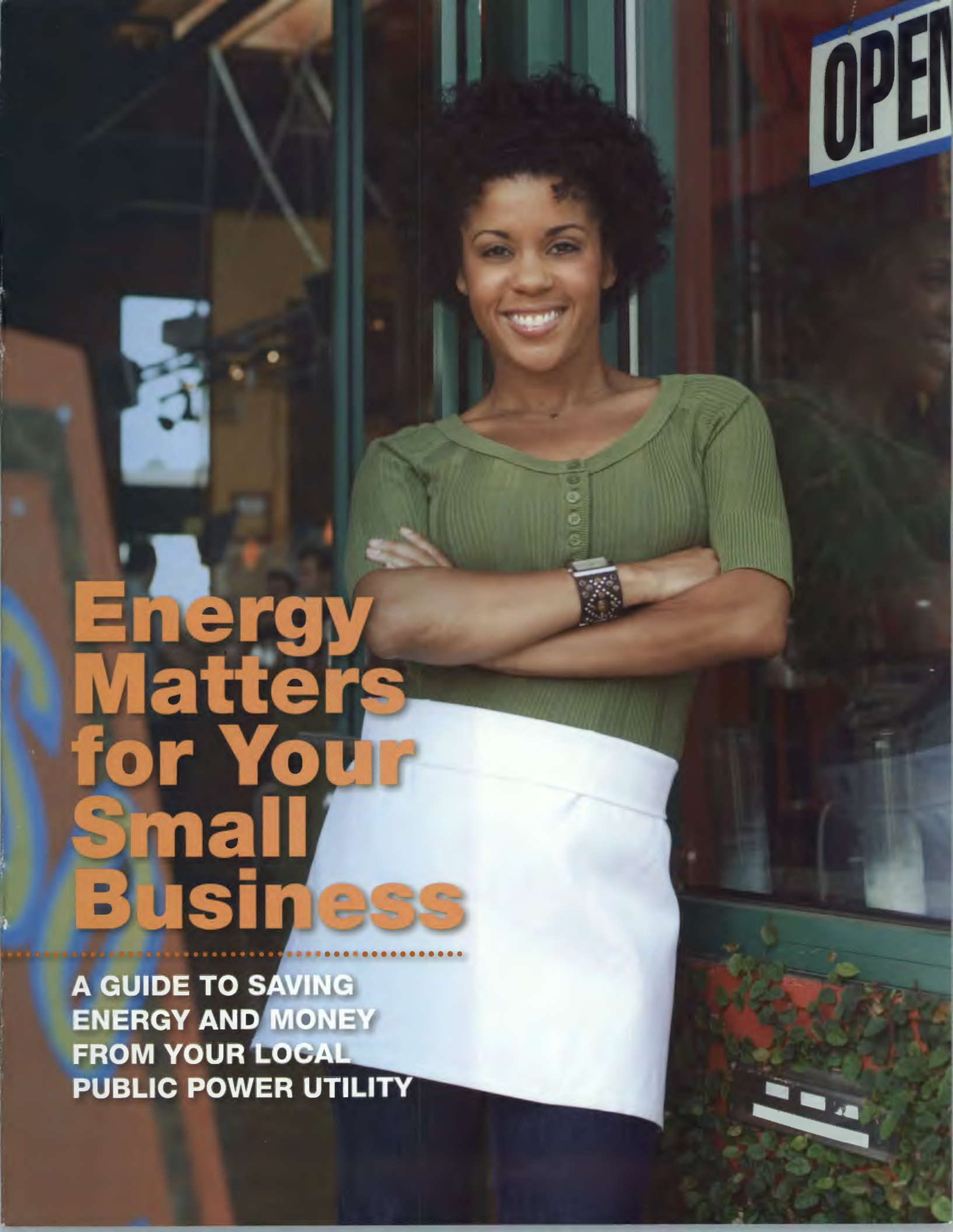

Energy Matters for Your Small Business

A GUIDE TO SAVING ENERGY AND MONEY FROM YOUR LOCAL PUBLIC POWER UTILITY

"In my business, style is important. Can lighting be energy efficient and attractive?"
p.8, 9

"I'm running a small office. Could my efforts to save energy make a difference?"
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"I rent my shop. Do you have any ideas for me?"
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"I'm no energy expert, but I want to cut my cooling cost."
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Ten Ways to Cut Your Energy Bills

No matter what kind of business you have—and whether you own your workspace or rent it—you can start saving money and energy today. Use this checklist to mark the energy-saving steps you can take right now. Then, review the list later and plan to do more throughout the year.

✓ **Turn lights, computers, and other equipment off when not in use.** Turn printers, copiers, computer monitors, and task lights off, especially overnight. Switch the screen-saver setting on computers to automatic sleep mode. Use power strips (mount them for easy access) that have a "full off" switch for computer screens, chargers, desk lamps, and other devices that don't need power 24/7. You can even install advanced power strips, with built-in timers or master operating sensors.

✓ **Plan building improvements for energy efficiency.** If you own your building, put an energy review on your calendar, and commit to energy-savings goals you can check every quarter. If you rent, discuss energy-saving repairs and improvements with your landlord or property manager. If any building improvements are planned, put in a word for energy efficiency. Some landlords simply have not considered how energy efficiency improves their property value. In cases where improvements can create quick savings on your energy bills, you might choose to share the cost.

✓ **Share the effort and reward employees who help.** Ask for energy-saving suggestions, and implement the best of them. Post a monthly progress report. Post small signs asking staff and customers to close doors, turn off bathroom lights, and shut off faucets, etc. Let customers know that your business supports energy-saving programs or buys green power.

✓ **Control direct sunlight through windows.** In summer, block sunlight using screens, film, blinds, or outdoor awnings, vines, and trees. In winter, let the sunshine in for free heat.

✓ **Upgrade your lighting.** Upgrade overhead lights to high-performance T8 or T5 fluorescent tubes and ballasts for energy savings of 10–40%. If you own your building or plan to stay a while, replace halogen incandescent bulbs or spotlights with long-lasting LED lamps. Keep fixtures clean and paint walls and ceilings in lighter colors to get more light from fewer lamps.

Automate. Regulate temperatures throughout the day with programmable thermostats. Set the temperature back by 10 degrees after hours and save 10% or more on heating costs. Install automated lighting controls, especially in bathrooms and storage areas.

Clean and tune. Hire a contractor to clean and tune your heating, cooling, and ventilating equipment annually. This can save you money and prevent costly emergency repairs. Be on site with the contractor, and ask questions. You'll learn how to save more and keep your business safe.

Use fans. You can raise the thermostat by three to five degrees in summer and still be comfortable if you add ceiling fans. Every degree raised typically saves about 3% on cooling costs, so using fans could save you 10% or more. Flip the directional switch on reversible fans in winter, to pull cool air upward and force the naturally rising warm air back down.

Save water. Fix leaky faucets and replace outdated water heaters or washers, where applicable. You'll save on water bills and reduce energy use.

Use Energy Star products. Buy Energy Star labeled appliances, equipment, and services. Many of these can save you one-third or more on energy costs. Use Energy Star software to benchmark energy use in your business and to plan cost-effective improvements. Check EnergyStar.gov for details on benchmarking and on energy-saving lighting, heating/cooling equipment, computers, copy machines, printers, etc.

Energy Economics 101

Your concerns about energy use will differ based on:

- **Your utility's rate structure and regulated billing requirements.**
- **The weather, as it compares to the same season in previous years.**
- **Your type of business and its typical energy needs.**
- **Whether you rent or own your facility.**

This guide addresses common ways for small-to medium-sized businesses to cut energy costs. The Resources section on page 16 will point you toward more specific measures for your particular type of business. You will also find ideas just for renters. Whether you rent or own, some energy-related equipment and processes remain under your full control. You can take steps to reduce your bills and improve worker comfort and productivity, too.

STUDY YOUR BILLS

It pays to review your utility bills before starting an energy-savings plan. Utility bills differ from month to month, based on weather-related and seasonal needs, special business overtime or shutdown periods, the number of days in the month, and how your energy use fits the utility rate structure.

For example, your utility may charge separately for customer service, demand (kW), and energy (kWh). A demand charge represents the utility's generating capacity required to meet your peak need. You may pay for power factor correction, if your motors or other special equipment require an adjustment in the ratio of real power (kW) to apparent power (kVa) at a given point in time. You may also see separate, wholesale energy-supply costs and taxes on your electric bill.

A quick review of current and past bills can help you to understand and reduce your energy use. Check online, or call your utility representative to get answers to your billing questions.

START NOW, SAVE MORE

Many energy-saving improvements will "pay back" by saving as much in energy as they cost within two years or less. Use this formula to determine how long it will take to pay off your investment:
Total cost of improvement/annual energy savings = payback time.

Other products may not need to show full payback from energy savings, because you are paying for many other features, too. Consider only energy-related costs and benefits, but don't forget to factor in financing. The internal rate of return on an energy-saving investment

is defined as the interest rate that is equivalent to the present value of the total savings you expect, after considering financing costs and the length of time your money is tied up. While returns from energy-saving investments often beat returns from bank interest and other kinds of investments, experts suggest that you consider practical factors before making your decision. For example, energy saving investments are not liquid. Savings can vary with the quality of the work, so take steps to hire a good contractor.

Check out the small business resources at EnergyStar.gov or try the quick energy and cost savings calculators at energy.gov/eere/femp/energy-and-cost-savings-calculators-energy-efficient-products.

THREE WAYS TO GO

Do it yourself

DIY makes sense for simple, low-cost improvements and for basic maintenance and operations. Find out what kinds of energy-related equipment you have, check for obvious signs of breakdown, and follow a maintenance schedule. Invest in your maintenance staff and support basic energy management training from a community college. Consider where you can save more in the long run by hiring an expert.

Hire a project expert

You may hire a contractor to do expert work, such as cleaning or upgrading the heating system or installing new windows or insulation. Here are some tips for finding your expert:

- Choose a licensed and experienced contractor who is familiar with state and local energy codes.
- Look for professional certifications and memberships to lower your risk.
- Request bids from two or more contractors—describe the work, cost, billing expectations, and assurances such as warranties, service agreements, etc.
- Check references and find out if your contractor has a track record of finishing on time and on budget.

Contract with an energy services company

An energy services company (ESCO) is a turnkey business also known as a performance contractor, which generally uses a full energy audit to create an energy-saving plan. Nationwide, ESCO-driven savings have totaled more than $50 billion over the past 20 years.

An ESCO can:

- Design, package, and finance energy-saving improvements.
- Install and maintain necessary equipment and controls.
- Measure, monitor, and verify the project's energy savings.
- Guarantee that the project will save at least as much energy as predicted.

If you hire an ESCO, you may have little to no up-front cost. ESCOs are paid a percentage of the energy savings from the project. Most ESCO customers have large facilities, such as manufacturing plants, hospitals, and schools. However, some ESCOs focus on small businesses, working regionally or through local heating, cooling, and lighting companies. See naesco.org for more information.

There's an App for That

Small businesses can benefit from business-oriented control and automation technologies, plus measures designed for residences. There are many choices for every level of technical expertise. Jump in at a level that is comfortable for you, and watch your energy savings grow.

TIMERS AND SENSORS

For a simple approach, you can use timers that plug in between your lights or equipment and outlets. Use the clock-like dial (some use small pegs that you insert into the desired "on" and "off" time slots) to set your preferences. Such timers are ideal to control outdoor or display lighting and vending machines that sell non-perishable items. You can also use them on power strips that charge tablets, cell phones, and battery packs, which can get plenty of charge in six hours or fewer.

You have to reset these timers manually for Daylight Savings Time and sometimes have to adjust for longer days or nights. More advanced devices, still fairly inexpensive, use digital programming and can be linked to building automation systems.

A basic mechanical timer provides one convenient way to control outdoor lighting or battery chargers.

Source: NSI Industries

"Plug loads" for computers, phone chargers, vending machines, and coffee pots represent 30–50% of office energy use.

For tips on controlling plug loads and costs, see page 14.

Smart thermostats may be controlled through smart phones.

New sensor technologies respond to occupancy cues to turn lights and equipment on and off. These include fairly inexpensive infrared or passive infrared sensors, which detect the motion of heat from one area to another. Unlike the previous generation of motion sensors, these seldom trigger when they shouldn't. However, they sense within a line-of-sight, so they don't work well in irregular or obstructed spaces.

Audio sensors use a microphone and respond to the sounds of movement or voices. These may work well in larger, irregular spaces, but test them first to make sure you have the requisite low level of background noise in your workplace.

PROGRAMMABLE THERMOSTATS

For every degree you set your thermostat back on winter nights, you could save about one percent of your heating bill. Set it back by 10 degrees and your savings could add up. Similarly, you could save by raising the thermostat in summer by a few degrees during the day and by more after hours. However, as user behavior plays a key role here, the Energy Star program no longer lists programmable thermostats as true energy-saving devices.

Some small businesses are taking the time to learn how to get the most from programmable thermostats, and favor their low-cost convenience. Other businesses have upgraded to new, behavior-sensitive "smart" thermostats. Still others use zone-by-zone climate controls tied to fully integrated energy management programs.

Get Energy Use Information

Thanks to new software tools and mobile applications, small businesses have gained access to the kind of energy information that, until recently, only companies working with ESCOs could get. Options come from your neighborhood heating, ventilating, and cooling (HVAC) contractors and even one popular office supply store. Some branded services can remotely monitor and control doors and windows, thermostat settings, lighting, and more.

In the past few years, electricity suppliers serving about 60 million homes and businesses nationwide have joined the U.S. Department of Energy's Green Button project to provide energy use information and tools, using standard protocols to deliver data from smart electric meters to website and mobile services. Public power utilities have been leaders in providing Green Button and similar services that work with whatever kind of meter you have.

Independent developers offer a number of apps using the Green Button standard. Check out options at appsforenergy.challengepost.com and popular mobile app retailers.

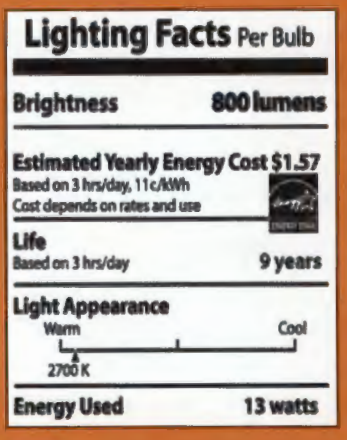
The Green Button logo, courtesy of the National Institute of Standards and Techology.

Lighting for Savings You Can See

Lighting accounts for 20–30% of all energy use by small businesses and could be the easiest energy use to reduce. The benefits of better lighting extend beyond dollar savings—to improved safety, productivity, sales, customer satisfaction, and public image.

Today, you have a wide choice of high-quality, efficient solutions for every lighting need. Dress your business in layers of light. Ambient lighting provides overall illumination, typically using high ceiling lights. Task lighting applies to the major activities in your business, whether lighting a retail display or creating a glare-free workstation. Accent lighting is the special touch, using fixtures equipped with high-efficiency LEDs and other super-efficient and long-lasting lamps.

Add lighting controls (see pages 6–7) and use natural lighting when available. The results can be beautiful as well as energy-efficient. Consult a lighting designer or do your own research and get ideas from other workplaces you visit.



Look for new lighting labels, similar to the nutrition labels on food. Remember, the estimated daily use and energy costs are national averages, which may differ from your situation.

Source: Federal Trade Commission.

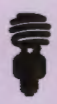
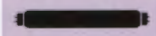
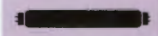
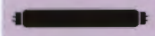
COLOR TONES: WARM OR COOL?

Lighting color tone is measured on a temperature scale referred to as Kelvin (K). Lower Kelvin numbers mean the light appears yellower and warmer; higher Kelvin numbers mean the light is whiter, bluer, or cooler. Old-fashioned incandescent bulbs were fairly warm, at around 3000° K. Today, energy-efficient lamps come in a variety of color choices to suit your mood!

Kelvin	Associated Effects & Moods	Appropriate Applications
6500°	Bright, cool	Jewelry stores, beauty salons, galleries, museums, printing
5000°	Bright, alert	Graphic industry, hospitals
4100°	Neat, clean, efficient	Office, classrooms, mass merchandisers, showrooms
3500°	Friendly, inviting	Executive offices, public reception areas, supermarkets
3000°	Soft, warm pleasing light	Homes, hotel rooms and lobbies, restaurants, retail stores
2700°	Friendly, personal, intimate	Homes, libraries, restaurants

Comparison of Small Business Lighting Choices[1]

Use this table to compare lighting choices. If possible, visit a lighting showroom to see best-practice applications. Efficient lighting is not just about the lamp, but also how the lamp is paired with the right ballast, reflector, fixture, and design principles to produce an attractive and efficient effect.

Lamp Type	 Halogen Incandescent	 Compact Fluorescent (CFL)	 Light Emitting Diode (LED)	 T8 Fluorescent with Electronic Ballasts	 T5 Fluorescent with Electronic Ballast	 T5HO with Electronic Ballast	 Electronic HID
Efficiency (Lumens per Watt)	~20 Lumens/W About 30% more efficient than outdated incandescent bulbs	~50 to 70 Lumens/W Up to 75% more efficient than outdated incandescent bulbs	~45 to 65 Lumens/W for typical replacement lamps Up to 90 Lumens/W for new designs	~85-95 Lumens/W	~80 to 95 Lumens/W	~90-105 Lumens/W	~60 to 80 Lumens/W
Lifetime (Average hours until 30% decline in lumens, or until replacement)[2]	2,250 to 3,500 2 to 3.5 times the life of incandescent bulbs	6,000 to 15,000 Life varies based on lamp and conditions of use; follow instructions for disposal	50,000 Long lamp life saves on product and maintenance costs	24,000 to 40,000 Lamp life saves on product and maintenance costs	30,000 to 40,000 Typically similar, but slightly greater lifetime value than T8	30,000 to 40,000 Lamp life saves on product and maintenance costs	20,000 Better long-term performance than previous HIDs
Typical Uses	Choices closely match incandescent bulbs of various sizes, color renditions, and special qualities	Choices closely match incandescent bulbs of various sizes, color renditions, and special qualities	High value due to long life, high-fashion designs, and prices that have fallen in recent years Also, larger, compound LEDs are HID alternatives	General ambient lighting; replaces fatter, inefficient T-12 lamps Many wattages and colors available; may cost less than T5	For ambient lighting in low- to medium-ceiling rooms; narrow tubes for greater design flexibility, but can be fragile; best at moderate temps	High output T5 replaces some High Intensity Discharge (HID) lamps; may be used with dimmers Shops, warehouses; best at moderate temps	Best choice for parking lots, high-bay applications. Perform well in extreme, dirty settings; need to maintain fewer fixtures

Open for Business: Windows and Doors

Whether you run a retail shop, a restaurant, or an office, you want to make a great first impression, while controlling winter heat loss and summer heat gain through doors and windows. Here are some ideas to help you create the look you want while saving energy and keeping workers and customers comfortable year-round.

EASY TIPS FOR DOORS AND WINDOWS

- Make sure doors and windows work. Automatic door closers keep interiors cooler in summer and warmer in winter, but sometimes they jam. The repair is usually as easy as adjusting a screw or using a silicone spray. If doors don't quite fit, adjust the hinges and locks before you add weather-stripping.
- Post a small sign on the door, asking customers to help save energy by closing it.
- Separate conditioned and unconditioned spaces. For example, if you have an open loading area, consider adding an automatic garage door. Curtains (possibly made of heavy plastic strips) are helpful, too. Be sure there are closed doors between the loading area and the conditioned space. If you have a restaurant, consider a vestibule or screen between the entry and dining areas.
- Use window shades or blinds according to the season. In summer, close them during the day and open them at night. In winter, open them during the day and close them at night. Automatic blinds might be worth the investment.
- If you have a broken window, fix it right away. If you have a window air conditioner, remove it or cover the exterior portion every fall to prevent heat loss through the unit.
- Install awnings to reduce window heat gain and glare —they can be attractive, too. Outdoors, potted trees or vines create seasonal shading.
- Check the fire code before you block any doors or windows, especially if you are using makeshift materials.

THE INSIDE STORY ON WINDOW FILMS

Standard, single-pane windows have almost no insulating value, and ordinary double-pane windows are better, but still invite extreme cold in winter and hot sun in summer. Short of replacing your windows, what can you do? First, try seasonal treatments, such as storm windows, insulated shades or blinds (including automated blinds), and awnings. Window films offer another fairly low-cost, year-round solution. Properly installed, they can cut summer heat gain by 60–80%, and reduce winter heat loss, too. Often, installing window films will pay back in fewer than three years.

Window films are usually applied by a professional to the interior of single- or double-pane glass. Recent improvements make window films a far better investment than a decade ago, when fading and cracking were common. Be cautious if window panes are very large; if glass is extra-thick or textured; and if windows are framed with solid concrete, aluminum, or steel.

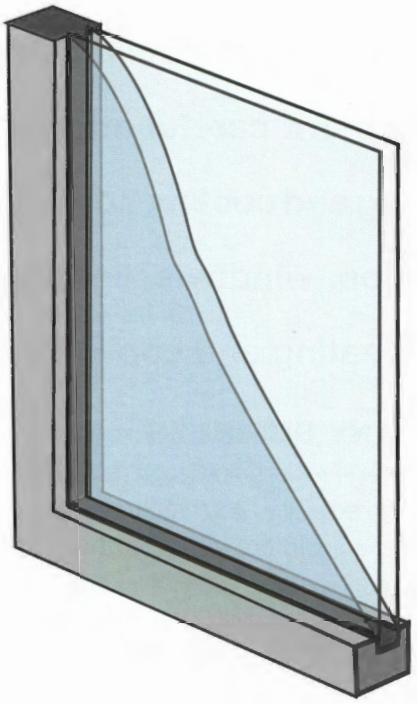
Look for product information from the National Fenestration Rating Council and ask the installer for references from jobs similar to your own.

Look for the right film to give you the benefits you want:

- High Visual Transmittance, rated between zero and one, means more natural light comes through.
- Greater Solar Heat Gain Coefficient, rated between zero and one, means better savings on summer cooling.
- High ultra-violet protection saves fabrics and carpets from fading.
- A transferable lifetime warranty is important.
- The level of reflection must comply with building ownership or business park rules.

REPLACING YOUR WINDOWS

Saving energy is usually only one reason that drives business owners to completely replace windows, skylights, and doors. If you are thinking about investing in this substantial upgrade, look for products that carry the Energy Star label. Energy Star requirements are upgraded every few years and labeled products are typically one-third more energy-efficient than non-labeled ones. Note that skylights can be the source of tremendous heat loss, so even though they are practically invisible, prioritize their replacement if you have them.



Source: Energy Star

Anatomy of an Energy-efficient Window

- Improved frame materials, including wood composites, vinyl, and fiberglass.
- Multiple panes—two, three, or more panes with an air- or gas-filled space in the middle—providing more energy efficiency, sound insulation, and impact resistance.
- Low-E coated glass to reflect infrared light, keeping heat inside in winter and outside in summer.
- Warm edge spacers made of steel, foam, fiberglass, or vinyl, to reduce heat flow and prevent condensation.

Heating and Cooling Basics

Heating, ventilation, and cooling (HVAC) in buildings are directly related to energy use and merit careful attention. Renters, as well as business owners, can lower heating and cooling costs, while improving indoor comfort. Improving building insulation, windows, lighting, or equipment energy use also reduces the amount of heating and cooling you need.

HVAC TIPS FOR ANY BUSINESS

Have a professional check HVAC equipment at the start of the heating and cooling seasons. A winter checkup with system cleaning and adjustments will typically save 5-10% on heating costs and more on avoided emergency repairs.

- Replace air filters monthly or according to professional recommendations. Your system will work more efficiently, and allergy-prone workers will breathe easier.
- Keep furnishings and drapes away from air ducts, radiators, and fans.
- Clean outdoor heat transfer coils for heat pumps, air conditioners, and chillers. Accumulated leaves and dirt reduce efficiency and system capacity.
- Inspect ducts and pipes to be sure there are no leaks or insulation gaps. Use new duct sealants instead of duct tape.
- Close vents or otherwise isolate spaces you don't need to condition, like entry and loading areas that are better suited for spot heaters and fans.
- Be sure thermostats are working and set properly. If workers change thermostat settings frequently, install a locked case over the thermostat.

Keep furnishings and drapes away from air ducts, radiators, and fans.

HOW TO TALK TO YOUR HVAC CONTRACTOR

These tips will help you to ask the right questions of your HVAC contractor, if you are considering upgrading your system. Understand your basic choices and insist that equipment is properly sized for your needs. Energy Star estimates that 25% of HVAC systems are oversized and so they waste energy and fail to control humidity.

A Fan Can

Comfort is a factor of temperature, humidity, and air movement. Ceiling fans, which gently move room air, add comfort and save energy. According to Energy Star, you can raise summer air-conditioning temperatures by three to five degrees, with no loss of comfort, if you use ceiling fans. Flip the directional switch on reversible fans in winter to pull cool air upward and force warm air back downward, and do not leave fans running after hours. There is a difference in energy efficiency among ceiling fans, so look for the Energy Star label. Remember, if you add a fan, you must raise the air conditioning thermostat to create real savings on your energy bills.

Air conditioners. For window air conditioners, the energy efficiency rating (EER) tells you the cooling output (in BTUs per hour) per watt of electricity used. A high EER rating will pay you back quickly in energy savings. Notice that even among Energy Star products, some are more efficient than others. Central air conditioners and heat pumps (in cooling mode) use a seasonal energy-efficiency rating (SEER). This season-long average is not directly comparable to an EER rating.

Evaporative coolers. In hot, dry climates, these systems are highly energy efficient, saving 25% or more on cooling costs. Find out if one could work for you.

Ductless heat pumps. Also called mini-split or variable refrigerant flow (VRF) heat pump systems, these are relatively new in the U.S., but have been popular in Europe for more than 20 years. They can reduce energy use by more than half, compared to energy-wasting baseboard electric heating, and also save in comparison to older-generation through-the-wall heat pumps and window air conditioners in hotels, restaurants, small shops, and offices. Ask about pairing VRF with heat recovery ventilation for added savings.

Single-zone chilled water systems. Consider reducing the rate at which air flows through the system. During relatively dry seasons, you may raise the cooling supply temperature. Also consider converting to a variable air volume system, or demand-controlled ventilation, which is more sensitive to actual ventilation needs.

Water-side systems. Consider downsizing oversized pumps and motors, installing variable-speed drives on pumps and motors, and converting single-loop systems to multiple loops that can be better controlled.

Water-cooled centrifugal chillers. Be sure chillers use new, non-polluting refrigerants. Replace outdated and inefficient equipment.

Boilers. Choose the right-sized boiler, which may include a high-efficiency burner, baffle inserts, combustion controls, controls that reduce boiler temperatures in warm weather, an economizer to preheat feed water, or a condensate-return system. Avoid running multiple boilers at partial load if one boiler run at full load will do.

Ground-source heat pumps. Also known as geothermal systems, these systems tap the naturally moderate temperature of the earth and are gaining popularity. They can reduce heating and cooling costs by up to 50%. Look into this technology especially if you have a large site where the ground loop could be easily installed.

Demand-controlled ventilation. These systems sense the amount of carbon dioxide in the air and adjust ventilation to meet actual needs. This saves energy in spaces such as meeting rooms that are often unoccupied or where the number of occupants changes frequently.

WHAT ABOUT WATER HEATING?

Some small businesses like restaurants, hotels, and laundries, require lots of hot water, while other small businesses hardly need it at all. Saving hot water not only lowers your energy bill, but also your water and sewer costs. Check out the Resources section on page 16 for energy-saving guides suited to your type of business.

Plug In to Energy Savings

In 2003, plug-in appliances and equipment represented less than 15% of all energy use in a typical office building. Today, they account for nearly one-third of energy use in a typical office building and half of energy use in high-efficiency buildings.

The New Buildings Institute (newbuildings.org), a non-profit energy research agency, suggests a five-step plan to help control plug-in energy use:

1. Review. Identify your needs. Look for equipment that is worn out and inefficient, such as old computers with large CRT monitors and laser printers or copy machines that give off enough heat to warm the room. Even small network equipment, such as modems and routers, are more efficient today than they were five years ago.

2. Remove. Eliminate or unplug unnecessary devices. This includes anything from an underused old fridge or vending machine in the break room to duplicate monitors, printers, scanners, and chargers.

Pay special attention if your business has data servers. Recent research by the Natural Resources Defense Council (nrdc.org) suggests that as much as 70% of electricity use by an office-based business may come from powering and cooling data servers. Have an IT specialist check to be sure you have just the equipment you need.

3. Replace. When it's time to replace, try to buy the most energy-efficient devices. For example, a laptop computer with an LED screen typically uses less than one-third the energy that a desktop computer does. Look for the Energy Star label.

4. Reduce. Just turning down the brightness control on your computers can add up to measurable savings. Make changes a few at a time, so your work team can find a comfortable level. Refer to pages 6-8 for tips on using timers, power strips, and controls.

5. Retrain. Make sure workers know why, when, and how to power down. One suggestion: send an email reminder out at the end of the day for a week. Add a request for more energy-saving suggestions.

PRESERVING YOUR DATA—AND YOUR SAFETY

Your utility strives to provide reliable and consistent electric services. Occasionally, especially in extreme weather, unplanned outages still occur. Power-quality disturbances may occur, too, though most of the time, such disturbances come from anomalies in customer energy use, such as poorly protected motor-drives or other heavy equipment on the line.

Call an electrician if your problems are severe. For basic help, try these options:

Surge suppressors. These devices reduce or eliminate potentially damaging power spikes or surges and electrical noise. Hard-wired surge suppressors, installed at the meter, can protect the whole building from most out-

The U.S. EPA Energy Star program (EnergyStar.gov) labels high-efficiency office equipment, including computer networking devices.
Source: Energy Star

side disturbances, including indirect lightening impacts. Plug-in surge suppressors are typically power strips that protect specific equipment or phone-line devices. Shop carefully, though. Some surge suppressors will break down after just a few low-threshold disturbances. Choose a suppressor with a functional indicator light, and check it periodically.

Uninterruptible power supplies (UPS). A standby UPS switches the protected equipment to a battery-powered inverter when the primary alternating current (AC) is out of range. Such devices often include a surge suppressor to manage power quality. These systems, available for under $100, will beep to remind you to shut down equipment, rather than depending on the battery for a long time. Most businesses consider this a good investment in protecting sensitive electronics.

The typical transfer time for standby UPS is usually two to 10 milliseconds. Newer desktop computers can handle this kind of brief interruption, with no loss of data. However, a safer bet for protecting small servers and networks would be a line interactive UPS. This equipment has a bidirectional inverter/charger, which is always connected to the output and uses a portion of AC power to keep the battery charged. When the input source fails, the transfer switch disconnects the AC input, and the battery/inverter then serves the load.

Back-Up Generators. IElectrical AC power generators for use in homes and small business are basically small engines, fueled by gasoline, diesel, propane, or natural gas. They cost hundreds to thousands of dollars, depending on their capacity (the wattage that is needed to run specific kinds of lights or equipment). This equipment, sometimes called a genset, produces electricity when the spinning shaft of the engine creates an alternating magnetic field through a coil, which induces voltage. The technology has gained popularity where there has been an increase in severe weather-related outages. However, for most small businesses, the protection of relatively simple UPS technologies is a better short-term solution. Electric customers should use extreme caution with generators, as more than 80 deaths per year are reported from genset-related carbon monoxide poisoning.

Here are some tips, suggested by the National Safety Council (nsc.org), for safer use of gensets:

- Always follow manufacturer's instructions in setting up and using portable and emergency generators.
- Only use your generator outdoors, and keep it away from open windows, vents, or doors. Fatal fumes can build up, and neither a fan nor open doors or windows can provide enough fresh air.
- Use a battery-powered carbon monoxide detector in the area you're running the generator.
- Gasoline and its vapors are extremely flammable. Allow the engine to cool at least two minutes before refueling and always use fresh gasoline. If you do not plan to use your generator in 30 days, stabilize the gas with fuel stabilizer.
- If you have to use extension cords, be sure they are the grounded type and are rated for the application. Coiled cords can get extremely hot; always uncoil cords and lay them in flat open locations.
- Never plug your generator directly into a common outlet. If you wish to connect to the building electrical system, call a qualified electrician.
- To avoid electrocution, never operate under wet conditions. Take precautions to protect the genset from rain and snow.

Resources for Your Business

This guide lists common ways for small businesses to save energy and money, but you may have special energy needs. Here are sources for more information specific to your needs.

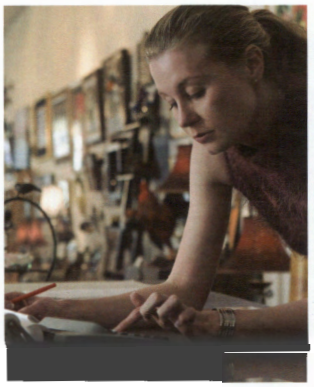
EnergyStar, EnergyStar.gov

The U.S. Environmental Protection Agency's Energy Star program for small businesses offers well-organized online resources. Learn how to assess energy use in your business, add energy efficiency to your procurement strategy, and select energy-saving products and services. You may even decide to become an Energy Star Partner, based on strong support for energy and environmental goals. While you are on the Energy Star website, do a quick search for the Building Upgrade Manual for specific ideas for supermarkets and grocery stores, hotels and motels, retail stores, food service, etc.

And don't miss the online energy-benchmarking tools. These tools allow you to compare your business energy processes and performance against a large database of buildings of similar designs, used for similar business purposes as yours. Energy Star has found that benchmarking leads to energy savings of about 2.5 to 7%. Plus, you will get lots of measure-specific how-tos along with your benchmarking report.

Small Business Administration, sba.gov

The Small Business Administration (SBA) is charged with helping small businesses succeed. You can find energy-efficiency resources from the home page or search for details on specific kinds of upgrades, such as heating and cooling, lighting, food service equipment, and office equipment. SBA also provides information on tax incentives and programs.



New Buildings Institute, newbuildings.org

New Buildings Institute (NBI) is a nonprofit organization working to improve the energy performance of commercial buildings. NBI offers guidance to individuals and organizations on designing, constructing, and operating energy-efficient buildings. While NBI is working toward buildings that use net-zero energy, it offers many practical factsheets and guides for small businesses that are just beginning to improve their energy use.

American Public Power Association (APPA), PublicPower.org

APPA's Energy Efficiency Resource Central (look under Topics/Energy Efficiency) web section supports public power utilities in helping their residential and business customers. Check it out, or ask an account representative at your local public power utility for assistance.

2451 Crystal Drive, Suite 1000
Arlington, Virginia 22202
PublicPower.org