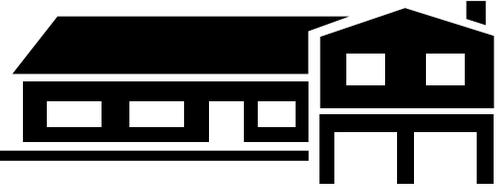


Energy-Efficient Appliances



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Introduction

In a typical U.S. home, appliances are responsible for nearly 60 percent of energy bills. The average household spends more than \$1,400 per year to operate heating and cooling equipment, water heaters, ranges and ovens, refrigerators, freezers, clothes washers, clothes dryers, and dishwashers.

Replacing old, inefficient appliances with new energy-efficient ones can save money and energy. While higher performance appliances may cost slightly more than less efficient models, the extra initial cost is paid back through reduced energy bills long before the product wears out. High-efficiency appliances and space-conditioning equipment may sharply reduce energy bills.

Energy-efficient appliances also impact the national economy and environment. Efficiently using oil, gas, and electricity reduces fossil fuel imports, improves U.S. economic competitiveness, and reduces environmental pollution from energy production and use.

EnergyGuides

The yellow EnergyGuide label provides detailed information to allow you to compare the energy efficiency and operating costs between similar appliances. A comparison scale shows the least and most energy used by similar models and indicates the performance of the labeled model.

The labeled energy consumption figures are based on average usage assumptions. Actual consumption may vary depending on the appliance usage, local utility rates, and product life.

EnergyGuide labels are required on all new refrigerators, freezers, clothes washers, dishwashers, water heaters, heat pumps, furnaces, boilers, and room air conditioners. Labels are not required on kitchen ranges, microwave ovens, clothes dryers, on-demand water heaters, portable space heaters, and lights.

Based on standard U.S. Government tests

ENERGYGUIDE

Clothes Washer
Capacity: Standard
Top Loading

Model(s) VBX1060V, YBXR1060V,
VBXR2070V, YBXR2070V

Compare the Energy Use of this Clothes Washer with Others Before You Buy.

This Model Uses 860 kWh/year	
Energy use (kWh/year) range of all similar models	
Uses Least Energy 312	Uses Most Energy 1306

kWh/year (kilowatt-hours per year) is a measure of energy (electricity) use. Your utility company uses it to compute your bill. Only standard size, top loading clothes washers are used in this scale.

Clothes washers using more energy cost more to operate. This model's estimated yearly operating cost is:

\$71	\$29
when used with an electric water heater	when used with a natural gas water heater

Based on eight loads of clothes a week and a 1997 U.S. Government national average cost of 8.31¢ per kWh for electricity and 61.2¢ per therm for natural gas. Your actual operating cost will vary depending on your local utility rates and your use of the product.

Important: Removal of this label before consumer purchase violates the Federal Trade Commission's Appliance Labeling Rule (16 C.F.R. Part 305).



Dishwashers

Appliance characteristics

New dishwashers use about half the electricity and water of 25-year-old models but still can consume 700 to 850 kWh of electricity a year. This is nearly as much as a clothes dryer or freezer.

New dishwashers are more efficient due to improved spray arms and filtering systems, allowing better movement and washing action, which decreases hot water use. Reducing hot water use is key since about 80 percent of the total energy used to wash dishes goes to heating water. The most efficient dishwashers only consume about 5 gallons of water per load, the least efficient, about twice that much.

Defining features, what to look for when buying

Use the Energy Star™ and EnergyGuide labels. The EnergyGuide label provides an estimate of the annual kWh of electrical energy use, based on 264 wash cycles per year, as well as an estimate of annual operating costs when using either gas or electricity for water heating.

Dishwashers also are rated by an energy factor (EF) which is like a miles-per-gallon rating for dishwashers. The federal minimum EF is .46, but units are available with EF exceeding 1.25. An Energy Star™ dishwasher has an EF of .58 or higher.

Choose a model that provides several different wash cycle options. Light wash or energy-saving wash cycles save energy by using less water and operating for a shorter period of time.

General features

Size – Dishwashers are available in standard and compact sizes. Compact dishwashers hold up to eight place settings. Compact-capacity dishwashers use less energy than standard washers per load. However, they are not always the most efficient choice because more loads may be needed. Purchase a dishwasher to fit the size of your family.

Convenience – Some models have three racks and adjustable-height shelving to facilitate large and odd-sized pans.

Efficient operation

- Don't pre-wash dishes.
- Only run full loads. If you must do part loads, use the energy-saver settings.
- Many dishwashers have booster heaters to raise the water temperature to 140°F to kill germs and cut grease. This increases electricity use but allows setting the water heater at 125°F, saving up to 13 percent on water heating costs.
- Use the “air dry” option rather than heat drying.

Web resources

www.eren.doe.gov/buildings/consumer_information/dishwash/

www.eren.doe.gov/femp/procurement/dishwash.html

www.rmi.org/images/other/E-HEB-Ovens.pdf

Clothes Washers

Appliance characteristics

During the last decade, the efficiency of top-loading clothes washers has doubled. Most models offer options on wash and rinse temperatures and can vary the water use to match the size of the load. Nearly 85 percent of the energy use of a clothes washer is related to the cost of heating the water, so using cold wash and rinse and selecting the proper water level are important.

Clothes washers can be divided into two broad categories, top- and front-loading machines.

Defining features, what to look for when buying

Choose models with the Energy Star™ and EnergyGuide labels. The EnergyGuide provides an estimate of the annual energy use and cost when using either gas or electricity for water heating. The minimum energy factor (EF) for washing machines is 1.18, while an Energy Star™ rating requires a 2.5 EF. Units are available with EFs exceeding 5.0.

Washers are also rated by water factor, a measure of the gallons of water per cycle for each cubic foot of tub volume.

The energy factor will be modified in 2004 to take into account water-removal efficiency during the spin cycle. The more complete the water removal, the less energy required by the dryer.

Horizontal-axis clothes washers (HAW) are generally more energy efficient and use less water than vertical-axis washers.

In a vertical-axis washer, the tub or drum used for washing is filled two-thirds to three-quarters full, depending on the load. In horizontal-axis washers, the water level is only one-third to one-half full, and clothes are tumbled through the water. Because less water is used for washing, less energy is required for heating that water. This saves on energy and water costs, which, in turn, saves the homeowner money.

High-efficiency washers, such as the horizontal-axis style, use up to 18 gallons less water per load and reduce energy costs up to 50 percent. The high-speed spin cycle removes more water and reduces drying costs.

General features

Sizes – Washing machines are available in a range of sizes. While smaller capacity machines use less energy and water per load, they often use more when considering the number of loads washed.

Performance – Horizontal-axis washers use less detergent, are easier on the clothes than an agitator style, and provide superior cleaning performance.

Efficient operation

- Use cold or warm water settings and wash full loads.
- Set your water heater to 125°F.

Web resources

www.rmi.org/images/other/E-HEB-Washers.pdf
www.cee1.org/resid/seha/rwsh/rwsh-main.php3
www.energystar.gov/products/clotheswashers/

Clothes Dryers

Appliance characteristics

Clothes dryers use more electricity than any other appliance in your home other than your refrigerator. However, unlike many appliances, the energy performance between most models of clothes dryers does not vary a great deal. The actual cost of drying clothes is strongly dependent on the water-removal efficiency of the washing machine and the fuel used to power the dryer.

Defining features, what to look for when buying

Clothes dryers do not have EnergyGuide labels nor does Energy Star™ provide a rating or label. Dryers are rated with an energy factor (EF), which is a measure of the pounds of clothing dried per kWh of energy consumed. The minimum EF for a standard capacity dryer is 3.01 and 2.67, respectively, for electric and gas dryers. However, it is difficult to find the energy factor for comparison.

Gas dryers are less expensive to operate than electric dryers. The cost of drying a typical load is about 30 to 40 cents in an electric dryer versus 15 to 20 cents in a gas dryer. However, gas dryers are more expensive to purchase.

General features

Performance – Dryers with a moisture sensor that automatically shuts off the machine when your clothes are dry will save about 15 percent, or about \$12 per year over a simple timed cycle. Wear and tear on your clothes will also be reduced. Some dryers use a temperature sensor rather than a true moisture sensor to control termination of the cycle. The exhaust temperature goes up when the clothes are dry. This will save costs, but not as much as a true moisture sensor.

Efficient operation

- Make sure the dryer is properly vented to the outside to minimize airflow restrictions.
- Verify the vent damper on the outside closes tight when the dryer shuts off, to prevent outside air from entering.

- Clean the filter after every load to maintain air circulation and performance.
- Dry only full loads, but do not overload.
- Separate dryer loads by weight of fabric. Synthetic fabrics dry more quickly than most natural-fiber materials.
- Dry two or more loads in a row, taking advantage of a warm dryer.
- Use the cool-down cycle (perma-press) to allow final drying with residual heat.

Web resources

www.ianr.unl.edu/pubs/housing/nf348.htm

Refrigerators

Appliance characteristics

A refrigerator uses the most electricity of all kitchen appliances, approximately 8 percent of a home's total energy usage. A typical refrigerator costs about \$1,140 to operate over its lifetime. Refrigerators made to meet the latest Department of Energy (DOE) 2001 standards will cut consumers' energy costs by 30 percent compared to the previous standard (1993) and more than 50 percent compared to older units. The energy bill for typical new refrigerators with automatic defrost and top-mounted freezer will be about \$55 per year, whereas a typical model sold in 1973 will cost nearly \$160 per year.

Super-efficient refrigerators are currently on the market that save even more. Often highly energy-efficient products will be more expensive to purchase but will cost less to operate over the lifetime of the appliance. For example, a more efficient model could pay for its additional cost in a little over three years.

If every household in the United State had the most efficient refrigerators available, the electricity savings would eliminate the need for more than 20 large power plants.

Defining features, what to look for when buying

Refrigerators with Energy Star™ labels are at least 10 percent more efficient than minimum standards. Use the EnergyGuide label to determine how the refrigerator you are considering ranks in comparison to all similar units with similar features. The EnergyGuide also provides an estimate of annual energy costs.

Refrigerators are classified by the location of the freezer compartment (top, bottom, or side-by-side) and the presence of icemakers, and through-the-door ice and water dispensers. The following items show the impact various features have on performance:

- Top-freezer models are more efficient (use 7 to 13 percent less energy) than side-by-side models.
- Manual-defrost models use half the energy of automatic-defrost models and cost less initially, but must be defrosted periodically to remain energy efficient.
- Automatic ice-makers and through-the-door dispensers will increase energy use by 14 to 20 percent and will increase the purchase price by about \$75 to \$250.
- Models with anti-sweat heaters will consume 5 to 10 percent more energy. Look for a model that has an "energy saver" switch that shuts the heaters used to prevent surface condensation during humid indoor conditions.
- It is usually less costly to run one larger refrigerator than two smaller ones.

General features

Sizes – The most energy-efficient models are in the 16- to 20-cubic-foot sizes. Too large of a model will waste space and energy; too small of a model could mean extra trips to the supermarket.

Performance – A well-insulated refrigerator with few added features, like through-the-wall ice and water, will be the most efficient.

Efficient operation

- Don't keep that old, inefficient fridge for occasional beverage cooling.
- Set and check refrigerator temperatures at 37 to 40°F and freezer temperatures at 0 to 5°F.
- Defrost manual-defrost refrigerators when ice thickness reaches 1/4 – 1/2 inch.
- Keep doors shut as much as possible.
- Cover food items to reduce evaporation that increases compressor operation.
- Learn under what conditions you can turn on the “energy saver” switch and still not have condensation.
- Plan the location of the refrigerator to allow space (2 inches or more) on both sides and behind the refrigerator for airflow.
- Clean the refrigerator on the bottom or back of the unit at least semi-annually, more often if needed.

Web resources

www.energystar.gov/products/refrigerators/
www.eren.doe.gov/femp/procurement/begin.html

Water Heaters

Appliance characteristics

Water heating typically uses 14 percent of the energy in a home, with costs of between \$150 and \$400 per year. Heating with electricity generally costs about twice as much as with gas or propane.

Most water heaters are storage type, fueled by natural gas, propane, or electricity. Other options for water heating include demand (tankless), heat-pump, and solar.

Defining features, what to look for when buying

Natural gas and propane water heaters are the most common choices and are generally less expensive to operate. Energy factors (EF) for gas and propane water heaters range from about 0.5 to a high of 0.65, with an EF of .60 being a reasonable choice. EFs for electric units range from 0.7 to 0.95, with a mini-

um rating of .92 being recommended. If you are considering an electric heater, check with your local utility company or electricity supplier to see if they offer all-electric rates. The EnergyGuide label will provide estimates of annual energy costs you can use to compare not only the initial cost but also annual operating costs.

Most water heaters have natural-draft venting. These devices often spill combustion products during start-up and may pose other indoor air quality problems, especially in very tight construction. Units with sealed combustion draw combustion air from the outside and power-vent the combustion products to the outside. Other units draw combustion air from the inside but use power venting to exhaust the spent fuel. Both avoid backdrafting of combustion gases into the home. Power-venting, in combination with high-efficiency furnaces, will eliminate the need for traditional through-the-roof venting systems.

General features

Sizes – Choose the size of a water heater based on the first-hour rating rather than tank size. This rating accounts for the effects of tank size and the speed by which cold water is heated. Tank size alone is not a good indicator of actual hot water capacity.

Safety – Have the water heater installed in accor-

Choosing the right first-hour rating

Your house has—			
How many bathrooms?	1 to 1-1/2	2 to 2-1/2	3 to 3-1/2
How many bedrooms?	1 – 2 – 3	2 – 3 – 4 – 5	3 – 4 – 5
First-hour rating of:	43–60–60	60–70–72–90	72–82–90

dance with local codes to assure safe electrical, fuel, and combustion vents systems.

Emerging – **Point-of-use** water heaters, also known as “tankless” heaters, provide hot water on demand. They use gas or electricity and are installed near demand points, such as under kitchen sinks. They are more expensive than storage water heaters, but can cost less to operate and will have a longer life. Because tankless water

heaters typically provide only 1 to 2 gallons of hot water per minute, make sure its reduced capacity will be adequate for your needs.

Solar water heaters can reduce annual water heating costs by more than half. Throughout the year, the solar system preheats the water before it reaches the conventional water heater. During the summer, it may provide all the required heat.

Desuperheater water heaters are an attachment to your air conditioner or heat pump used to heat domestic water. In hot climates, a desuperheater can provide most of a home's hot water needs during the summer.

Efficient operation

- Reducing the amount of hot water used is the best way to reduce the cost of heating water.
- Install modern, low-flow showerheads for reduced volume but not a wimpy shower.
- Install aerators or laminar-flow faucets (produce tiny parallel streams of water) on sinks to reduce flows.
- Upgrade to a horizontal-axis clothes washer to reduce washer water use by 40 percent.
- Lower the setpoint temperature of the water heater. Each 10°F will reduce water-heating costs by an average of 15 percent.

Web resources

www.eren.doe.gov/buildings/consumer_information/water/
www.rmi.org/images/other/E-HEB-WaterHeating.pdf

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