



APPLIANCES

Minnesota Department of Commerce Energy Information Center

Home appliances are big energy savers – and big energy users. They eliminate much of the labor involved in such tasks as washing and drying clothes and cooling and cooking food. At the same time, they use significant amounts of electric and natural gas energy. Appliances and lighting account for about one-fifth of all the energy used in the home.

Selecting and
operating energy
efficient:

Refrigerators

Freezers

Washers

Dryers

Ovens and Cook
Tops

Lighting

Home Office
Equipment

The good news is that appliances and lighting are becoming more energy efficient. Appliance models on the market today are much more efficient than those of ten or more years ago, and compact fluorescent lamps are available that use about 75 percent less energy and last about ten times longer than the incandescent bulbs they can replace.

The National Appliance Energy Conservation Act set minimum energy standards for many appliances and specified deadlines for meeting those standards. The law also directs the Secretary of Energy to review the standards and upgrade them when improvements in technology make it worthwhile. The standards apply to date of manufacture, not date of sale. Standards went into effect for the following appliances on January 1 of the specified year:

Dishwashers, clothes washers, clothes dryers, ranges, ovens – 1988;

Room air conditioners, pool heaters, water heaters – 1990;

Refrigerators, refrigerator/freezers, and freezers – 1993; and

Central air conditioners, central air conditioning heating pumps, furnaces and boilers, direct heating equipment – 1992.

Look for the efficiency labels

New appliance and lighting energy labels are another recent change. The new appliance labels are easier to read and more useful to consumers in comparing energy efficiencies of different models. In addition to listing the estimated annual operating cost of the appliance, they show how the particular model compares in energy use to other similar models. (See Figure 2.)

New labels are also required for three types of lamps: general service incandescent bulbs (30 watts or higher), compact fluorescent lamps designed to replace general service incandescent lamps, and general service fluorescent lamps. The new labels list the light output (in lumens), the amount of energy used (in watts), and the life of the lamp (in hours).

In the near future, “Energy Star” labels will begin appearing on appliances and other products used in buildings. Initially developed by the U.S. Environmental Protection Agency for computers and other office equipment, the “Energy Star” label will be greatly expanded to serve as a seal of approval on most energy efficient refrigerators, water heaters, air conditioners, thermostats, and building materials such as insulation. The plan is to rank competing products based on their energy efficiency and offer the label to those ranking in the top 25 percent.

Related Guides:

Low Cost/No Cost Ideas

Home Lighting

What is the true cost of an appliance?

Owning and operating a new appliance is like buying on the installment plan. The purchase price is only a down payment. The rest of the cost is paid to the utility company through gas and electric bills, month after month, for as long as the appliance works. These monthly energy costs add up. For example, running a refrigerator for 15 to 20 years typically costs three times as much as the purchase price.

When shopping for new appliances, look not only for a good purchase price, but for energy efficiency as well. Following are the annual energy use and approximate annual energy costs (based on a rate of 7 cents per kWh and \$.50 per therm of natural gas) for the most efficient models of some appliances. These efficiencies are for recent models, but continuing improvements make it likely that new models coming on the market will have even higher levels of efficiencies.

- Refrigerator, 21 cubic foot capacity, with side mounted freezer and through-the-door ice maker, automatic defrost: 561 kWh, \$39.
- Clothes washer, standard capacity, top loading: 267 kWh, \$19.
- Water heater, natural gas, first-hour rating 40 gallons: 242 therms, \$121.
- Freezer, 21.2 cubic feet capacity, upright type, manual defrost: 482 kWh, \$34.
- Dishwasher, standard capacity: 471 kWh, \$33.

Appliance operation and maintenance

Buying an efficient appliance is the first step in reducing appliance energy use and costs; equally important is the next step – maintaining and operating the appliance to ensure maximum efficiency. Read the owner's manual that comes with the appliance and carefully follow manufacturer's recommendations. If you have misplaced your owner's manual, contact the manufacturer and ask that a manual be sent for the specific model you own.

Buying used appliances

The Energy Information Center strongly recommends buying a new rather than a used appli-

ance. Although used appliances are substantially cheaper than new appliances, they are generally less efficient than new models of similar style and size and therefore are actually more costly.

The money saved by reduced energy consumption is likely to justify the cost of purchasing a new appliance. This is especially true for appliances such as refrigerators, which in recent years have improved substantially in energy efficiency.

If forced to buy a used refrigerator, look for energy efficient features described in the sections below on individual appliances. Also, call the manufacturer and ask for the Energy Guide label for the model you are considering.

Repairs

When an appliance needs repair and it is covered by a warranty, be sure to use an authorized service dealer; otherwise you may not be reimbursed for the cost of the repair. If the warranty period has elapsed, but the problem began while the appliance was still under warranty, you may be able to be reimbursed. Be sure to check. Also, when having an appliance repaired, routinely have the service person check and replace worn gaskets and belts.

When you go on vacation

When you leave the house for a few days or longer, you can reduce appliance energy costs by taking a few simple steps. These include:

- Unplug TV sets and all other appliances that aren't too difficult to re-program. Also unplug the little transformers and chargers for cordless vacuums and phones.
- If you will be gone for a long time, you can empty your refrigerator and set it on its warmest setting (but not turn it "off").
- Turn all incandescent lights off and place fluorescent lamps on a timer to help discourage break-ins.

Common Small Appliance Energy Use and Cost*

Appliance	Typical wattage	Typical hours used/month	Typical cost/month
Coffee makers, automatic drip with low wattage	1550	9	\$.98
warming	50	300	\$1.05
Toaster oven	1436	6	\$.60
Toaster	1146	3	\$.24
Blender	386	3	\$.08
TV, color, 19" or larger	200	210	\$2.94
Stereo	109	83	\$.63
Radio	71	101	\$.50
Personal computer	25	120	\$.21
VCR	25	10	\$.02
Water bed heater	400	360	\$10.08
Electric blanket***	117	200	\$1.26
Hair dryer	1200	8	\$.68
Vacuum cleaner	630	6	\$.27
Clock	2	730	\$.11
Fan, oscillating	88		less than \$.01/hour
Fan, window	200		less than \$.01/ hour
Humidifier	120		less than \$.01/ hour

*** Full wattage is not on all the time.

* Based on a cost of \$.07 per kilowatt-hour

The Fridge

Keeping the refrigerator clean and in good condition is a major factor in its efficient operation.

Refrigerators & Freezers

Refrigerators particularly have benefited from recent advancements in energy efficiency: the average refrigerator today is at least two to three times as efficient as the average model of 10 or more years ago.

Choosing a refrigerator and freezer

- Buy the appropriate size for your needs. Too large a refrigerator, besides costing more than a smaller model, wastes space and energy. Too small a model leads to extra trips to the store.
- A second refrigerator? Generally it is much less expensive to buy and operate one refrigerator than two smaller refrigerators.
- Chest freezers are typically 15-20 percent more efficient than upright freezers because they are better insulated and cold air doesn't spill out when they are opened.
- Manual defrost refrigerators use less electricity than automatic defrost models, but they are not widely available in large sizes. Manual defrost models also must be defrosted on a regular basis to maintain their efficiency.
- Manual defrost freezers are more common than automatic defrost models and generally do a better job of storing food. Since the freezer is opened less frequently than a refrigerator, frost builds up more slowly.
- Features such as automatic icemakers and through-the-door dispensers can increase energy consumption and frequency of repairs.

Installation

- Air must circulate freely around refrigerator/freezer condenser coils so they can give off heat. The unit also will fail to lose heat properly if it is located in direct sunlight or next to the dishwasher or stove/oven.
- Although refrigerators and freezers should be located in a somewhat cooler area, during the winter they should be in heated space – at least 60 degrees F. for best operation. Never locate an automatic defrost freezer in an unheated space.

Operation and maintenance

- Consult your owner's manual for specific instructions. Remember, keeping the refrigerator in good condition, and cleaning the food compartments as well as the refrigerator coils, are major factors in the efficient operation of a refrigerator.
- Temperature inside the refrigerator should be about 38 degrees F. or a little lower; the freezer compartment should be about 0 to 5 degrees F. Place thermometers in each compartment; if the temperature varies significantly from the thermostat settings, the refrigerator or freezer probably needs attention.
- On manual defrost models, do not allow more than a quarter-inch of ice build-up in the freezer or freezer compartment before defrosting.
- If you have a second refrigerator that is needed only a few days a year, turn it off when it's not in use. Be sure to chain the door shut or turn the door to the wall to make sure children can't climb in.
- Many automatic defrost refrigerators have small heaters built into the walls to prevent moisture from collecting on the walls when humidity is high. Some models have a switch that allows you to turn the heaters off; during periods of low humidity, when there is little frost build-up, turn the switch off to reduce energy use.
- Make sure refrigerator and freezer doors shut tightly. Test by closing the door or doors on a piece of paper and then trying to remove it. If the paper pulls out easily, heat is leaking into the appliance and new seals are needed. Since new seals are not cheap, this may be a good time to evaluate whether to buy a new refrigerator or freezer.

Cleaning

- Condenser coils are located in the back of older refrigerators and at the bottom of most new ones. They should be periodically cleaned with a vacuum or brush. Be sure to unplug the refrigerator when cleaning the coils. The coils on freezers also should be cleaned regularly.

Washers & Dryers

- Use the energy guide labels to help you buy the most efficient clothes washer. Energy use for a standard top loading washer, for example, ranges from 267 kWh per year for the most efficient model to 1818 kWh for the least efficient. This makes a difference of more than \$100 a year in energy costs.
- Equally important, look for models with water level and water temperature controls. Since up to 90 percent of the energy needed to wash clothes is used to heat water, controls that allow you to use cooler water and adjust the amount of water to the load save energy. Remember, however, that one large load uses less energy than two small loads.
- Consider a front loading machine with a horizontal axis of motion; this kind of washer is more efficient and uses less water and detergent, significantly reducing monthly operating costs.

Washer operation

- Most laundry loads can be washed in cold or warm water, significantly reducing the amount of energy used. CAUTION: “cold water” as used in manufacturer’s literature and by makers of detergents means 70 degrees F. In Minnesota, the temperature of the cold water going into the machine can be below 50 degrees F, which is too cold to clean clothes properly. You may have to use the warm water setting.
- Wash full loads.

Choosing an efficient dryer

- Energy guide labels are not required on clothes dryers. To buy the most efficient dryer, look for energy-efficient features such as an automatic temperature control, a moisture sensor control, a cool-down cycle, and a no-heat cycle. These features can be found on both gas and electric dryers. The dryer may have several selections based on type of fabrics being dried; regardless of the number of these options, dryers have either two or three heat settings.
- All new gas dryers sold in Minnesota after January 1, 1979, have electronic ignition. In 1983, most U.S. manufacturers made electronic ignition a standard feature for clothes dryers.

Some propane clothes dryers may still have pilot lights. Since pilot lights increase annual gas consumption, you will save money by selecting a dryer with electronic ignition.

- Moisture sensors automatically turn the dryer off as soon as the clothes are dry and typically cut energy use by 10 to 15 percent. With a timer only, the dryer may run longer than necessary. Look for a dryer with an alarm announcing the end of the drying cycle and a post heat tumbling cycle to prevent wrinkling.

Dryer operation

- It is important to remember that the clothes dryer exhaust adds to the removal of air from the home and can be a factor in reducing the amount of combustion air available for furnaces and other fuel-burning appliances. If the dryer uses natural gas, it, too, will require combustion air. A shortage of combustion air can cause backdrafting of dangerous gases into the home, so it is important to ensure an adequate combustion air supply.
- The most important way to save energy and money with your clothes dryer is to shorten the drying time. Set the dryer moisture sensor and automatic temperature control to keep drying time to a minimum and to prevent over-drying. Over-drying not only wastes energy, it also shortens fabric life, causes wrinkles, and generates static.
- Two small loads will consume more energy than one large load; be careful not to overload the dryer, however, since this causes wrinkling and uneven drying.
- Clean the lint screen between each load. Lint restricts air movement, which can cause the dryer to run longer.
- Twice a year, disconnect the exhaust hose and clear of lint. Always use smooth metal ducting for the dryer exhaust. Flexible exhaust hoses increase operation time and trap lint, increasing fire risk. Tape all seams from dryer to exhaust.
- Check the dryer exhaust vent periodically to make sure it operates properly and doesn’t leak. The flapper on the outside should open and close freely; if it remains open, it allows heated

The Laundry

Always vent the dryer outside to prevent moisture damage to the home and to keep contaminants out of the air.

Cooking

Check the size of the cook top or hood exhaust fan and make sure there is adequate make-up air.

air to escape from the house during the winter. Check the flapper once a month and remove lint buildup.

- Always vent all dryers outside to prevent moisture damage to the home and to keep laundry contaminants out of the air you breathe.

Dishwashers

Dishwashers, like clothes washers, use energy for heating water as well as to actually run the dishwasher. An efficient automatic dishwasher, when used properly, normally uses less hot water than washing dishes by hand. The savings in water heating often make up for the power consumed by the dishwasher

Choosing a dishwasher

- Dishwashers carry the yellow and black energy guide label which compares energy use of the particular model with energy use of similar models. Check this label to ensure that you are buying a more efficient model, one that will save money on your energy bills. Efficiency of new models has improved 20 percent during the past two years.
- The majority of the dishwasher's energy use goes to heat water and not to run the machine, so it pays to look for features that reduce hot water use.
- Dishwashers do not need water heated to 140 degrees F. to dissolve detergent and cut grease. A setting of 120 degrees F. is the highest temperature needed for household use. This setting reduces water heating costs six to ten percent, compared to a 140 degree setting.
- Other useful features are short cycle and air-dry selectors. Short cycles use less hot water and are suitable when dishes are only slightly soiled. An air-dry selector automatically shuts off the heat during the drying cycle, cutting electricity use by up to 20 percent.

Installation

- The Department recommends that you do not locate your dishwasher next to a refrigerator or freezer. Dishwashers produce moisture and heat which cause the refrigerator and freezer to use more energy.

Operation

- Wash only full loads. Running two half loads can take twice as much energy as a full load.
- Don't waste water or your time by pre-rinsing dishes. Most newer model dishwashers require only that food be scraped off and liquids emptied. If you do pre-rinse, use cold water. Use short cycles when you have easy-to-clean loads.

Cook Tops & Ovens

The kitchen range consists of a cook top and an oven. Because many modern kitchens have separate cook tops and ovens, this guide refers to the combination as a "range." It also uses the term "gas" for both natural gas and propane.

Choosing a new range, cook top, or oven

- Electronic ignition replaces the pilot light on a gas range and cuts gas use by about 40 percent. All new natural gas ranges are now required to have electronic ignition. Propane ranges also are available with electronic ignition.

Electric cook tops

The most common electric burners in America are exposed coils, but a variety of new styles are available.

- Radiant elements under ceramic glass are easier to clean than exposed coil cook tops, but they are slower to heat up. It is important to use flat pans with this type of surface.
- Electric induction cook tops use magnetism to heat the pan. They may be a separate cook top or part of a range. They cut electric consumption substantially – by as much as half – and control temperature more easily than conventional electric cook tops do. They also are safer because they are cooler and less likely to cause burns, and their flat surface makes them easier to clean. Induction cook tops have some disadvantages, however. They can only be used with steel and iron pans, and they are more expensive than regular cook tops. Their extra expense may not be justified by their energy savings.

- Halogen cook tops use halogen lamps to heat a smooth glass surface. They provide heat quickly and are more efficient than regular cook tops, but they also are more expensive.

Ovens

- Convection ovens circulate hot air with a fan, providing for more even temperature in the oven. Because of this even heat, temperatures often can be lowered and cooking times shortened, thereby reducing energy use. The more even temperatures also allow for more items to be cooked at the same time.
- Self-cleaning ovens are up to 20 percent more energy efficient because they have more insulation. If you use the self-cleaning function more than once a month, however, you'll use more energy than the insulation saves.
- Microwave ovens use up to two-thirds less electricity than conventional ovens, but they require special cooking utensils and are not suitable for cooking all types of food. They are not a substitute for an oven for major meal preparation. Some microwave ovens have features that save additional energy, such as variable power settings and controls to turn off the oven when the food is cooked.

Ventilation equipment

- AN IMPORTANT CAUTION. Check the size of the exhaust fan and make sure that there is adequate make-up air. When a ventilation fan operates, it draws air from inside the house to the outside and creates or contributes to a slight vacuum in the house. The resulting negative pressure is serious; if the negative pressure is strong enough, it can cause the furnace and other fuel-burning appliances to backdraft dangerous gases into the home. All exhaust fans, including clothes dryers, must have an adequate supply of make-up air. For information on make-up air, call the Energy Information Center.
- Ventilation is necessary to remove cooking fumes, grease, moisture, and smoke. Hood or cook top exhaust fans should vent directly to the outside .
- If the range, oven, or cook top is on an inside wall and can't be directly vented to the outside,

a remote exhaust vent with a damper located on the kitchen wall is the next best option. This system can work with other household exhaust fans and fresh air intakes to improve indoor air quality. To discuss further options for ventilation, call the Energy Information Center.

- Recirculating ventilation hoods are partially effective for removing certain cooking pollutants, but ineffective for removing moisture or gases.

Efficient operation of cook tops and ovens

- Cook tops and ovens are generally not very efficient at cooking small quantities of food. Microwave ovens, toaster ovens, pressure cookers, and the common insulated ceramic pot with an electric heating element use less energy than cook tops or ovens.
- On gas ranges, keep the flame away from the bottom of the pot.
- On electric ranges, use pots and pans with flat bottoms. They provide the best contact with electric cook tops. Also, the element can be turned off a few minutes ahead of time and the hot element will continue to cook the food.
- Keep oven preheating to a minimum. Preheating is often unnecessary. Keep the oven door closed except when the food must be treated or moved. Up to 50 percent of the heat escapes each time the oven door opens. Food takes longer to cook and the loss of heat can affect browning and baking results. Use timers instead.
- Don't cover oven racks with foil; this reduces heat flow and increases cooking time. Also, don't line the bottom of the oven with foil, since the foil blocks secondary air supply to the burners and leads to increased carbon monoxide production.
- For efficient microwaving, keep inside surface clean so that microwaves can reach food effectively. Defrosting food in a microwave may be convenient, but defrosting at room temperature is free.

Compact Fluorescent Lamp

Light Output:
1200 lumens

Energy Used:
20 Watts

Life:
10,000 hours

Incandescent Lamp

Light Output:
1710 lumens

Energy Used:
100 Watts

Life:
750 hours

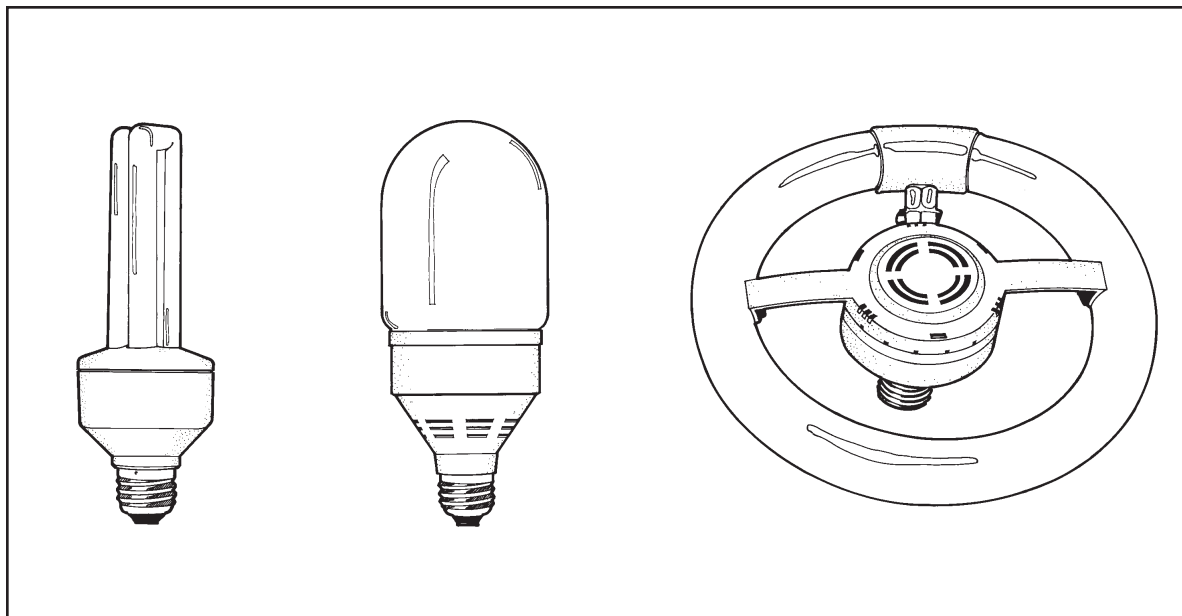


Figure 1

Compact fluorescents come in a variety of shapes and sizes to fit different fixtures.

Lighting

Lighting accounts for five to ten percent of total home electric use. The incandescent bulb has long been the standard home lighting fixture; however, recent advances in technology make it possible to replace incandescents with high quality light that uses much less electricity than incandescents.

Selecting efficient lighting

- Compact fluorescent lamps come in a variety of shapes and sizes and can replace incandescents in many table and floor lamps and in ceiling and wall fixtures as well. These lamps provide the amount and quality of light comparable to incandescent bulbs while using much less electricity. A 15-watt compact fluorescent lamp, for example, provides about the same amount of light as a 60-watt incandescent bulb. Check the energy label and compare light output and watts used with that of incandescent bulbs. (See Sidebar.)

Compact fluorescent lamps also save money. Although their initial cost is significantly higher (\$15 to \$20, compared to \$.75), their long life (more than 10 times that of an incandescent) and energy savings make them half as costly as incandescent lighting.

You'll get the most benefit from compact fluorescent lamps by using them in fixtures that are used for three or more hours a day. One caution: fluorescent lamps cannot be used with dimmer switches. For outdoor use, choose a compact fluorescent rated to -20 degrees F.

- Color quality. The quality of tube fluorescents has greatly improved; special phosphors produce a high quality light in warm and cool tones. Color Rendition Index (CRI) is a measure of the ability of the light to illuminate colors accurately. Look for lamps with a CRI rating of 85.
- Tungsten-halogen incandescent bulbs are a good choice where fluorescent lighting cannot be used – with dimmers, for example. Tungsten-halogen are more efficient (10 percent or more) than regular incandescents and last up to three times as long. They bring out the true colors of what they illuminate, and are available in floodlight, spotlight, and general service models. Tungsten-halogen PAR (parabolic aluminized reflector) lamps are appropriate for recessed lighting or track lighting and are 40 percent more efficient than incandescent reflector lamps.

Lighting label requirements

Federal law requires that specific information on energy efficiency be included on the packaging for these lamps: general service incandescent, compact fluorescent, and incandescent reflector. Their light output, energy used, and life ratings must be listed in terms of lumens, watts, and hours, respectively. The label for a general service fluorescent lamp must contain the capital letter E, printed within a circle, with the statement that this symbol means the bulb meets federal minimum efficiency standards.

Lighting controls

Automatic lighting controls also save energy. They include:

- Electronic dimmers regulate the brightness of incandescent and tungsten halogen lights, allowing you to alter lighting levels according to need and also save energy.
- Motion sensing light switches turn lights on and off automatically when someone enters a room, reducing the waste of energy that results when people forget to turn off the lights.
- Electronic timers turn lights on and off at specific times, and are often used for home security.

Using lights efficiently

- Use task lighting, rather than general space lighting, when appropriate. For example: a cabinet light to illuminate kitchen work surfaces, a reading lamp next to a chair, and a light over a sewing machine.
- Use natural daylight as much as possible. In rooms where you read or for other reasons need bright light, use light colored furnishings, light wall and ceiling surfaces, and reflective louvers or blinds to bring as much daylight as possible inside.
- Clean your light fixtures; accumulated dust can significantly reduce a bulb's output.
- Use airtight, recessed ceiling fixtures that reduce air leaks and are rated for insulation contact. Airtight fixtures help keep warm moist air from leaking into the attic and condensing onto insulation, adversely affecting its insulating ability.

- A fixture with a single bulb gives more useful light than one with several bulbs having the same total wattage. For example, four 25-watt bulbs give only half the light of one 100-watt bulb.
- Outdoors, in the garden or along pathways, use low-voltage incandescent or tungsten-halogen lamps. High pressure sodium lamps are a good choice for security lighting on garages and other buildings. Lighting controls are also useful outdoors; these include automatic timers, photo-cell controls that automatically turn lights on at dusk and off at dawn, and security spot lights that turn on and off when someone steps in and out of their range

Computers & Office Equipment

More and more people are using computers and other office equipment at home. In fact, for many Americans, home is also their place of work. In 1993, more than a third of households owned computers.

Casual use of a personal computer at home does not use large amounts of electricity; however, large computer monitors, laser printers, and home copy machines used in a true home office work-day can be significant energy consumers.

Selecting efficient equipment

- Look for and buy computers, monitors, and printers with the U.S. Environmental Protection Agency's Energy Star label.
- Computers, monitors, and printers that feature an automatic standby – or “sleep” – mode save energy when they are not in use. The Energy Star label is awarded to equipment that has this feature. It is important to remember, however, that the Energy Star label does not indicate the amount of energy the equipment uses when it is in use, and this varies considerably.
- Although desktop computers are clearly the choice of most people, lap top computers are much more efficient, costing around \$5 a year to operate nine hours a day for 280 days.
- Faster computers tend to use more energy than slower models. Color monitors use twice as much electricity as black and white, with one exception: LCD (liquid crystal display) color

Look for the Energy Labels

At right is a sample of the Energy Guide label for appliances. The Federal Trade Commission (FTC) requires that this type of label appear on refrigerators, refrigerator/freezers, freezers, dishwashers, clothes washers, and water heaters.

See Compact Fluorescent Lamp Sidebar. The FTC requires this information on compact and other general service fluorescent and incandescent lamps. To buy the most efficient lamp, find lamps with the light output you need and compare watts. Those with the lowest wattage save energy. The life of the lamp also helps determine its value. A compact fluorescent, for example, may cost more than an incandescent, but it pays for itself several times over in energy savings and length of life.

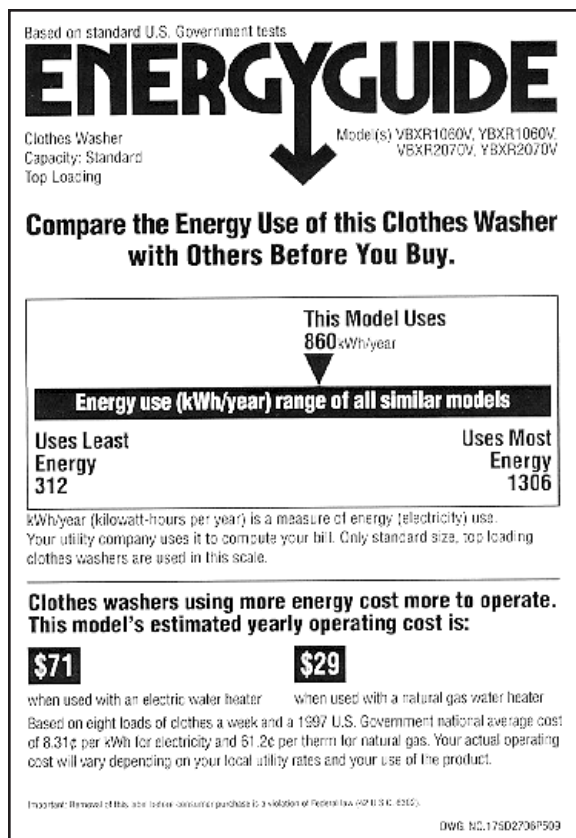


Figure 2

monitors are generally more efficient than standard models.

- Laser printers are less energy efficient than inkjet and dotmatrix printers. Although laser printers are of higher quality, in many cases the quality of the less efficient printers is sufficient for home use.
- Liquid ink photocopiers use slightly less energy than other types, but the copy quality is not quite as good. Inkjet copiers use quite a bit less energy than others, but they are slower. Digital duplicators are more efficient for high volume applications.
- Photocopiers with standby or sleep modes reduce energy use when inactive. Higher-volume copiers use more energy per copy.
- Phone faxes are efficient since they add only slightly to the amount of electricity consumed by telephone answering machines. Inkjet faxes typically use less energy than other types; thermal fax machines are the next best in terms of efficiency, and laser faxes use the most power.

- A fax modem installed in your computer saves energy since you won't have to print out the messages.
- Integrated systems that combine printing, scanning, faxing, and copying generally are more energy efficient than having separate units.

Operating equipment efficiently

- Turning off your computer monitor whenever it won't be used for 15 minutes or more and turning off the computer when it won't be used for two hours or more, saves energy and is not harmful to the equipment.
- Doing your printing at one time, and leaving the equipment off for the rest of the day, reduces energy use. The same principle applies to photocopying.
- Using less paper saves more energy than using more efficient equipment does. Eliminating wasteful spacing; printing only final copies, not drafts; and printing or copying on both sides of the paper are ways to reduce energy use.

Bibliography

American Council for an Energy-Efficient Economy (ACEEE), *Consumer Guide to Home Energy Savings*. Contact ACEEE, phone 510-549-9914.

Minnesota Department of Commerce Home Energy guides: *Home Lighting* and *Combustion Air*. Single copies available free by calling the Energy Information Center, 612-296-5175 in the Twin Cities; 1-800-657-3710 from elsewhere in Minnesota, or <http://www.dpsv.state.mn.us> (Internet).

Northern States Power Company, *EnergyWise Guide to Home Energy Conservation*. For availability of copies, call NSP, 612-330-6000.

Rocky Mountain Institute, *Homemade Money: How to Save Energy and Dollars in Your Home*. Contact the Institute at 970-927-3851 (phone), 970-927-3420 (fax), or orders@rmi.org (e-mail).