



ENERGY STAR® Guide for Cafés, Restaurants, and Commercial Kitchens



ENERGY STAR



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ENERGY STAR®, a U.S. Environmental Protection Agency program, helps us all save money and protect our environment through energy efficient products and practices. For more information, visit www.energystar.gov.

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IN PARTNERSHIP WITH

PG&E's Food Service Technology Center (FSTC) is the industry leader in commercial kitchen energy efficiency and appliance-performance testing as well as a leading source of expertise in commercial kitchen ventilation and sustainable building design. Learn more at www.fishnick.com.

The National Restaurant Association's Conserve Program is designed to initiate and inspire actions that improve a company's bottom line but also benefit people and the planet. Get inspired at conserve.restaurant.org.

ACKNOWLEDGMENTS

This best practices guide was created with the assistance of California's four investor-owned utilities (Southern California Gas Company, Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison). These energy suppliers are working together to provide comprehensive energy efficiency resources for California's food service industry, including, but not limited to, the following resources: rebates for cooking and refrigeration equipment, food-service-specific seminars and workshops, Web tools, energy audits, appliance testing, and energy education centers. The California energy efficiency research and educational programs are funded by California ratepayers under the auspices of the California Public Utilities Commission and are administered by the four investor-owned utilities.



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Disclaimer: All energy, water, and monetary savings listed in this document are based upon average savings for end users and are provided for educational purposes only. Actual energy savings might vary based on use and other factors.

Using energy efficiently is a sound business practice that improves profitability, reduces greenhouse gas emissions, and conserves natural resources. This guide is designed to help you identify ways to save energy and water in your restaurant, or other commercial or institutional kitchen, and boost your bottom line while helping to protect the environment.

AN INTRODUCTION: ENERGY STAR® FOR COMMERCIAL FOOD SERVICE (CFS)

Throughout this guide, commercial and institutional kitchen operators will learn about ENERGY STAR® and other energy-saving kitchen equipment options. This guide provides estimates of savings potential from energy efficient Commercial Food Service (CFS) equipment, suggestions on additional ways to save energy in your kitchen, and key resources to help you learn best practices.

ENERGY STAR, a voluntary labeling program managed by the U.S. Environmental Protection Agency (EPA) and recognized by more than 90 percent of Americans, helps us all save money and protect our environment. Operators of restaurants and commercial or institutional kitchens can save money annually and over the equipment lifetime by choosing ENERGY STAR certified models. To meet the program's stringent requirements for energy efficiency, manufacturers use high-quality components and innovative technologies that often lead to other benefits such as shorter cook times, improved recovery times, higher production rates, and longer product lifetimes. For added savings, many utilities offer rebates across ENERGY STAR's nine CFS equipment categories, including dishwashers, fryers, griddles, hot food holding cabinets (HFHCs), ice makers, ovens, refrigerators and freezers, steam cookers, and coffee brewers.

The current lists of ENERGY STAR certified products can be viewed at www.energystar.gov/cfs. For more information about the scope of products covered and the benefits of certified products, see the training presentations and individual product fact sheets on the ENERGY STAR Training Center at www.energystar.gov/training.

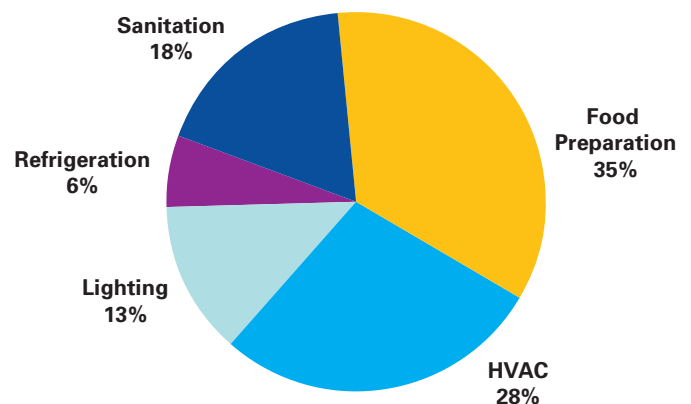
Operators who are using ENERGY STAR certified equipment are encouraged to tell their story! If you know of an organization or your organization has installed ENERGY STAR certified CFS equipment, we want to hear about it. EPA invites you to inspire others to improve the energy efficiency of their operations and help protect the environment. To submit a story, download the submission form at www.energystar.gov/cfs/success.

ENERGY EFFICIENCY AND YOUR KITCHEN

Restaurants are extremely energy intensive, using about five to seven times more energy per square foot than other commercial buildings, such as office buildings and retail stores. High-volume, quick-service restaurants may even use up to 10 times more energy per square foot than other commercial buildings.

Most commercial kitchen appliances are also very energy intensive. For instance, a typical electric deep-fat fryer uses more than 18,000 kilowatt hours (kWh) annually, whereas the average U.S. household's electricity use is approximately 12,000 kWh annually. As energy costs increase, investing in energy efficiency is a great way to protect your business against these rising prices.

Example of the Average Energy Consumption in a Full-Service Restaurant
(British Thermal Units [Btu])



When replacing old appliances or buying new ones, look beyond the sticker price. Ongoing costs of utilities and maintenance greatly outweigh the initial purchase price of a piece of equipment. Buying and installing equipment that has earned the ENERGY STAR label could trim thousands of dollars from your annual utility bills. In order to maximize savings from ENERGY STAR certified equipment, you must train your staff to use energy wisely by following good operating practices.

ENERGY STAR CERTIFIED REFRIGERATORS, FREEZERS, AND ICE MAKERS

Refrigerators and Freezers

ENERGY STAR certified commercial refrigerators and freezers offer average **energy savings of 20 percent** compared to standard models.



Cost-Saving Tips

- ▶ Look for the ENERGY STAR label
- ▶ Turn off door heaters when possible
- ▶ Inspect and clean the coils
- ▶ Set defrost timers
- ▶ Replace worn gaskets
- ▶ Ensure adequate airflow around the unit and the evaporator
- ▶ Maintain door hinges and check that doors close firmly and completely

ENERGY STAR certified commercial refrigerators and freezers can save you:

- \$30 for electricity annually (per solid door refrigerator) or \$40 annually (per glass door refrigerator)
- \$50 for electricity annually (per solid door freezer) or \$90 annually (per glass door freezer)
- \$300–\$420 over the product lifetime (refrigerators)
- \$540–\$945 over the product lifetime (freezers)

The ENERGY STAR certified commercial refrigerators and freezers specification covers a wide array of solid, glass, and mixed solid/glass door (hybrid) product types, including reach-in, roll-in, or pass-through units; merchandisers; undercounter units; milk coolers; bottle coolers; and beer-dispensing units. Some design features that have increased the efficiency of these products include improved insulation and components, such as low-global warming potential refrigerants, high-efficiency compressors, improved coil design, and efficient interior lighting. ENERGY STAR certified refrigerators and freezers also emit less heat into the kitchen compared to standard models.

Ice Makers

Commercial automatic ice makers that have earned the ENERGY STAR label are on average **12 percent more energy efficient**. Batch-type ice makers are approximately **25 percent more water efficient** when compared with standard models.

The ENERGY STAR label can be found on air-cooled, batch-type (cubed) and continuous-type (flake and nugget) ice makers. Covered



products include ice-making head, self-contained, and remote condensing units (RCUs). Air-cooled RCUs designed for connection to remote rack compressors that are alternately sold with a dedicated RCU are also eligible. Water-cooled ice makers are not covered by the ENERGY STAR program. For a list of efficient water-cooled machines, see the Consortium for Energy Efficiency (CEE) list at cee1.org.

Technologies used in ENERGY STAR certified ice makers to make them more efficient include low-global warming potential refrigerants, harvest-assist devices, high-efficiency compressors, fan motors, and water pumps. Such technologies in ENERGY STAR certified equipment can result in longer product lifetimes and quicker ice harvesting compared to standard machines.

Cost-Saving Tips

- ▶ Look for the ENERGY STAR label
- ▶ Inspect and clean the coils and condenser
- ▶ Keep the bin lid closed
- ▶ Adjust the purge water timer
- ▶ Clean the machine regularly
- ▶ Cut down on your daytime electricity demand by installing a timer and shifting ice production to nighttime (off-peak hours), if possible, or consider purchasing a model with connected functionality
- ▶ Choose size wisely and you could get twice the ice capacity at half the energy cost per pound of ice (*bigger ice makers are typically more efficient than smaller ones, yet the price difference is usually not very large*)
- ▶ Avoid open-loop, water-cooled ice makers (*because of their high water cost, they are significantly more expensive to operate*)

ENERGY STAR certified ice makers can save you:

- \$125 for electricity annually (for batch-type) or \$185 annually (for continuous-type)
- \$905–\$1,345 over the product lifetime



ENERGY STAR CERTIFIED COOKING AND KITCHEN APPLIANCES

Steam Cookers

Steam cookers are an effective way to batch-cook food, but generating steam is an energy-intensive process. ENERGY STAR certified steamers have a sealed cooking cavity that consumes **60 percent less energy** than a traditional open-system design.

ENERGY STAR connectionless models can also **save 90 percent or more water** when compared with standard steamers. In many cases, the dollar savings are so great that it makes sense to replace an existing steamer with an ENERGY STAR certified one. Choose the right steamer for your application: boilerless (connectionless) designs work well for batch cooking; steam generator designs work well for à la minute cooking.



Cost-Saving Tips

- ▶ Look for the ENERGY STAR label
- ▶ Use the timed cooking mode instead of “manual mode”
- ▶ Reduce idle time
- ▶ Perform regular steam generator maintenance (this does not apply to connectionless steamers)
- ▶ Maintain door gaskets
- ▶ Use treated (filtered) water for steam production, but use city water for condensate cooling



ENERGY STAR certified steamers can save you:

- \$1,000 on energy bills annually
- An additional \$1,400 in water savings—totaling \$2,400 annually
- \$12,000 on energy bills over the product lifetime
- An additional \$17,000 in water savings—totaling \$29,000 in lifetime savings

Good practices can save you:

\$250 in annual energy costs for a traditional, electric, open-system steamer by eliminating an hour of on time per day.

The ENERGY STAR label can be found on gas and electric steam cookers. Eligible models include countertop models and floor models mounted on a stand, pedestal, or cabinet-style base. Steamers must be three-pan or larger to earn ENERGY STAR certification and cannot be a combination/hybrid steamer or a pressure steamer. ENERGY STAR certified steam cookers may incorporate increased insulation, better steam control, improved gaskets, smart condensate cooling water controls, and connectionless designs to reduce energy and water consumption.

Fryers

Standard-sized commercial fryers that have earned the ENERGY STAR label are up to **14 percent more energy efficient** than standard models. Large vat fryers that have earned the ENERGY STAR label are up to **35 percent more energy efficient** than standard models.



Cost-Saving Tips

- ▶ Look for the ENERGY STAR label
- ▶ Reduce idle time and turn off back-up fryers when possible
- ▶ Calibrate the fryer controls to operate at the correct temperature
- ▶ Perform regular maintenance
- ▶ Use a fry pot cover during idle periods
- ▶ Engage low power mode idle setting during long periods of fryer downtime, if available
- ▶ Use fryers with built-in filtration systems to improve operator safety
- ▶ Filter your oil daily and use a test kit to determine when oil needs be discarded



ENERGY STAR certified fryers can save you:

- \$245 (electric) or \$400 (gas) annually for standard-sized fryers
- \$180 (electric) or \$390 (gas) annually for large vat fryers
- \$2,500 (electric) or \$4,640 (gas) over the product lifetime for standard fryers
- \$1,870 (electric) or \$4,600 (gas) over the product lifetime for large vat fryers

Good practices can save you:

\$200 annually for a gas fryer by cutting four hours of idle time per day.

ENERGY STAR certified fryers may offer shorter cook times, faster temperature recovery times, and extended oil life, which can significantly reduce oil costs. Electric models may also utilize an insulated fry pot, which reduces standby losses and gives the fryer a lower idle energy rate. The ENERGY STAR label can be found on gas and electric open deep-fat fryers, including standard fry pot sizes and large vat fryers. Countertop and floor-type models are eligible for the ENERGY STAR label.

Ovens

The ENERGY STAR label can be found on convection, combination, and rack ovens. Commercial ovens that have earned the ENERGY STAR label may feature direct-fired gas or infrared burners, improved insulation and gaskets, and digital controls that help use energy more efficiently than standard models. These technical approaches can lead to higher production capacity, improved air circulation, and faster and more uniform cooking processes. These benefits can also lead to a reduction in heat loss by the oven, leading to a cooler kitchen and improved working environment.



Cost-Saving Tips

- ▶ Look for the ENERGY STAR label
- ▶ Reduce idle time and turn off back-up ovens when possible
- ▶ Fully load the oven when cooking
- ▶ Inspect and replace gaskets and tighten hinges when needed
- ▶ Maintain the steam generators in combination ovens
- ▶ Use treated water for steam generation and city water for condensate cooling in combination ovens
- ▶ Reduce preheat time—most ovens heat up in under 15 minutes
- ▶ Utilize the cool down mode at the end of the day to improve component life
- ▶ Clean the ovens regularly

Combination Ovens

Do your homework when buying a combination oven: ENERGY STAR certified models are on average **30 percent more energy efficient** than standard models. The combination oven is a versatile piece of cooking equipment, which often includes a self-cleaning feature. Operating a combination oven in “steam” or “combination” mode typically uses more energy and water than operating it in convection mode. Use the oven’s programming capabilities to properly control different cooking modes to maximize energy efficiency and cost savings. Eligible gas combination ovens must have a capacity of six or more pans. For electric models, the pan capacity must be at least five pans and no



ENERGY STAR certified combination ovens can save you:

- \$730 (electric) or \$210 (gas) annually
- \$7,450 (electric) or \$2,500 (gas) over the product lifetime

Good practices can save you:

up to \$800 annually by reducing an electric combination oven’s idle time by two hours daily.

more than 20. Lastly, use combination mode wisely. Switch to hot air mode or turn off when not cooking.

Convection Ovens

Convection ovens cook food faster because of increased hot air circulation inside the oven cavity. ENERGY STAR certified convection ovens are approximately **20 percent more energy efficient** than standard models.



ENERGY STAR certified convection ovens can save you:

- \$70 (electric) or \$140 (gas) annually
- \$680 (electric) or \$1,660 (gas) over the product lifetime

Griddles

Griddles are a versatile, workhorse piece of equipment found on most cook lines. Griddles that have earned the ENERGY STAR label are approximately **11 percent more energy efficient** than standard models. Variations in efficiency, production capacity, and temperature uniformity make it important to choose wisely when shopping for a griddle.



The ENERGY STAR label can be found on gas and electric, single- and double-sided models that are thermostatically controlled. Manually controlled griddles and fry-top ranges are not currently eligible.



Cost-Saving Tips

- ▶ Look for the ENERGY STAR label
- ▶ Reduce idle time by turning the griddle down or off during periods of slow production
- ▶ Calibrate the griddle controls to operate at the correct temperature
- ▶ Replace missing control knobs

Some of the approaches manufacturers use to earn the ENERGY STAR label for their griddles include improved thermostatic controls, advanced burner design, and highly reflective plate materials. Some benefits of these high-performance griddles include improved uniformity of temperature across the griddle plate and a higher production capacity.

ENERGY STAR certified griddles can save you:

- \$130 (electric) or \$90 (gas) annually
- \$1,330 (electric) or \$1,100 (gas) over the product lifetime

Good practices can save you:

\$175 annually from a gas griddle by cutting three hours of idle time per day.

HFHCs

ENERGY STAR certified HFHCs typically feature improved insulation, so heat stays in the cabinet and out of the kitchen. An insulated ENERGY STAR certified holding cabinet is approximately **70 percent more energy efficient** than a standard model.



The ENERGY STAR label can be found on glass and solid door cabinets (fully enclosed compartment with one or more doors). Additionally, ENERGY STAR certified HFHCs may feature technologies such as full-perimeter door gaskets, magnetic door handles, and/or Dutch doors for increased efficiency. These approaches help certified models to offer improved temperature uniformity within the cabinet and a cooler external cabinet temperature—resulting in a cooler kitchen and reduced impact on your air conditioning systems.

Cost-Saving Tips

- ▶ Look for the ENERGY STAR label
- ▶ Shut off overnight
- ▶ Replace missing or worn out control knobs
- ▶ Use humidity settings wisely to provide maximum benefit; holding cabinets may use more energy when operated in wet mode
- ▶ Maintain gaskets and door latches



ENERGY STAR certified HFHCs can save you:

- \$310 on utility bills annually
- \$3,100 over the product lifetime

Good practices can save you:

\$600 annually by turning off an un-insulated holding cabinet when the kitchen is closed (8 hours).

Dishwashers

From an operational standpoint, dishwashers are one of the most expensive pieces of equipment in your kitchen. Commercial

dishwashers that have earned the ENERGY STAR label are on average **40 percent more energy efficient**. ENERGY STAR certified commercial flight-type dishwashers are 50 percent more energy and water efficient than standard models. ENERGY STAR certified dishwashers have features that conserve energy and water such as advanced controls and diagnostics, improved nozzles, heat recovery technology, and a rinse arm design.

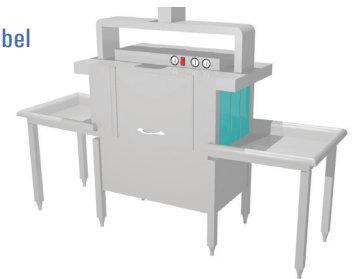


You can improve the efficiency of your dishwasher even further with inexpensive good practices, such as:

- Run fully loaded dish racks through the dishwasher. Cutting wash cycles could save you hundreds of dollars annually in energy, water, and chemical charges.
- Pay attention to your dishwasher’s pressure gauge—if it’s showing pressure above 25 psi, there is a good chance you are using much more water than is necessary. Most dishwashers require only around 20 psi.
- If you have a conveyor-style dishwasher, make sure you are using it in auto mode, which saves electricity by running the conveyor motor only when needed.

Cost-Saving Tips

- ▶ Look for the ENERGY STAR label
- ▶ Turn off dishwasher and booster heater at night
- ▶ Replace torn wash curtains
- ▶ Repair leaks and perform regular maintenance
- ▶ Replace worn spray nozzles
- ▶ Replace worn dish racks
- ▶ Engage low power mode during long periods of downtime, if available, or between mealtimes
- ▶ Make sure to effectively scrape dishes to get the most out of the wash water
- ▶ Check tank fill sensors to ensure that wash and rinse tanks are not overfilling



Although many variables play into what type of dishwasher a facility may require, smaller restaurants typically use undercounter or door-type dishwashers, whereas conveyor-style and flight-type dishwashers are often found in larger restaurants and institutional kitchens. All of the above-mentioned dishwasher types are eligible to earn the ENERGY STAR label.

The ENERGY STAR label can be found on high-temp (hot water sanitizing), low-temp (chemical sanitizing), and dual sanitizing machines. The following product types are eligible: undercounter; single-tank, door-type; single-tank conveyor; multiple-tank conveyor; and flight-type machines. Glasswashing machines and pot, pan, and utensil machines are also eligible.

To save even more money, consider purchasing a dishwasher with waste heat recovery technology.

ENERGY STAR certified commercial dishwashers can save you:

- \$5,800 annually and \$73,000 over the product lifetime of flight-type machines
- \$1,400 annually and \$18,000 over the product lifetime for other eligible dishwashers
- Additionally, ENERGY STAR certified flight-type machines can save over 150,000 gallons of water annually

BEYOND ENERGY STAR: ADDITIONAL ENERGY EFFICIENT KITCHEN EQUIPMENT OPTIONS

If the ENERGY STAR label is not available for the equipment type you are looking for, don't worry. You still have options for energy efficient kitchen equipment. You can ask distributors and manufacturers for energy use information, and check online for equipment reviews. The California CFS incentive program is also a useful third-party resource because, like ENERGY STAR, appliances that qualify for the program must meet designated efficiency standards. The list of qualifying appliances can be found at www.fishnick.com/saveenergy/rebates.

Broilers

Broilers are true kitchen workhorses, but their dependability and simplicity come at a price: searing heat requires a great deal of energy, and broilers have simple, non-thermostatic controls. This combination can make the broiler the most energy-intensive cooking appliance in the kitchen. For example, one gas broiler can use more energy than six gas fryers. A new generation of broilers incorporates lids, thermostatic controls, advanced cooking surfaces, and improved radiants. These features control the broiler's energy consumption or reduce the number of burner BTUs required to heat the cooking surface. These features can reduce broiler energy use by as much as 40 percent.

Cost-Saving Tips

- ▶ Limit preheat time to 20 minutes
- ▶ Turn off unneeded sections
- ▶ Reduce idle time
- ▶ Replace missing knobs
- ▶ Adjust standing pilots



Good practices can save you:

\$800 annually by cutting out three hours of idle time per day.

Ranges

The range top is one of the most widely used pieces of equipment in restaurant kitchens. Ranges are manually controlled and can be energy guzzlers depending on how you operate them. To improve energy efficiency on your gas range, consider changing your cooking vessel. Pot designs incorporating metal fins on the bottom increase the surface area exposed to the flame, thus considerably improving heat transfer. A potential alternative to traditional ranges is an induction range. Although induction ranges are more expensive,

they are very efficient and offer rapid heat up, precise temperature control, and low maintenance.

Cost-Saving Tips

- ▶ Maintain and adjust burners
- ▶ Calibrate the standing pilots
- ▶ Turn off burners when not in use
- ▶ Reduce idle time
- ▶ Replace missing knobs



Walk-In Refrigerators and Freezers

Walk-in refrigerators and freezers are important to any successful restaurant. Proper operation and maintenance can cut energy costs and prevent costly equipment failure. Improve this equipment's energy performance with a few inexpensive upgrades and good practices, such as:

- Adding strip curtains or plastic swing doors and automatic door closers to your walk-in refrigerator or freezer: they are inexpensive and easy-to-install.
- Swapping out incandescent light bulbs for ENERGY STAR certified light-emitting diode (LED) light bulbs, which not only use less energy but also emit less heat into the walk-in.
- Installing electronically commutated motors on the evaporator and condenser fans can reduce fan energy consumption by approximately two-thirds.
- Performing walk-in maintenance, such as:
 - Check and replace door gaskets
 - Check and replace the door sweep
 - Adjust door hinges
 - Clean evaporator and condenser coils
 - Insulate refrigerant suction lines
 - Check refrigerant charge

Cost-Saving Tips

- ▶ Allow air circulation through the evaporator
- ▶ Insulate suction lines
- ▶ Check refrigerant charge
- ▶ Repair and realign doors
- ▶ Clean coils
- ▶ Ensure that doors are not propped open
- ▶ Use auto door closers
- ▶ Confirm that the evaporator is not blocked by product packaging

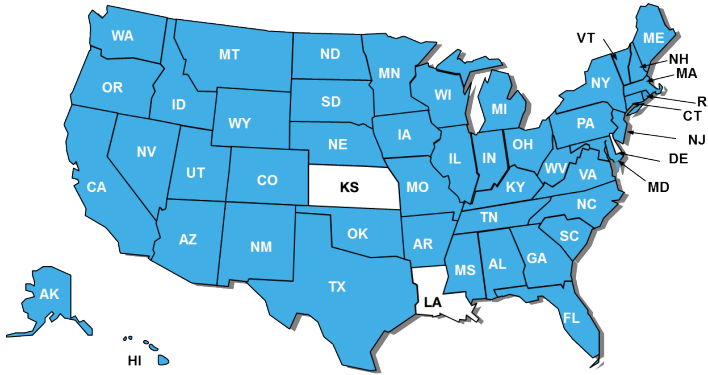


ELIGIBLE INCENTIVES AND REBATES FOR EFFICIENT KITCHEN EQUIPMENT

Not only will ENERGY STAR certified equipment save you money over the product lifetime, but you may also get money back on your purchase via rebates or calculated incentives from your local energy utility.

More than 200 utilities across the nation offer incentives for commercial kitchen equipment. To see if your state utility offers incentives, use the map below, contact your local utility, or visit www.energystar.gov/rebatefinder. Utility programs change on a regular basis. Please confirm with your utility that a rebate is still available prior to making a purchase.

Map of Available CFS Utility Incentives



States in blue have utilities that offer rebates for energy efficient kitchen equipment. If you are doing a major renovation or retrofit, you should contact your utility about available rebates. Even if the utility does not offer a rebate on efficient kitchen equipment, it may offer custom incentives for your project.

Incentive ranges for CFS equipment currently supported under ENERGY STAR are as follows:

PRODUCT	INCENTIVE RANGE
Dishwashers	\$15–\$1,500
Fryers	\$80–\$1,700
Griddles	\$30–\$1,600
HFHCs	\$75–\$1,000
Ice makers	\$35–\$700
Ovens	\$150–\$7,000
Refrigerators and freezers	\$40–\$400
Steam cookers	\$50–\$2,600

Find Monetary Incentives
 Access the ENERGY STAR Rebate Finder at www.energystar.gov/rebatefinder.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

Selecting ENERGY STAR certified CFS equipment can reduce the heat output into your commercial kitchen and potentially reduce the impact on your HVAC system—lowering your utility bills and increasing comfort. Below are some additional tips to help make smart decisions about your facility’s HVAC system.



Light Commercial HVAC (LCHVAC)

For many facilities, heating and cooling is second only to food preparation in terms of annual energy consumption. ENERGY STAR certified LCHVAC equipment can save \$130 per year or more than \$2,000 over the equipment’s lifetime.

To save additional energy in your facility, look for ENERGY STAR certified ventilating fans for the bathroom and ceiling fans in the front of the house. ENERGY STAR certified ventilating fan models use 50 percent less energy than standard models. Certified ceiling fan/light combination units are over 60 percent more efficient than conventional units.

Cost-Saving Tips

- ▶ Look for ENERGY STAR certified LCHVAC if your facility is smaller and you do not have commercial code requirements
- ▶ Clean heat-transfer coils
- ▶ Replace air filters
- ▶ Consider an Energy Management System
- ▶ Repair broken duct work
- ▶ Re-commission economizers

According to CEE, at least 25 percent of all rooftop HVAC units are oversized, resulting in increased energy costs and equipment wear. Properly sized equipment dramatically cuts energy costs, increases the life of the equipment, and reduces greenhouse gas emissions.

Commercial Water Heaters

Commercial kitchens can also benefit from ENERGY STAR certified commercial water heaters, which could save a full-service restaurant \$850 annually. The ENERGY STAR label can be found on gas storage and tankless units that use 75 percent of the energy of a conventional commercial unit by employing more efficient heat exchangers.

Cost-Saving Tips

- ▶ Check water heater set points to ensure that the water is heated to the correct supply temperature
- ▶ Insulate all hot exposed water lines

For more information on ENERGY STAR certified HVAC products and savings opportunities, see the commercial water heater, ventilating fan, ceiling fan, and LCHVAC specifications at www.energystar.gov/products.

Commercial Kitchen Ventilation (CKV)

Kitchen ventilation is the single biggest user of energy in a CFS facility. An unbalanced or poorly designed kitchen exhaust system can allow heat and smoke to spill into your kitchen, spelling trouble for both your restaurant's air quality and for your utility bills. Spillage leads to a hot, uncomfortable working environment and higher energy bills for air-conditioned kitchens. Some best practices to optimize your CKV system and save energy include:

- Keep the kitchen cool and smoke free by adding side panels, pushing back appliances, moving four-way makeup air (MUA) diffusers away from the hood, and centering heavy-duty cooking appliances.
- Reduce exhaust and MUA fan energy by turning the fans off during non-business hours.
- Install a demand-based exhaust control that uses sensors to monitor your cooking and varies the exhaust fan speed to match your ventilation needs. Demand ventilation controls could reduce your exhaust system costs by anywhere from 30 to 50 percent and can either be installed on new equipment or retrofitted to existing hoods. However, it is important to make sure that the hood effectively captures heat and smoke and that the ventilation system is balanced before installing a demand control kitchen ventilation (DCKV) system.

If you are planning a new kitchen or renovating an old one, check out "Improving Commercial Kitchen Ventilation System Performance," a two-part kitchen ventilation design guide written by the experts at PG&E's FSTC and available at www.fishnick.com/ventilation/designguides.

Look for Award-Winning Ventilation Designs

The ENERGY STAR Emerging Technology Award is an extension of the trusted ENERGY STAR brand and is given to innovative technologies that meet rigorous performance criteria to reduce energy use and lower greenhouse gas emissions. These award-winning systems could **cut your energy use by 60 percent or more!** For more information, visit www.energystar.gov/emergingtech.



LIGHT BULBS AND LIGHTING FIXTURES

Lighting is a significant energy user—averaging 13 percent of the total energy use of a restaurant—and is a great place to start an efficiency upgrade. ENERGY STAR certified light fixtures and bulbs, used in both the front and back of the house, save energy, save money, and help protect the environment.



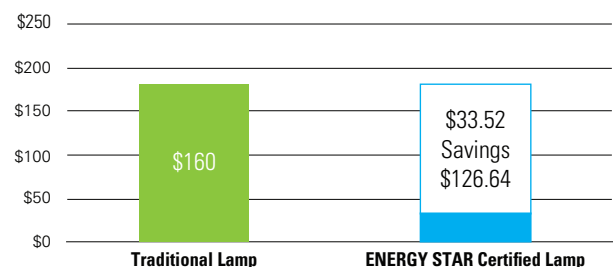
In a typical restaurant, lights are usually on for 16 to 20 hours a day. For many areas in your restaurant, ENERGY STAR certified LED bulbs and fixtures are your ticket to savings. An ENERGY STAR certified light bulb uses up to 90 percent less energy than traditional bulbs, lasts at least 15 times longer, and produces 70–90 percent less heat. Upgrading lighting systems with efficient light sources, fixtures, and controls can reduce lighting energy use, improve the visual environment, and impact the sizing needs of HVAC and electrical systems.

ENERGY STAR Lighting Tips:

- Install ENERGY STAR certified fixtures and light bulbs in your dining area to use 70–90 percent less energy and produce 70–90 percent less heat. ENERGY STAR certified lighting also lasts at least 15 times longer than incandescent lighting.
- Install occupancy sensors in closets, storage rooms, break rooms, restrooms, and even walk-in refrigerators. Look for sealed, low-temperature-specific sensors for refrigerated environments. Check for compatibility between controls and your energy efficient lighting.



Annual Savings After Replacing Eight Traditional Lamps with Eight ENERGY STAR Certified Lamps



- Upgrade your restaurant’s lighting if it is using linear fluorescent lighting with T12 lamps and magnetic ballasts. T12 lamps and fixtures are generally no longer available under the new federal laws regulating lighting efficiency. Switch to more efficient, longer lasting, fully integrated LED fixtures; these are typically a better bet for performance and safety than simply swapping out tubes.
- Look for utility incentives for lighting upgrades in your area. Visit www.energystar.gov/rebatefinder.
- Visit www.energystar.gov/lighting for additional helpful lighting information and cost-saving information.

ENERGY STAR Certified vs. Traditional Light Bulbs: Potential Savings Across U.S. Restaurants

If each of the nearly 1 million restaurants in the U.S. replaced only one traditional light bulb with an ENERGY STAR certified bulb, the restaurant industry could save nearly \$30 million annually and reduce CO₂ emissions by more than 466 million pounds each year, equivalent to the emissions from more than 44,000 passenger vehicles.

Calculations based on 980,000 restaurants, according to the National Restaurant Association 2013 Restaurant Industry Forecast.

FRONT OF THE HOUSE (AND OTHER PARTS OF YOUR FACILITY)

ENERGY STAR Options

The ENERGY STAR program covers more than 70 product categories, many applicable to other areas of your restaurant or facility. From televisions and computers/monitors to energy efficient windows, learn more about these and other products below!



Digital Signage

Did you know that the ENERGY STAR program covers commercial signage displays that can be used for digital menu boards? Commercial signage displays that earn the ENERGY STAR label are, on average, **18 percent more energy efficient** than conventional models. If all professional displays sold in the United States were ENERGY STAR certified, the cost savings would grow to more than \$55 million each year, and more than 1 billion pounds of annual greenhouse gas emissions would be prevented, equivalent to the emissions from more than 95,000 vehicles.

Televisions and Audio/Video Products

Televisions that earn the ENERGY STAR label are on average **27 percent more energy efficient** than conventional models. TVs as large as 80” and have features such as Internet connectivity have earned the ENERGY STAR label. The ENERGY STAR label can also be found on products like audio amplifiers, soundbars, AV receivers, and Blu-ray disc players.

Computers, Monitors, and Printers

An office equipped with a desktop computer, LCD monitor, and multifunction device that have all earned the ENERGY STAR label

and have power management enabled can **save up to \$250 over the life of the products.**

Other Options

Patio Heaters

The best approach to saving money with patio heaters is to cut back their use—both for hours of operation and for the number of patio heaters running at any given time. Patio heaters are radiant devices that heat up quickly, so there is no reason to leave them running if a seating area is temporarily empty.

Good practices can save you:

\$175 per heater annually by cutting three hours of use per day.

Parking-Lot Lighting

Most parking lots are illuminated by older high-intensity discharge lighting technology without any energy-saving controls. New LED technology can cut parking-lot lighting energy bills by 40 percent or much more with controls, while delivering additional benefits, including long life, reduced maintenance costs, and improved lighting uniformity.

The U.S. Department of Energy’s (DOE) Better Buildings Alliance has developed a performance specification to help building owners take advantage of these improved lighting technologies.

Restaurants are invited to join the Lighting Energy Efficiency in Parking campaign for access to tools and technical assistance to help lower their facility’s exterior lighting operating costs through thoughtful design of a new parking site or lighting retrofit. Campaign members have unique access to the technical expertise and may be recognized for their achievements. For more information, visit www.leepcampaign.org.

ADDITIONAL SAVINGS TIPS: WATER AND WASTE

Water Use

In addition to energy-saving equipment, using water more efficiently preserves water supplies, saves money, and protects the environment.

By conserving hot water, you trim not just one but two bills: one for the water and sewer, and another for the electricity or natural gas required to heat the water used in bathroom faucets, kitchen sinks, pre-rinse spray valves (PRSVs), and dishwashers.



Good practices can save you:

- \$1,000 annually by fixing leaks in sinks, mop stations, and dishmachines
- \$1,800 annually by turning down dipper wells and making sure they are OFF when the kitchen is closed

WaterSense®

Similar to the ENERGY STAR label, the WaterSense label identifies water-efficient products and programs that are independently certified for efficiency and performance. WaterSense is a partnership program sponsored by EPA. Additional information is available at www.epa.gov/watersense.

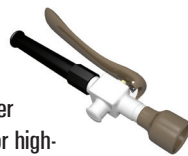
To reduce your restaurant's water consumption, look for WaterSense labeled plumbing and irrigation products and work with irrigation professionals certified by a WaterSense labeled program if you irrigate your landscape.

- WaterSense labeled toilets are 20–60 percent more water efficient than standard models.
- WaterSense labeled urinals are at least 50 percent more water efficient than standard models.
- Replacing a standard clock timer with a WaterSense labeled weather-based irrigation controller can reduce irrigation water use by 15 percent.
- Installing new or replacing existing spray sprinkler bodies with WaterSense labeled models throughout an in-ground irrigation system with high water pressure can reduce irrigation water use by as much as 22 percent.

A WaterSense labeled commercial PRSV is one of the most cost-effective energy- and water-saving devices available to the food service operator. And it is easy to install! Just unscrew your old spray valve and screw in your new, water-efficient one.

WaterSense Labeled Commercial PRSVs

In addition to minimizing water consumption, reduce your water-heating and sewer expenditures per month with WaterSense labeled PRSVs. Typical spray valves can release hot water at a rate of three to four gallons of water per minute (gpm). Although the current federal standard for high-efficiency PRSVs is 1.6 gpm, WaterSense labeled options have been independently certified to use 1.28 gpm or less. WaterSense labeled PRSVs are also required to meet spray force criteria and lifecycle testing to ensure performance. What does this mean for you?



Replacing one standard 1.6 gpm PRSV with a WaterSense labeled model can save:

- More than 7,000 gallons of water per year—equivalent to washing more than 4,800 racks of dishes.
- Nearly \$110 annually in water, sewer, and natural gas costs—paying for itself in as little as eight months!
- Approximately 1,300 kWh of electricity per year in kitchens that use electricity for water heating, or about \$200 per year in water, sewer, and electricity costs—paying for itself in as little as five months.

Because kitchens use hot water to pre-rinse dishes, replacing a PRSV with a WaterSense labeled model can reduce your annual natural gas use by about 5,700 ft³ per year. That's enough energy to run a convection oven for 12 hours a day for nearly three weeks. To learn more about WaterSense labeled spray valves, visit www.epa.gov/watersense/pre-rinse-spray-valves.



Save more money annually by implementing best practices. Facilities can use the *WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities* guide to identify best practices to implement and calculate potential water savings and simple payback. This guide is available at www.epa.gov/watersense/best-management-practices.

Cost-Saving Tips

- ▶ Install WaterSense labeled products, such as toilets, urinals, PRSVs, irrigation controllers, and spray sprinkler bodies
- ▶ Add 0.5 gallon per minute (gpm) aerators to faucets in public restrooms and aerators that limit flow to 2.2 gpm or less in kitchen sink faucets
- ▶ Repair leaks, especially hot water leaks
- ▶ Replace equipment that discharges water continuously, such as food disposals and dipper wells, with more efficient models, and turn off when not in use
- ▶ Consult with an irrigation professional certified by a WaterSense labeled program to help improve the efficiency of irrigation systems and reduce overall outdoor water use

Waste Reduction

Waste reduction is good business—helping with increased operating efficiency and cost savings. Decreased solid waste generation reduces collection and disposal costs just as reducing electricity and water consumption reduces utility bills. Waste minimization also may reduce your purchasing costs for restaurant supplies. Use of recycling and composting bins as well as sustainable take-out containers are excellent ways to demonstrate to your customers your efforts to be more environmentally sustainable. For help identifying waste reduction opportunities, please visit www.epa.gov/smm/wastewise.



BENCHMARK FOR CONTINUOUS IMPROVEMENT

Portfolio Manager Guidance

ENERGY STAR Portfolio Manager® online tool is designed to help businesses benchmark and track energy and water use, costs, and greenhouse gas emissions—all within a free, password-protected, online user account. Restaurant chains can benefit from benchmarking using Portfolio Manager by comparing similar properties (e.g., all restaurants of a given layout or prototype) in order to identify underperformers and target those properties for energy efficiency improvements.

Alongside functionality for tracking energy and water usage, EPA has recently implemented new Portfolio Manager functionality that allows building owners and managers (including restaurants) to benchmark and track 29 different waste types (including building materials, glass, paper, plastics, and trash). This “tracking trifecta”—energy, water, and waste—is

a powerful way to streamline your sustainability management program and gain a bird's eye view of your environmental footprint and resource costs. Portfolio Manager also offers the option to track renewable energy credits.

Your restaurant can generate a Statement of Energy Performance that includes the property's weather-normalized energy use intensity (kBtu/ft²), associated greenhouse gas emissions, and comparison to the national average for similar building types. Access to the tool and free online training on the use of Portfolio Manager is available at www.energystar.gov/benchmark.

Energy Audits

In addition to benchmarking, another step in improving the energy efficiency of your operations is to perform an energy audit on your facility. Energy utilities, state energy offices, and private sector service and product providers can assist you in identifying a trained professional to conduct your audit.

However, comprehensive, affordable energy audits are not available in every community. EPA provides free, online, energy-saving tools and information through its ENERGY STAR program. Basic guidance for self-assessment are part of the Guidelines for Energy Management, "Step 2: Assess Performance," at www.energystar.gov/guidelines. Additionally, the [ENERGY STAR Building Upgrade Manual](#) can suggest specific measures or upgrades a building owner or manager may wish to consider.

Once you have identified the areas of potential energy savings, decide which energy efficiency upgrades you want to install and what practices to initiate. If your finances and operating schedule make it impractical to perform all of the upgrades at once, you can take a staged approach and install them as time and money allow. The *Building Upgrade Manual* includes recommendations for how to stage different types/categories of upgrades to ensure that you can achieve maximal, cost-effective savings.

Remember, having your restaurant or facilities manager 100 percent on board is absolutely key to saving your restaurant money and protecting the environment. Your best-laid energy-saving plans are only as good as the staff that is implementing them!

START SAVING TODAY!

To recap what you have learned throughout this guide, you can reduce your commercial kitchen facility's energy and water consumption by following the tips below:

- **SELECT ENERGY STAR CERTIFIED MODELS.** If you are in the market for new equipment, think in terms of life-cycle costs, which include purchase price, annual energy costs, maintenance, and other long-term costs associated with the equipment. Although efficient appliances could cost more up front, lower utility bills and utility incentives can make up for the price difference. Be sure to ask your dealer or kitchen designer to supply you with ENERGY STAR certified equipment. For a list of ENERGY STAR certified CFS equipment dealer partners, visit www.energystar.gov/cfs/wheretobuy.
- **LOOK FOR THE WATERSENSE LABEL.** Whether pursuing water savings opportunities in your kitchen, your bathrooms, or outdoors, look for the WaterSense label, which identifies products and services certified to use at least 20 percent less water and perform as well as or better than standard models. WaterSense labeled products suitable for commercial kitchen facilities include toilets, urinals, pre-rinse spray valves, irrigation controllers, and irrigation spray sprinkler bodies. Irrigation

professionals certified by a WaterSense labeled program have demonstrated knowledge of water-efficient design, installation, maintenance, or auditing of irrigation systems and can help reduce your outdoor water use and water costs.

- **ASK YOUR UTILITY ABOUT REBATES.** Whenever you look for new equipment, check with your utility for rebates or visit the ENERGY STAR Rebate Finder at www.energystar.gov/rebatefinder.
- **INVESTIGATE ENERGY SAVINGS OPPORTUNITIES OUTSIDE THE KITCHEN.** The ENERGY STAR program covers more than just CFS equipment. Make sure you look for energy efficient products in all areas of your facilities.
- **CUT IDLE TIME.** If you leave your equipment ON when it is not performing useful work, it costs you money. Implement a startup shutdown plan to make sure you are using only the equipment you need, when you need it.
- **TAKE TIME TO EXAMINE YOUR OPERATIONS AND MAINTENANCE.** There are many low or no-cost energy and water savings options available.
- **MAINTAIN AND REPAIR.** Leaky walk-in refrigerator gaskets, freezer doors that do not shut, cooking appliances that have lost their knobs—all these "energy leaks" add up to money wasted each month. Don't let everyday wear and tear drive up your energy bills.
- **COOK WISELY.** Ovens tend to be more efficient than rotisseries; griddles tend to be more efficient than broilers. Examine your cooking methods and menu; find ways to rely on your more energy efficient appliances to cook for your customers.
- **RECALIBRATE TO STAY EFFICIENT.** The performance of your kitchen equipment changes over time. Thermostats and control systems can fail, fall out of calibration, or be readjusted. Take the time to do a regular thermostat check on your appliances, refrigeration, dishwashers, and hot water heaters and reset them to the correct operating temperature.
- **START BENCHMARKING.** Measure your progress with ENERGY STAR's Portfolio Manager tool. Access the tool and free online training at www.energystar.gov/benchmark.

For more information, please consult the following online resources:

- ENERGY STAR CFS Equipment: www.energystar.gov/cfs
- ENERGY STAR Restaurants: www.energystar.gov/restaurants
- ENERGY STAR Portfolio Manager: www.energystar.gov/benchmark
- PG&E Food Service Technology Center: www.fishnick.com
- National Restaurant Association Conserve: www.restaurant.org/conserve
- EPA WaterSense: www.epa.gov/watersense
- EPA WasteWise: www.epa.gov/smm/wastewise

SHARE YOUR STORY!

Operators of restaurants and any commercial or institutional kitchens that are using ENERGY STAR certified equipment are encouraged to tell their story at www.energystar.gov/cfs/success and inspire others today!

See how other operators have used ENERGY STAR certified CFS equipment in their operations and the results they have been able to achieve.

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For more information, visit www.energystar.gov/cfs.

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