

Boosting Restaurant Profits With Energy Efficiency

A Guide for Restaurant Owners and Managers

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Flex Your Power is California's statewide energy efficiency marketing and outreach campaign. Initiated in 2001, Flex Your Power is a partnership of California's utilities, residents, businesses, institutions, government agencies and nonprofit organizations working together to save money, energy and the environment. The campaign includes a comprehensive website, an e-mail newsletter, educational materials, Flex Alert notifications, retail promotions and advertising.

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For more information, contact:

Southern California Edison's Foodservice Technology Center in Irwindale
www.sce.com/ctac

The Southern California Gas Company's Food Service Equipment Center in Downey
www.socalgas.com/business

Pacific Gas and Electric Company's Food Service Technology Center in San Ramon
www.fishnick.com

San Diego Gas and Electric Company
www.sdge.com/foodservice



Flex Your Power also acknowledges the assistance of ENERGY STAR. ENERGY STAR collaborates with Flex Your Power and provides free energy efficiency information and technical support for restaurants. For more information, visit www.energystar.gov/smallbiz and click on "Restaurants."



Getting Started With Energy Efficiency

Cook Up Some Savings

Square-foot for square-foot, restaurants rank among the most energy-intensive commercial spaces in California. It's not just the cooking equipment that's to blame—heating, cooling, lighting and sanitation each account for major portions of the average restaurant's electricity and natural gas consumption.

As you might guess, all that energy use means there's a lot of room to start saving. But here's something you might not have guessed: Saving energy—and thus saving money—is easy. In some cases, it's as simple as changing a few everyday practices.

Take broilers, for example. Cutting out only one hour each day of broiler “on” time can translate to a savings of around \$450 annually. While \$450 might not sound like much at first, it could be huge when you think in terms of your profit margin. Consider this: If your restaurant operates with a profit margin of around 5 percent, you'll need about \$9,000 worth of sales to earn \$450.

Every dollar saved through energy efficiency is a dollar profit—and even modest improvements to efficiency can lead to major leaps in overall profits.

Tips for Buying New Cooking Equipment

In the case of new appliances, it pays to look beyond the sticker price. Make an energy-smart purchase by thinking in terms of life-cycle costs, which include purchase price, annual energy costs, and other long-term costs associated with the equipment.

Thinking in the long term can really pay off. In the case of ENERGY STAR qualified connectionless steamers, for example, the water and energy savings over a conventional boiler-based steamer could add up to several thousand dollars in just one year! Multiply those annual savings by the entire life of the appliance, and the financial benefits of energy efficiency become truly striking.

Energy audits

An energy audit is a great way to learn about your energy use and to identify custom efficiency options. Depending on your utility provider, both on-site and online options may be available—possibly for free. Log on to Flex Your Power's Rebates, Incentives & Services Locator to find programs in your area. Find it at www.FlexYourPower.org/assistance.

If you're in the market for new equipment, consider the following general tips for minimizing life-cycle costs:

- > Always ask equipment manufacturers and dealers for energy use information.
- > Check online for efficiency information on specific manufacturers and models. The website of PG&E's Food Service Technology Center is a great place to start. Find it at www.fishnick.com.
- > Ask dealers about maintenance. In some cases, energy-efficient equipment may require less upkeep than standard-efficiency equipment.
- > Buy ENERGY STAR qualified appliances whenever possible.

Tips for Tenants and Owners

How much you're willing to invest in energy efficiency will inevitably depend in part on whether you lease/rent or own your restaurant space. In either case, energy efficiency is in the best interest of everyone. Owners can reap the benefits of having a more up-to-date and marketable property, tenants can enjoy lower utility bills—and California can have a more stable and secure energy supply.

Whether you're a renter or an owner, try taking the first step in the energy efficiency process by listing all of your options for efficiency upgrades. Next, highlight those options that would benefit all parties involved. Here, look for the options that both cut energy costs and improve the marketability of the property. Lastly, use this shortened list of options as a jumping-off point for an energy efficiency conversation between you and your tenant (if you're the owner) or you and your landlord (if you're the tenant).

Find more information on special owner-tenant arrangements in the small-business section of www.FlexYourPower.org.

Appliances and Food Preparation

Saving Energy in the Kitchen

When it comes to saving energy in the kitchen, how you use your appliances can be just as important as what appliances you use. Buying and using an energy-efficient oven, for example, is undoubtedly a good starting point and could trim hundreds of dollars from your annual utility bills—but saving the most energy and money will require something more: good practices.

Cut idle time. Do you need all of your appliances on, all of the time? Probably not. Leaving equipment on standby costs you money, so implement a startup/shutdown plan to make sure you're using only the equipment that you need, when you need it. The savings can be substantial. Cutting only one hour of broiler idle time every day, for example, could save \$450 annually.

Cook wisely. Ovens tend to be more efficient than rotisseries; griddles tend to be more efficient than broilers. Examine your cooking methods and menu and find ways to rely on your more-efficient appliances.

Maintain and repair. Don't let everyday wear and tear drive up your energy bills. While a leaky gasket, clogged burner or loose oven-door hinge may not waste much energy, combine all three and suddenly the waste is not so insignificant. Stop waste by staying on top of repairs.

Recalibrate to stay efficient. It's likely that over time the performance of your kitchen appliances will degrade. Thermostats and control systems can fail or fall out of calibration. Take the time to do an occasional thermostat check and recalibrate as necessary to ensure that you're cooking at the right temperature. Repair or replace broken control panels on ovens, steamers, and other appliances that feature control systems, and don't forget to replace missing knobs on manually controlled appliances like ranges, griddles and broilers.

Check pilot lights. Older gas-burning appliances typically feature pilot lights, which require a constant stream of gas to stay lit. Check pilot flames occasionally to make sure you're using only as much gas as you need. How do you spot an over-fired pilot light? A tall yellow flame is the giveaway. Adjust flames so they are bullet shaped and mostly blue.

The biggest energy users

If you're looking for a shortcut to the biggest savings, consider focusing on what are likely some of your kitchen's biggest energy users: broilers, hot-top ranges, boiler-based steamers, pasta cookers, conveyor ovens, and combination ovens.

Buy energy-efficient appliances. Inefficient appliances make for an expensive double-whammy: in addition to having higher operating costs, inefficient kitchen appliances tend to emit more heat than their efficient counterparts resulting in a hotter kitchen and potentially forcing you to spend more to cool the air in your kitchen.

Buy with capacity in mind. Size up your food production needs and try to buy appliances that match your needs on a pounds-per-hour basis. Grossly oversized appliances can hit you in the pocketbook as both capital costs and operating costs. Overcapacity is particularly painful, as you pay to heat up the production capacity you will never use.

Steamers

Thanks to good heat transfer, steamers can rank among the more energy-efficient kitchen appliances. But just because steamers are sometimes more efficient than other kitchen appliances doesn't mean they can't use a lot of energy. Here's one reason why: until recently, most steamers were boiler-based water hogs, consuming an average of 40 gallons of water per hour. Bringing so much water to a boil requires a lot of energy—thousands of dollars worth per year for larger restaurants. Fortunately, steamer technology has come a long way in recent years. New “connectionless” steamers operate as a closed system—without a boiler

and a drain—so they consume far less water and, ultimately, far less energy. Many of the connectionless steamers are designed with output in mind and they can produce just as much food as traditional boiler-based steamers but at a much lower cost to operate.

Don't wait: Go connectionless

With ENERGY STAR qualified steamers, good things come to those who don't wait. That's because the savings are substantial. In most cases it makes financial sense to make the switch to an ENERGY STAR qualified connectionless steamer right away, rather than waiting until your old boiler-based steamer is ready to call it quits.

Close the door! Your profits are literally evaporating away if you're operating your steamer with its door open.

Use only as many compartments as you need. With steamers, two—or three or four—compartments are not better than one when it comes to saving energy and money. Shut down unnecessary compartments during slow periods.

Cut standby time. Eliminating an hour of standby time daily on a boiler-based steamer can save from \$50 to \$300 over the course of a year.

Use the timer. If you're not using your steamer's timer, you're probably paying the price for it. Timers save energy by ensuring that the steamer runs at full heat only when needed.

Keep it clean. Flushing out the boilers and removing mineral deposits will help ensure that you're always operating at maximum efficiency.

Fix leaks. When gaskets loosen or tear, don't waste time before replacing them. Steam leaks reduce cooking efficiency and drive up utility bills.

Invest in connectionless technology. Connectionless steamers require less maintenance than boiler-based steamers and consume far less energy and water. Field testing by PG&E's Food Service Technology Center (FSTC) has shown just how great the savings can be: In one head-to-head challenge between a three-pan connectionless steamer and a traditional, boiler-based steamer, the connectionless steamer slashed annual water bills by \$2,000 and annual electricity bills by \$3,000. Get in on the savings—look for an ENERGY STAR qualified connectionless steamer.

Broilers

Broilers are true kitchen workhorses, but their dependability and usability come at a price: All that scorching heat requires a great deal of energy—perhaps more than any other appliance in the kitchen. FSTC has reported that one broiler can use as much energy as six fryers! Making matters worse, broilers tend to rank among the least efficient appliances in the kitchen. Fortunately, a few good cooking habits can help trim energy waste and have a direct impact on your bills.

Cut preheat time. Don't start the heat before you need it—you'll waste energy and needlessly heat up your kitchen, forcing your air conditioner to work harder. Few cooking appliances require more than 20-30 minutes to preheat.

Reduce the cooking area. Because broilers use so much energy, turning off a section of your broiler can yield noticeable savings.

Eliminate standby time. Don't leave your broiler at full heat during long lulls in activity—turn it down or off whenever possible. If you can manage to cut three hours of standby time every day, you could save upwards of \$1,350 annually.

Rely on your griddle. For some restaurants, griddles may be good alternatives to broilers. Thermostatically controlled griddles tend to use far less energy than broilers, and grooved griddles can be used to sear "grill marks" onto foods so they look broiled.

Align broilers with exhaust hoods. Sometimes appliances get pulled out for cleaning and don't make it all the way back under the exhaust hood. This adds extra heat and smoke to the kitchen. Make sure that your broiler is fully under the hood and pushed as far back to the rear wall as possible.

Pasta Cookers

You might not think that doing something as simple as boiling water could cost thousands of dollars per year, but that's probably the case—especially if you happen to cook enough pasta to require a dedicated pasta cooker.

Dial in minimum settings. Do you boil water with your temperature dials to the max? If so, you might be throwing away more than \$1,000 per year. Find the minimum settings required to maintain a boil—your food will cook just as fast, and you'll slash your energy bills in the process.

Cut the idle time. Shutting down appliances during slow hours is always a good idea. In the case of pasta cookers, you could save \$600 annually simply by cutting two hours of idle time each day. If you can't shut down your pasta cooker, consider at least turning it down—a pasta cooker standing by at less than boiling temperature will use far less energy than a pasta cooker running a constant boil.

Ovens

In terms of energy efficiency, ovens are usually mid-level performers—they're often more efficient than broilers, but less efficient than steamers and pressure cookers. Although to date no ovens have secured ENERGY STAR status, several energy-efficient convection and combination-style models are available, with some even qualifying for utility-sponsored rebate programs.

Use “combi” mode sparingly. Combination ovens are attractive because of their versatility as a cooking platform and their space-saving ability to mix the duties of ovens and steamers. Unfortunately, this double-duty can come at a cost—combination mode can use double the energy use of convection mode. Worse still, ovens operating in combination mode can use upwards of 40 gallons of water per hour! Typically, it is not necessary to operate these units in the combination mode

Putting energy use in perspective

Sometimes it's difficult to appreciate just how energy-intensive kitchen equipment can be. Here's some information to help put things in perspective—and to underscore the importance of saving energy in your kitchen:

11,000 kWh is enough energy to . . .

. . . power a typical electric open deep fat fryer for about a year.

. . . power the average California home for nearly *two years!*

. . . keep six 13-W energy-efficient lamps lighted five hours daily for *77 years!*

Case in point: Porto's Bakery, Glendale

Porto's Bakery is a great example of how energy-efficient natural gas appliances can help a business expand while keeping energy bills to a minimum. Working with the Southern California Gas Company as part of a major expansion project, the bakery was

outfitted with energy-efficient griddles, ovens, fryers, and other pieces of cooking equipment. The investment in energy efficiency paid off: "Even though our sales went up by 40 percent, our gas costs stayed the same," reports Raul Porto, the bakery's owner.

during an entire cooking cycle. Follow the manufacturer's recommendations—use the oven's built-in programmability and limit the amount of cooking in the combination cycle.

Cut idle time. The bigger the oven, the more energy you're wasting by leaving it idling. The amount of energy wasted can quickly add up, especially with conveyor ovens, which allow heat to escape at both ends. Turn ovens down or off during slow periods, shut down your backup ovens during lulls and shut oven doors all the way when the oven is empty but still on.

Keep it full. It is more efficient to cook in a fully loaded oven than a partially loaded one. If your workload permits it, cook in large batches and then turn off the oven in between loads.

Replace seals and tighten hinges. When seals and gaskets tear, replace them. When oven door hinges loosen, tighten them and re-align the doors.

Ranges

Like broilers, ranges are manually controlled and can be energy guzzlers depending on how you use them.

Maintain and adjust burners. Wavy, uneven or yellow flames are all signs that it's time for a good burner cleaning and adjustment of the air shutter. Loosen the adjustment screw and move the shutter until the flame is bullet shaped and mostly blue, then retighten the screw. Never drill out the burners or the gas orifice to get a bigger flame—you'll end up lowering the efficiency of your burner.

Put a lid on it. Use a lid on stockpots to hold in heat, boost efficiency and shorten cook times.

Consider induction technology. Induction ranges are a potential alternative to traditional range tops; they are more expensive than traditional gas or electric ranges but offer very high efficiency, rapid heat up, precise controls, and easy maintenance. Induction hobs can be purchased as single units or grouped together and can be set on top-off or built-into counter tops. Induction cook tops do require magnetic cookware in order to work properly.

Griddles

Griddles are one of the few pieces of cooking equipment that can be purchased with either manual or thermostatic controls. Typically, thermostatically controlled griddles cost less to operate. Utility rebates are available in many parts of the state for the most efficient thermostatically controlled griddles.

Cut standby time. Chances are that you don't need your griddle ready and waiting all day, every day. Save up to \$250 annually by cutting three hours of griddle standby time per day.

Invest in a double-duty griddle. When the time comes to invest in a new griddle, consider a model that features both grooved and flat cooking surfaces—especially if you do a lot of broiling. As mentioned earlier, griddles tend to be more efficient than broilers, and grooved griddles can achieve broiler-like char marks on food. Shifting cooking duties from a broiler to a grooved griddle will save money.

Fryers

Fryers are one of four classes of kitchen equipment that include ENERGY STAR qualified models. Simply look for the ENERGY STAR label when narrowing down your purchase options; once you're up and running, mix in some of the smart cooking practices below and you'll be on the fast track to lower bills.

Cut idle time. FSTC has observed that kitchen fryers tend to spend upwards of 75 percent of the day idling. Cutting out four hours of idle time each day could save around \$250 annually for a gas fryer and about \$350 for an electric fryer.

Check and adjust thermostats. Are you cooking hotter than you think? It's not uncommon for fryer thermostats (or any other appliance thermostat, for that matter) to lose accuracy over time. Invest in periodic temperature checks and recalibration as necessary.

Efficient cooking appliances: Taking the next step

Make an ENERGY STAR list.

EPA's ENERGY STAR program takes the guesswork out of buying efficient appliances. Whether you're in the market for new or used equipment, start your hunt by making a list of the ENERGY STAR qualified models that fit your needs. Focus on these as you start narrowing down your options.

See what utility rebates are

available. Some energy-efficient cooking equipment qualifies for rebates from utility providers. To find out more, call your utility provider directly or log on to Flex Your Power's Rebates, Incentives & Services Locator: www.FlexYourPower.org/assistance.

Ask questions and check online

for reviews. If no ENERGY STAR qualified models exist for the type of equipment you're looking for, don't worry—you've still got options. Ask distributors and manufacturers for energy use information, and check online for equipment reviews. The FSTC website is a great place to start. Find it at www.fishnick.com.

Buy an ENERGY STAR qualified fryer. Fryers that have earned the ENERGY STAR label are up to 25 percent more energy-efficient than standard models. With natural gas fryers, the added efficiency can save you about \$350 annually.

Braising Pans

Close the lid. FSTC has found that you can use 50 percent less energy simply by closing your braising pan's lid during periods of extended use.

Buy an insulated braising pan. If you're in the market for a braising pan, look for one with insulated walls.

Holding Cabinets

When it comes to saving energy with hot food holding cabinets, the answer is in the insulation. Well-insulated holding cabinets have been shown to be up to 65 percent more efficient than uninsulated models. Expect to save between \$350 and \$450 annually simply by choosing a good insulated cabinet.

Shut it off! The U.S. Department of Energy reports that holding cabinets are frequently left on overnight. Don't waste energy by heating empty space—implement a shutdown schedule and make sure your cabinets are part of it. An uninsulated holding cabinet left idling for eight hours every night could wind up costing you around \$500 per year!

Buy an ENERGY STAR qualified cabinet. As of January 2006, California law requires that any new holding cabinet you purchase be at least an insulated ENERGY STAR qualified cabinet or equivalent. Utility rebates are available in many areas for select models.

Case in point: Montebello Unified School District

With an assortment of energy-efficient steam kettles, braising pans and other equipment, cafeterias throughout the Montebello Unified School District (MUSD) are saving natural gas and cooking smart. Southern California Gas Company helped make the upgrades happen, providing more than \$12,000 in

rebates for new gas equipment, which is saving the district as much as \$18,000 a year in energy costs. "With the money saved through energy efficiency, the school district budget can be spent in direct support of our students," said Derrick Williams, MUSD's energy manager.

A tale of two restaurants

With restaurant appliances and other equipment, energy consumption can vary dramatically from model to model. As a consequence, making equipment purchases without considering energy use is a bit like rolling the dice with your utility bills—you could just as easily end up with equipment that sips energy as equipment that guzzles it.

The table below helps illustrate this point with two hypothetical restaurants: one that chose 12 pieces of standard-efficiency equipment, another that chose 12 pieces of high-efficiency equipment. The “savings” column lists the amounts that Restaurant 2 could expect to save, relative to Restaurant 1, by using the high-efficiency equipment.

Equipment	Restaurant 1: Standard Equipment	Restaurant 2: Efficient Equipment	Savings/Year Restaurant 2
1. STEAMER	ELECTRIC, STANDARD-EFFICIENCY	ENERGY STAR QUALIFIED	\$2,700
2. BROILER	GAS, STANDARD-EFFICIENCY UNDERFIRED	GAS, HIGH-EFFICIENCY UNDERFIRED	\$660
3. OVEN	ELECTRIC, STANDARD-EFFICIENCY CONVECTION	ELECTRIC, HIGH-EFFICIENCY CONVECTION	\$290
4. GRIDDLE	GAS, STANDARD-EFFICIENCY	GAS, HIGH-EFFICIENCY	\$60
5. FRYER	GAS, STANDARD-EFFICIENCY	GAS, ENERGY STAR QUALIFIED	\$360
6. HOLDING CABINET	ELECTRIC, STANDARD-EFFICIENCY	ELECTRIC, ENERGY STAR QUALIFIED*	\$430
7. SPRAY VALVE	STANDARD SPRAY VALVE, 3 GPM	LOW-FLOW SPRAY VALVE*, 1.6 GPM	\$1,400
8. ICE MACHINE	STANDARD-EFFICIENCY ICE MACHINE	HIGH-EFFICIENCY ICE MACHINE	\$320
9. REACH-IN FREEZER	STANDARD-EFFICIENCY SOLID DOOR	ENERGY STAR QUALIFIED SOLID DOOR*	\$40
10. REACH-IN REFRIGERATOR	STANDARD-EFFICIENCY SOLID DOOR	ENERGY STAR QUALIFIED SOLID DOOR*	\$60
11. EXIT SIGNS	THREE INCANDESCENT	THREE LED-BASED	\$130
12. LIGHTING	EIGHT INCANDESCENT LAMPS	EIGHT COMPACT FLUORESCENT LAMPS	\$440

Annual Savings at Restaurant 2 Using High-Efficiency Equipment: \$6,890

Notes: All calculations except those relating to lighting and exit signs were done with online calculators provided by PG&E's Food Service Technology Center. Assumptions: \$0.13/kWh, \$1.00/therm, \$2.00/CCF water, \$3.00/CCF sewer. Steamer and spray nozzle savings include consideration of water and sewer costs. Attributes for standard-efficiency appliances and high-efficiency/ENERGY STAR appliances derived from default settings in online calculators. Calculations for lighting assume 100-W incandescent, 27-W CFL, 16 hours of daily use. Calculations for exit signs assume 40-W incandescent sign, 2-W light-emitting diode (LED) sign. Spray nozzle savings assume gas water heating.

*Now required in California.

Sanitation and Water Use

Save Water to Save Energy

For restaurants, saving water—especially hot water—makes great economic sense. By conserving hot water you trim not one but two bills: one for the water, and another for the electricity or natural gas used to heat it.

Don't ignore leaks. A leaky faucet or dish machine, or a stuck solenoid valve, that loses one-tenth of a gallon per minute will waste more than 50,000 gallons over the course of a year. If that same leak just happened to be hot water—you'd be spending hundreds of dollars heating water only to send it right down the drain!

Check your water temperature. Use a thermometer to make sure your water heater isn't working any harder than it has to; hot water should be around 140 degrees at the faucet of the pot sink closest to the dish machine.

Add aerators. Hand-sink faucets can use as much as 10 gallons of water per minute when not equipped with efficient water aerators. Outfit the hand sinks in your kitchen and bathrooms with low-flow aerators—you'll cut water use and ultimately save on water-heating costs.

Add insulation. Heating water is a significant expense for most restaurants. Fortunately, it's relatively easy to reduce that expense by adding insulation to your hot-water system. Start saving by simply wrapping your hot-water pipes with the insulated covers available at most hardware stores.

Activate the automatic flue damper. Many commercial water heaters have an automatic flue damper that closes when the burners are off. This damper saves energy by blocking heat from escaping up the flue. Make sure that the damper motor's switch is in the "on" position so that the damper will operate properly.

Control the recirculation pump. If your hot water system includes a recirculation pump, install a timer that turns the pump off when your kitchen is closed. You'll reduce the heat loss from your hot water pipes, potentially saving hundreds of dollars on energy costs.

Switch to low-flow pre-rinse spray valves. Depending on the size and workload of your restaurant, a low-flow spray valve could save you more than \$1,000 annually. The secret to the low-flow valve's success is its ability to save in three ways at once. By lowering your water consumption, the sprayer simultaneously slashes your water, wastewater-disposal and energy bills. And don't worry, low-flow

Case in point: Merkl's Deli & BBQ, Chula Vista

Merkl's Deli & BBQ in Chula Vista was designed with energy efficiency in mind. Among other features, the deli is outfitted with low-flow spray valves, which perform as well as standard valves but save vast amounts of water and cut water-heating costs. "They work great," reports Steve Wilson, one of the deli's co-owners. "I've actually been able to turn the water pressure down with them."

The California Urban Water Conservation Council (CUWCC) estimates that small and very small restaurants can use low-flow spray valves to cut water-heating energy by around 7,600 kWh annually. In addition to saving hundreds of dollars on electricity costs, conserving 7,600 kWh would prevent nearly 12,000 lbs of CO₂ from entering the atmosphere. For more information on spray valves, visit www.cuwcc.org.

doesn't mean slow—low-flow spray valves are engineered to work as well as or better than standard valves. As of January 2006, any new pre-rinse spray valves that you purchase are required by law to be low-flow models; however, thousands of old sprayers are still out there wasting water and energy. You may be able to replace your old valves for free by taking advantage of a give-away program through your local utility or water district.

Dishwashers

From an operational standpoint, dishwashers are one of the most expensive pieces of equipment in your kitchen. Every rack of dishes you wash can include as many as eleven separate cost items within the three main categories of water, water heating and chemicals. Smart purchasing, operations, and maintenance can save you thousands of dollars in the dishroom.

Don't waste the space! You'll pay the same amount to run a half loaded dish rack as a fully load one, so make sure you only run fully loaded dish racks through the dish machine. Cutting wash cycles could save you hundreds of dollars annually.

Turn it off. High-temp dishwashers typically feature internal tank heaters. If you've got one of these dishwashers and you're not turning it off at night, you're wasting energy by heating water that you don't need. The same holds true for booster heaters and dishwasher exhaust hoods: turn them off at night to save.

Check rinse pressure. Pay attention to your dishwasher's pressure gauge—if it's showing pressure above 25 psi, there's a good chance you're using much more water than is necessary. Most dishwashers require only around 20 psi.

Check water temperature. Follow manufacturer specifications for tank temperature and rinse temperature.

Operate conveyors in auto mode. If you have a conveyor-style dishwasher, make sure you're using it in auto mode, which saves electricity by running the conveyor motor only when needed.

Add or maintain wash curtains. Wash curtains—the plastic strips that hang on both sides of conveyor dishwashers—improve washing efficiency by trapping heat. Replace curtains when the old ones begin to deteriorate.

Design your new dishwashing system with both energy and water efficiency in mind. If you're in the market for a new dishwashing system, it'll pay to look into energy-efficient gas booster heaters. Compared to a standard electric booster heater, a gas booster heater could trim energy costs significantly due to the relative lower cost of natural gas as a fuel (though keep in mind that a gas booster heater could have a higher first cost and installation cost than the electric unit). Also, look for dishwashing systems that use one gallon or less of water per rack washed—typically, the less water required per rack, the less you'll pay in energy costs.

Consider heat recovery. Refrigerant heat-recovery systems use waste heat from the walk-in refrigerators and freezers to preheat water that can be used in the kitchen. These systems are relatively simple and have reasonable payback periods when installed in kitchens with moderate to high hot-water needs.

Refrigeration Systems

Refrigerators and Freezers

How often do you think about your refrigerator? Refrigerators tend to have tank-like durability, which can make them easy to forget about. But just because your refrigerator is working doesn't mean that it's working well—at least not when it comes to energy efficiency. As with any other mechanical equipment, refrigerator performance can dip over time. A few upgrades and a bit of maintenance can have a positive impact on your electricity bills.

Turn off door heaters. Simply switch off the door heater on your reach-in refrigerator or freezer and you could save up to \$75 annually per door. Turn the switch back on if you notice significant frost around the door or if there is water dripping on the floor from the front of the refrigerator—never do anything that compromises safety or performance.

Allow for air circulation. Refrigerators remove heat from inside the box and reject that heat out through the coils on the top or bottom of the unit. Don't push your reach-ins into tight spaces where that heat will build up or the unit will end up working harder and using more energy.

Clean condenser and evaporator coils. If you take a look at your refrigerator's condenser you'll see that the fins are magnets for dust and grime. Debris like this builds up on the fins, blocks air flow across the coils and drags down refrigeration efficiency. Dirty coils can also lead to early equipment failure and are cited by one manufacturer as the number one reason for service calls. Similarly, check and clean evaporator fins; find them behind the evaporative fans in your walk-in.

Close the lid on your food wells. Leaving the lid up on your prep table could increase electricity consumption by up to 50 percent.

Check and set defrost cycles. Defrosting is an energy-intensive process that can vary dramatically from restaurant to restaurant, so it's important to take some time to figure out which defrost settings are right for you. The key is to only defrost for as long as you need, which in most cases is no more than 15 minutes, four times daily. Find your defrost time clock: Use the pins on the outside ring to set the number of defrost cycles, and use the center dial to set how long each defrost cycle lasts. One

Pick your plan

When it comes to utility plans, being picky can be a good thing. Most utility providers offer an array of rate plans, so take the time to find out which one is right for you. Simply call your provider—they can help guide your decision by examining your billing history.

restaurant owner observed by Southern California Edison's engineers saved more than \$800 annually by shortening the length of each defrost cycle from 70 minutes to 15 minutes.

Replace old gaskets. Add new door gaskets to any refrigerator that has torn or loose door gaskets. In some areas, utility rebates are available for gasket replacements, and there are service companies that will “turnkey” replace all the worn gaskets in a restaurant.

The importance of peak power

Becoming more energy efficient is good business—for you and for the state as a whole. By consuming less electricity, you'll be helping to stabilize California's power grid during peak hours, which refers to the time of day—roughly between noon and 7:00 p.m.—when electricity demand is highest. If you're on a time-of-use electricity rate schedule, it's also when electricity is most expensive.

When peak energy supplies are at their lowest, a Flex Alert is triggered. That's your signal to cut back on electricity use wherever possible. Here are some good options for cutting demand during a Flex Alert:

- > Turn off all non-essential lighting.
- > Adjust air conditioner thermostat to 78° F or higher.
- > Shut off unneeded cooking equipment.
- > Make sure walk-in doors are shut (not propped open).

For more on Flex Your Power NOW!, peak electricity and time-of-use electricity plans, visit www.FlexYourPower.org/now.

Upgrade your walk-in. Strip curtains and automatic door closers are inexpensive, easy-to-install upgrades suitable for just about any walk-in. By some estimates, strip curtains alone can cut outside-air infiltration by 75 percent. Utility rebates that cover a big chunk of the upfront costs to purchase a strip curtain are often available. With a rebate, the payback on a strip curtain is usually well under one year.

Use efficient lights. Swapping out incandescent lights for low-temperature CFLs in your walk-in is a smart move. Incandescent lighting gives off much more heat than CFLs, forcing your refrigerator to work harder.

Shade remote condensers. Direct sunlight can really put a dent in the efficiency of a remote condenser. (Remote condensers are usually associated with walk-ins and can often be found on rooftops.) Use a few strategically placed panels to shade the condenser from direct sun during the hottest part of the day, while still allowing for good airflow into and around the condenser unit.

Insulate suction lines. On refrigeration systems with remote condensers, suction lines transport refrigerant from the evaporator to the compressor. Adding inexpensive insulation to suction lines can help keep them from absorbing heat during the transfer process, ultimately making the entire refrigeration process more efficient. Check with your utility—rebates may be available to offset the cost of the insulation.

Add night curtains to display cases. Open-case refrigerators may be a great way to put products at the customer's fingertips, but they're typically not a top choice when it comes to energy efficiency. Cut down on energy waste by installing night curtains, which will help trap cold air inside the refrigerator case while you're closed. The curtains are relatively inexpensive, and utility rebates are available in many parts of the state.

Recharge low refrigerant. Operating a walk-in with too little refrigerant puts extra strain on the compressor, driving energy costs up and increasing the risk of equipment failure. Fortunately, it's fairly simple to keep track of your refrigerant level; simply look for the sight glass—the small window into the refrigerant line—on the condenser. If you see bubbles while the system is running, then it's probably time to arrange for a recharge.

Switch to efficient fan motors. Installing efficient fan motors—specifically, the “electronically commutated” (ECM) variety—on a small, two-fan walk-in freezer has been shown to save about \$200 a year per fan. Naturally, the bigger the refrigerator and the greater the number of fan motors replaced, the greater the electricity savings will be. If you're in the market for a new walk-in, then California law requires you to install efficient fan motors. If you have an existing walk-in, consider swapping out the old fan motors for newer ECM models. Don't wait until your old fan motors fail: It's actually cheaper to plan ahead and upgrade to ECMs early rather than waiting for an emergency service call. Rebates are available in many parts of the state for ECM motors; check with your utility to see if you are eligible.

Buy ENERGY STAR. Starting January 2006, California law requires that any new reach-in refrigerator or freezer sold is at least ENERGY STAR qualified or equivalent. Compared to standard models, ENERGY STAR labeled commercial solid door refrigerators and freezers can lead to energy savings of as much as 45 percent. Utility rebates are available in many areas for the most efficient models.

Ice Machines

Shift ice production. Cut down on your daytime electricity demand by installing a timer and shifting ice production to nighttime off-peak hours. Most restaurants pay less for electricity at night and you'll be turning off a hot, noisy piece of equipment during normal kitchen hours. (See the text box on page 16 for more on “peak” electricity demand and why it's important.)

Shop for efficiency. Ice machine manufacturers voluntarily list the water and energy-use numbers for their ice-cube machines with the Air Conditioning and Refrigeration Institute (ARI) at www.ari.org. With this list in hand, you can comparison shop for the most efficient ice machine and save yourself hundreds of dollars a year in water and electricity. Many utilities offer rebates for purchasing efficient ice machines, so check with your energy provider or ice machine dealer to see if you qualify.

Purchase with capacity in mind. Bigger ice machines are typically more efficient than smaller ones in the sizes used by most restaurants. For instance, a 520 pound-per-day machine will make ice using as little as half the energy needed by a smaller 200 pound-per-day machine. The best part is that the bigger 520-pound machine does not cost twice as much as the 200-pound unit. So, choose wisely and you could get twice the ice capacity at half the energy cost per pound of ice. The larger machine also makes it easier to shift all of your ice making to nighttime hours.

Heating, Cooling and Ventilation

Heating and Cooling Systems

When it comes to annual energy use in California restaurants, heating and cooling systems account for a big piece of the pie. In fact, for most restaurants, heating and cooling is second only to food preparation in terms of annual energy consumption.

Rely more on fans, less on air conditioning. Air conditioners and central cooling systems require a tremendous amount of energy; most fans, on the other hand, do not. Research indicates that energy use falls by 4 to 5 percent for every degree that you raise your cooling thermostat. Easing back on central cooling by only 3 degrees Fahrenheit could trim air conditioning costs by 12 – 15 percent. One way to improve customer comfort is to compensate for the difference in air temperature by using an efficient ENERGY STAR qualified ceiling fan.

Inspect, clean and maintain equipment. Dirty heat-transfer coils (the winding metal coils on the back of an air conditioner) and torn or misaligned ducts can both drag down the efficiency of your climate control equipment. Clean and mend where you can.

Replace dirty air filters. Don't let your air filter get too dirty—a grimy filter will impede airflow, forcing your heating and cooling motors to work harder. As a general rule, check and change filters at least once every three months.

Install a programmable thermostat. Still setting your thermostat by hand? Consider adding some precision to the process by adding a programmable thermostat and using its “night setback” mode. With automatic setback, never again will you have to remember to turn off the heat or air conditioning at the end of the workday. According to ENERGY STAR estimates, proper use of a programmable thermostat could save you up to \$100 annually on heating and cooling costs.

Find out if an energy management system (EMS) is right for you. If your restaurant has a centralized heating and cooling system, an EMS may be able to cut your energy costs dramatically. Finding out if an EMS is right for you might take some footwork—you'll need the help of an energy expert on this one. But the extra effort may be worth it since an EMS can also control other systems like lighting and kitchen exhaust fans.

Kitchen Ventilation

An unbalanced or poorly designed kitchen exhaust system can spell trouble both for your restaurant's air quality and for your utility bills. Get ahead of the game by enlisting the help of an expert to design an optimized exhaust setup that works.

Catch all that you can. At least in principle, kitchen ventilation is a straightforward art with a simple goal: Capture and contain as much cooking effluent—the combination of grease, smoke and heat that emanates from each appliance—as possible. In practice, however, the task is much more challenging. Cross drafts and misaligned appliances can allow heat and smoke to spill into the kitchen. Spillage leads to a hot, uncomfortable working environment and higher energy bills if you air-condition your kitchen. Cut down on spillage by adding inexpensive side panels to hoods that are failing to capture, and push each appliance as far back against the wall as possible to maximize hood overhang and close the air gap between the appliance and the wall.

Rebalance your act. If you have not performed an air balance recently, it's time to call a contractor. Time, maintenance, broken belts, and poor commissioning all lead to kitchen exhaust systems that are out of balance, potentially moving too much or too little air, spilling and costing you money. This tip applies to your dining room heating, ventilation, and air conditioning (HVAC) system as well; outside doors that are hard to open because of suction or that blow open by themselves are a sure sign that it's time to order an air balance.

Consider variable-speed exhaust. Typically, kitchen exhaust hoods have two settings: "off" and "on". Naturally, "off" is ideal for when the kitchen is empty, and "on" may be great for the frenzied dinner rush—but neither is quite right for the afternoon lull, the post-dinner wind down, or any other situation when the kitchen isn't operating at full capacity. Variable-speed, demand-based exhaust controls get around this problem by using sensors to monitor your cooking and varying

the exhaust fan speed to match your ventilation needs. Demand ventilation controls typically reduce the cost to operate an exhaust system by anywhere from 30 to 50 percent and can be installed on either new installations or retrofitted to existing hoods.

Maximize overhang. A 4-foot deep hood is somewhat typical for restaurant exhaust, but you'll capture more smoke and heat with a 5- or 6-foot deep hood.

Learning more about kitchen ventilation

If you're getting ready to design a new kitchen or renovate 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 Food Service Technology Center.

www.fishnick.com/ckv/designguide/

Group heavy-duty appliances together. If you're designing a new kitchen, try to group your heavy-duty appliances (e.g., broilers, wok ranges, salamanders) together in the middle of your appliance lineup. You might also consider placing the broiler under a separate dedicated exhaust hood with a higher exhaust rate and leaving the light-duty equipment under the original hood at a lower rate.

Around the Building

Investigate window glazes. If your restaurant gets a lot of sun through south- and west-facing windows, applying a clear, heat rejecting, window film will help cut your cooling costs while making your dining room more comfortable. A quality film will be applied by a professional and should include a warranty. Window film that is properly designed into new construction can dramatically reduce your need for mechanical cooling, which helps to offset the cost of the film. Window films also block the damaging ultra-violet light that fades your carpets, chairs, and other fixtures. Awnings and overhangs are other good alternatives for keeping heat out of the building! Check with your utility—rebates are often available.

Patio Heaters

Cut back on heaters and heat time. Without a doubt, the best approach to saving money with patio heaters is to cut back—both on the hours of operation and on the number of patio heaters running at any given time. Consider that three 50,000-Btu heaters operating an average of three hours daily could cost you upwards of \$1,600 per year.

Design with efficiency in mind. Keep in mind that moving air can disperse the heat that radiates from patio heaters. Be smart with your patio layout; block cross drafts and consider how to use the fewest heaters so you can get the most bang for your energy buck.

Heating and cooling: Taking the next step

Investigating your climate control options can really pay off, especially if your restaurant has a centralized heating, ventilation, and air conditioning system (commonly referred to as an HVAC system). HVAC systems that are improperly calibrated or that rely on outdated equipment can waste a lot of energy. Here are two options for getting the process started:

Call your local utility. In many cases, finding out more about your heating and cooling options is as simple as picking up the phone—most utilities either offer a suite of energy efficiency services or can direct you to others that do.

Use Flex Your Power's Rebates, Incentives & Services Locator. Service providers throughout the state offer energy audits, rebate programs and other services for small businesses, sometimes for free. See what's out there—visit www.FlexYourPower.org/assistance.

Lamps and Lighting Fixtures

Save With Lighting

Options for efficient lighting have exploded in recent years, which is great news for restaurants, where lights are typically on for 16 to 20 hours a day. Remember this general rule as you sort through your options: For many lighted areas in your restaurant, high-efficiency fluorescent lamps—in particular, compact fluorescent lamps (CFLs)—are your ticket to savings.

Use a shutdown schedule. Take stock of all the lights—indoors and out—that are not necessary at night; implement a shutdown schedule to make sure each unnecessary light gets shut off at the end of the workday. And take stock of all the lights that are not necessary for routine operations and turn them off whenever you can.

Install occupancy sensors. Closets, storage rooms, break rooms and even walk-in refrigerators are great candidates for occupancy sensors. The sensors help you save energy by automatically shutting off lights when no activity is detected in a room. Look for low-temperature sensors for refrigerated environments.

Replace incandescent bulbs with CFLs. If you have a lot of incandescent lamps, you're paying the price for them. Compact fluorescent lamps (CFLs) last far longer and use only a fraction of the energy. As with occupancy sensors, low-temperature models are available for refrigerators and freezers. Quality can vary from manufacturer to manufacturer, so always look for ENERGY STAR qualified CFLs. Making the switch to CFLs can get tricky in rooms that require subdued light, in part because not all CFLs are dimmable, so check with a lighting supplier to find the best options for dining areas or other spaces that require more nuanced lighting.

Swap out your T12s. Does your restaurant feature tubular fluorescent lighting with two or four long tubes arranged parallel to each other? If so, and if you haven't

Case in point: Milton Stirm, Subway franchise owner, Lodi

Lodi business owner Milton Stirm re-energized his three Subway franchises with a handful of energy efficiency upgrades. Thanks in part to assistance from Lodi Electric Utility, which supplied both financial incentives and expertise throughout the

upgrade process, Stirm made the jump from inefficient four-lamp T12 fixtures to energy-efficient two-lamp T8 fixtures. "It's just as bright as before, with half as many lights," reported Stirm. Utility rebates for the lighting and other upgrades ranged from \$250 to \$750.

done a lighting upgrade recently, there's a good chance that you're getting your light from what are called T12 lamps, which is an inefficient technology from the 1940s. Modernize your lighting by switching to newer, more efficient T8 or T5 lamps and fixtures. Though the switch isn't quite as simple as changing a light bulb, you can rest assured that help is available; upgrade programs sponsored by utilities

and other organizations are widely available throughout California. Get the ball rolling by calling your utility or logging on to Flex Your Power's Rebates, Incentives & Services Locator at www.FlexYourPower.org/assistance.

The right look, the right light

Never before have there been so many options on the market for energy-efficient lamps and fixtures. This is great news for restaurant owners looking for the perfect mix of energy efficiency, quality of light and elegance of lighting fixture. Today, energy-efficient options are available for nearly every type of fixture, from wall sconces to chandeliers.

Use LED signs. Signs that use light-emitting diodes (LEDs) are a great alternative to incandescent-based signs. LED signs use far less energy, and the "bulbs" typically last 10 years or more (compared to about three months

for incandescent signs). Electricity savings can sometimes exceed 80 percent. Don't forget to check with your utility provider—rebates for LED exit signs are available in many service areas and can sometimes cover most of the purchase price.

Compact fluorescent vs. incandescent

If each of California's 80,000 restaurants replaced only *one* incandescent light bulb with a CFL, 50 *million* pounds of CO₂ emissions could be avoided each year, and the restaurant industry could save about \$4.4 million annually. Here's how much you could save in your own restaurant by switching eight incandescent lamps with eight CFLs:

Eight 100-W incandescent lamps	Eight 27-W CFLs
Used 16 hours daily	Used 16 hours daily
At \$0.13 per kWh	At \$0.13 per kWh
Cost per year: \$607	Cost per year: \$164
Annual savings with CFL: \$443	



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