

Managing Energy Costs in Restaurants



According to the U.S. Department of Energy, a typical full-service restaurant consumes 29 kilowatt-hours (kWh) of electricity and 1.2 cubic feet of natural gas per square foot, and an average quick-service restaurant consumes 81 kWh and 1.7 cubic feet per square foot, annually. Restaurants are the most energy-intensive commercial sector, with food service facilities using three times more energy per square foot than most other types of commercial buildings.

Patterns of energy consumption in restaurants differ depending on fuel type—cooking accounts for 46 percent of total annual natural gas consumption (Figure 1), while refrigeration comprises 32 percent of total annual electricity consumption in a typical restaurant (Figure 2). There are many simple no- or low-cost efficiency upgrades restaurants can implement that can lead to significant energy and water savings. Many utilities offer energy audits, which is a great

way to identify opportunities for energy and water savings. Your utility may also provide financial incentives, such as rebates or low-cost financing, to help you implement energy-saving measures. And there are federal tax credits available for making efficiency improvements in commercial buildings; to learn more, visit the Tax Incentives Assistance Project Business Tax Incentives page at http://energytaxincentives.org/business/commercial_buildings.php.

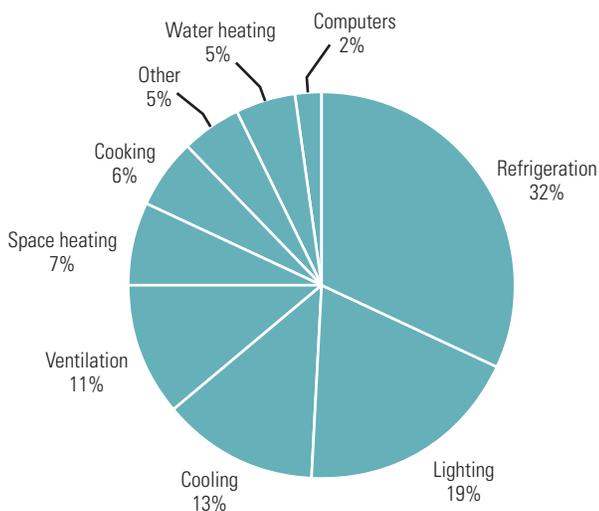
Quick Fixes

These simple practices can boost your bottom line.

Turn equipment off when not in use. Lights, dishwashers, and other equipment are often left on when not in use. An uninsulated hot food holding cabinet left idling overnight every night could cost \$500 per year. Develop simple energy-management procedures with checklists, and assign responsibility to employees on each shift and at the end of the day for turning equipment off.

FIGURE 1: Electric consumption in restaurants by end use, 2003

Refrigeration makes up one-third of total electricity consumption in restaurants.

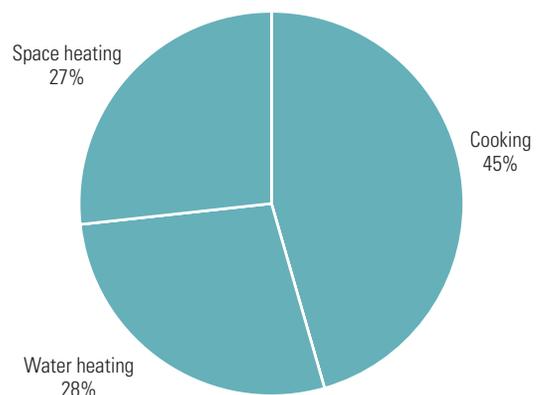


Note: May not total 100% due to rounding; office equipment is omitted because of insufficient data.

© E SOURCE; data from the U.S. Energy Information Administration

FIGURE 2: Natural gas consumption by end use, 2003

Almost three-quarters of total natural gas consumption are related to heating water and cooking activities.



© E SOURCE; data from the U.S. Energy Information Administration

Decrease the standby/preheat time when cooking.

Cutting the idling time of steamers, broilers, ovens, griddles, and fryers is one simple way to cut energy costs. For example, reducing broiler standby time by one hour every day could save you \$450 annually. Few cooking appliances require more than 20 to 30 minutes to preheat.

Switch off the door heater on your reach-in refrigerator or freezer.

Such a simple measure could save you up to \$75 per year. But if you notice significant frost around the door or if there is water dripping on the floor from the front of the refrigerator, turn the switch back on.

Check the temperature setting in refrigerators and freezers.

Temperatures that drift below recommended levels can waste energy and cost money. The most commonly used settings are between -14° Fahrenheit (F) and -8° F for freezers, and between 35° F and 38° F for refrigerators.

Clean refrigerator coils regularly. Cleaning dirty evaporator and condenser coils can improve efficiency and help prevent early compressor failure.

Reduce defrost cycles in refrigerators. Defrost for only as long as you need to—in most cases, no more than 15 minutes, four times a day. The defrost timer can be in various places, such as inside the fridge compartment or at the back in the motor compartment. By shortening the length of each defrost cycle from 70 to 15 minutes, one restaurant owner saved \$800 in a year.

Inspect refrigerator and freezer doors. To prevent leakage of cool air, replace worn gaskets and make sure that doors are aligned properly. Check that automatic door closers are functioning and strip curtains are not damaged.

Upgrade your walk-in refrigerator and freezer. Adding strip curtains could cut outside air infiltration by 75 percent. Automatic door closers are also inexpensive. Both measures are suitable for just about any walk-in unit.

Shift ice production time in ice machines. Install a timer and shift ice production to nighttime off-peak hours. If

you are paying a time-of-use rate, you are most likely paying less for electricity at night. You'll be turning off a hot, noisy machine during operating hours as well.

Replace incandescent light fixtures with LEDs. Light-emitting diodes (LEDs) are an excellent option for replacing incandescent fixtures for exit signs, exterior signs, menu boards, and refrigerated display cases. LEDs require less than one-eighth of the watts to illuminate a sign compared to an incandescent bulb to produce the same effect, and LEDs can last 5 to 10 years.

Install occupancy sensors. Areas that are not consistently occupied, such as storage rooms, restrooms, back offices, and walk-in refrigerators, are ideal places for occupancy sensors. They can save 30 to 75 percent in lighting energy consumption, and the payback period is typically one to three years.

Replace air filters in air-conditioning (AC) systems.

AC filters should be changed every month, and more often if your building is located next to a highway or construction site where the air is dirtier.

Check the economizer. Many AC systems use a vent called an economizer to draw in cool outside air. A malfunctioning economizer could let in hot air during cooling seasons and cold air during the heating season. Have a licensed technician check, clean, and lubricate your economizer about once a year and repair if necessary.

Check AC temperatures. With a thermometer, check the temperature of the return air going to your air conditioner, and then check the temperature of the air coming out of the register nearest the unit. If the temperature difference is less than 14° F or more than 25° F, have a licensed technician inspect your unit.

Maintain panels on rooftop AC units. On a quarterly basis, make sure that the panels to your rooftop AC unit are fully attached, that all of their screws are in place, and that the gaskets are intact so no chilled air leaks out of the cabinet. Such leaks can cost \$100 per year, per rooftop unit.



Maximize location of kitchen appliances. Group heavy-duty appliances such as char-broilers under the center of the hood, and place ovens at the ends. Push appliances as far back against the wall as possible to maximize hood overhang, and close the air gap between the appliances and the wall.

Add side panels to your exhaust hood. There is a chance that your ventilation is not capturing and containing as much smoke and heat as possible, which can lead to a hot working environment and more cooling load. Side panels are inexpensive and an effective fix for this problem.

Install a low-flow pre-rinse sprayer valve. At around \$60 per valve, these devices help restaurants save up to \$1,700 per year on natural gas and water bills, and the payback period is often less than two months.

Set your hot water temperature at around 130°F. A 5°F reduction in thermostat setpoint can yield a reduction of 6 percent in natural gas consumption per year.

Ensure that the automatic flue damper is on. Check and see if the switch to the automatic flue damper of your hot water heating system is on. This damper automatically closes when the burners are off and saves energy by blocking heat from escaping through the flue.

Fix leaks. A leaky faucet or dishwasher that loses one-tenth of a gallon per minute will waste more than 50,000 gallons over the course of a year. Remember that every drop of water wasted is billed twice, and sewage costs are higher than water costs.

Maximize efficiency of dishwashers. Set the dishwasher tank temperature to 160°F, and set the booster heater setpoint to 180°F. Or, follow the setpoint specified by the manufacturer. Add or replace old wash curtains to conveyor washers—wash curtains improve energy efficiency by trapping heat. Also, turn off the internal tank heater of your dishwasher at night—leaving this on overnight wastes energy by unnecessarily heating water.

Longer-Term Solutions

When it is time to replace your old appliance, think in terms of minimizing life-cycle costs. Consider purchasing Energy Star-qualified products, and look for rebates offered by manufacturers, dealers, municipalities, and your local utility companies. The Energy Star program (www.energystar.gov) provides a list of efficient equipment and a user-friendly store locator. The U.S. Environmental Protection Agency's WaterSense program (www.epa.gov/WaterSense/index.htm) provides a list of water-efficient fixtures. The free life-cycle cost calculator offered by the Food Service Technology Center (www.fishnick.com) is useful to make your investment decisions prior to purchasing new equipment.

Invest in connectionless steamers for cooking. Connectionless steamers can typically operate 60 percent more efficiently than traditional boiler-based steamers. In addition, connectionless steamers use less water by saving up to 174,500 gallons per year, and they require less maintenance.

Upgrade to energy-efficient pots and pans. New, energy-efficient cookware can capture and transfer much more of the heat from your stoves to the food being cooked. Not only does this save energy—it also shortens cooking time. A well-designed stock pot could increase the energy efficiency of gas ranges by up to 60 percent.

Call your contractor to perform a ventilation air-balance test. Any air that exits the building through exhaust hoods and fans must be replaced with outside air (makeup air); this is called air-balance. If the replacement air doesn't come in, the ventilation hood is not capturing and releasing cooking smoke and steam. Exhaust systems that are out of balance cost you money.

Install a variable-speed (exhaust) hood controller. Commercial kitchen ventilation devices typically operate at 100 percent capacity, even during idle times, resulting in wasteful losses of conditioned air. A variable-speed hood controller activates the exhaust fan only when it is needed and only at the required speed. If installed appropriately, this technology yields a one- to two-year payback.

Install fan controllers for walk-in coolers and freezers.

Controllers that slow air-cooling fans when full-speed operation is unnecessary can save up to 60 percent of energy used in refrigeration. Payback can be as short as one year.

Install electronically commutated fan motors. Such motors can be installed in walk-in refrigerators or freezers, or those with failing fan motors. Annual cost savings per motor could result in a one-year payback.

Retrofit the defrost controller. A “smart” defrost controller can reduce the number of daily defrosts by about 30 percent and can help maintain the quality of products kept in the freezer because they maintain a more constant temperature.

Invest in remote air-cooled ice machines. Remote units are efficient because they discharge heat outside the building. The payback period is approximately three years.

Use a larger ice machine. A 520-pound-per-day ice machine is typically more efficient and productive than a 200-pound-per-day unit. And bigger units do not cost twice as much as smaller units. Larger ice machines also make it easier to shift your ice making to nighttime.

Invest in a high-efficiency, condensing water heater. These units can potentially reduce annual natural gas consumption by 20 percent, and the payback period for a high-efficiency system is two to three years.

Consider low-flow fixtures. Low-flow toilets, waterless urinals, and urinal sensors can significantly reduce cold-water usage.

Install energy-efficient windows. High-performance windows with double- and triple-pane glazing and other

high-performance glazing reduce cooling and heating needs and improve guest comfort. Installing solar glazing or reflective film inside existing windows may be a more cost-effective option than new windows.

Paint the exterior in a light color. A light-colored building exterior can help reflect summer heat, ease cooling loads, and reduce energy consumption. Light-colored roofing materials can lower AC loads by up to 60 percent in some commercial buildings, achieving typical savings of around 20 percent, extending roof life, and earning payback within only a few years. These measures are particularly suitable for buildings with high AC use.

Strategic Solutions

Embracing sustainable practices may give you a competitive advantage because you can brand yourself as green.

Certified Green Restaurants. You can obtain this certification from the Green Restaurants Association (www.dinegreen.com) by meeting the following criteria: recycling, phasing out polystyrene foam, and committing to complete “environmental steps” ranging from energy and water efficiency to purchase of sustainable food products.

Certified Green Commercial Kitchen Program. The FoodService Warehouse (www.foodservicewarehouse.com) helps restaurants cut utility costs by offering advice on how to conserve energy and water, reduce waste, and adopt a greener cleaning practice. Operators who adopt green practices receive a certification and are rewarded with rebates for FoodService Warehouse products.