Longer-term energy-saving strategies should also be considered. Although the actions covered in this section require more extensive implementation, they can dramatically increase the efficiency of your facility without compromising the hospitality environment. Ask your local utility's representative for more information about initiating such projects.

Commissioning

Commissioning is a process in which engineers observe a building and perform a tune-up to ensure its systems are operating appropriately and efficiently. Studies have shown that continuously monitoring a building's energy systems can lead to reductions of 10 to 15 percent in annual energy bills. For the typical 50,000-ft² motel, that's equal to about \$6,000 in savings per year! Savings typically result from resetting existing controls to reduce HVAC waste while maintaining or even increasing comfort levels for occupants. Commissioning usually costs between 5 and 40 cents/ft².

Upgrade to More-Efficient Lighting

Compact fluorescent lamps (CFLs) can replace incandescent lamps in many applications, reducing energy use by two-thirds and saving up to \$20 per lamp per year. Special CFLs are available for three-level table lamps and dimming circuits. During renovations or

when buying new table or floor lamps, consider fixtures designed to accept only CFLs so that maintenance staff cannot accidentally relamp them with incandescents.

If your facility uses T12 fluorescent lamps, relamping with modern T8 lamps and electronic ballasts can reduce your lighting energy consumption by 35 percent. Adding specular reflectors, new lenses, and occupancy sensors or timers can double the savings. Paybacks of one to three years are common. Light-emitting diode exit lights that consume only 2 watts represent a great energy savings over incandescent fixtures and are easier to maintain because of their long service life.

Use Smart Lighting Design in Parking Lots

Most parking lots are designed with far more lighting than the Illuminating Engineering Society of North America's *Lighting Handbook* (2000) recommends—that is, an average of one foot-candle or less for most applications. Using lower-wattage bulbs can actually increase the safety of your lot: An overlit lot can be dangerous to drivers if their eyes cannot adjust quickly enough in the transition from highly lit to dark areas. When designing lighting for a new parking lot, consider low-wattage metal halide lamps in fixtures that direct the light downward, instead of high-pressure sodium (HPS) lamps. Even though the wattage is lower, a motel could safely use fewer lamps if this type of lighting were adopted. Metal halide is less efficient than HPS in conventional terms, but it puts out more light in the blue part of the spectrum, which happens to be easier for our eyes to see under low-light conditions.

Occupancy Sensors

Occupancy sensors can reduce energy requirements, and some can even help staff serve guests better. Some occupancy sensors control only lighting systems, some can control both lighting and HVAC, and there are even a few that go beyond equipment control. The GEM system (www.lodgingtechnology.com), for example, allows for equipment control and also provides a sensory

module so that housekeeping staff can detect whether or not a room is occupied without disturbing the guests.

Hot Water

Motels have various options for using less hot water and heating water more efficiently:

- Low-flow showerheads
- Solar hot water heaters
- Reduction of laundry hot water to 120° Fahrenheit
- Pool and hot-tub covers

Vending Machine Controls

Because vending machines operate continuously, one refrigerated vending machine can consume 2,500 to

4,400 kWh annually, and this can cost up to \$440 per machine per year. The VendingMiser (www.bayviewtech.com) is a control device that turns off vending-machine refrigeration and lighting when nobody is near and when temperature levels are low enough that refrigeration is not needed. VendingMiser has resulted in vending-machine energy savings ranging from 24 to 76 percent, with pay-backs of less than three years.

The Bottom Line

All of the conservation measures discussed here represent good investments. Most will not only save money but also ensure the comfort of your facility's guests and staff.