



Washington Energy Extension Service
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USING APPLIANCES EFFICIENTLY

Families in the northwest typically spend \$300-\$600 a year to run household appliances. Replacing old appliances with new energy efficient ones and using appliances efficiently will help reduce costs. Proper maintenance will improve performance and extend equipment life.

This Update offers information on appliance selection and use to help you get the most from your appliances at lowest cost. It also provides data on typical operating costs for common appliances.

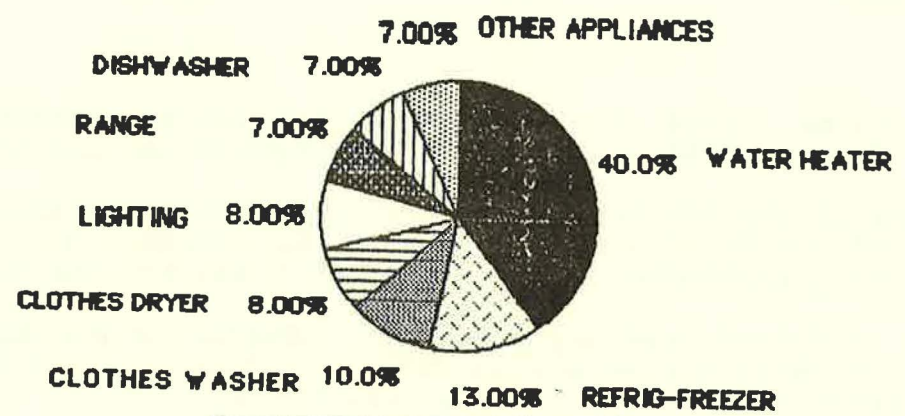
Nine Key Appliances

Your central heating system is the biggest energy user in your home. For this reason, weatherizing the home, setting back the thermostat at night and keeping the heating system tuned are some of the most practical, cost effective ways to reduce energy bills.

After the heating system, the biggest energy users are the following nine appliances:

- | | | |
|--------------|----------------|-----------------------|
| Water Heater | Range | Dishwasher |
| Refrigerator | Clothes Washer | Portable Space Heater |
| Freezer | Clothes Dryer | Lighting |

Their relative energy use is illustrated in the appliance use pie chart below. Since they are the biggest energy users, it's important to focus on them first before considering other appliances that use small amounts of energy such as power tools, toasters, hair dryers, and others.



APPLIANCE USE CHART

TABLE 1. ENERGY USE OF COMMON HOME APPLIANCES

Appliance	Typical Energy Use (kWh/year)	Cost (\$/year)
Water heater *		
electric	4800	\$216
gas	----	\$128
Refrigerator-Freezer (18 cubic feet)		
frost free	1800	\$ 81
manual defrost	1200	\$ 54
Clothes Dryer		
electric	1080	\$ 49
gas	----	\$ 26
Lighting	1020	\$ 46
Dishwasher *	935	\$ 42
Range-Oven		
electric	840	\$ 38
gas	---	\$ 38
Clothes Washer *	1200	\$ 54
Portable Space Heater (winter use)		
electric	550	\$ 25
kerosene	---	\$ 17
Television (Color)	480	\$ 22
Coffee Maker	120	\$ 5
Microwave Oven	120	\$ 5
Radio/Phono	110	\$ 5
Toaster	50	\$ 2
Hair Dryer	35	\$ 2
Clock	17	\$.77

*Water heater usage excludes hot water use by clothes and dishwasher. Hence, clothes and dishwasher figures include hot water use.

NOTE: Energy use can vary considerably depending on appliance efficiency and hours of use. Efficiency is presumed to be typical for existing appliances. Costs based on \$.045/kWh and \$.51/therm.

SOURCE: Compiled from appliance use information provided by the American Council for an Energy Efficient Economy, the Bonneville Power Administration and Seattle City Light.

EnergyGuide Labels

Bright Yellow EnergyGuide labels appear on most new major appliances including:

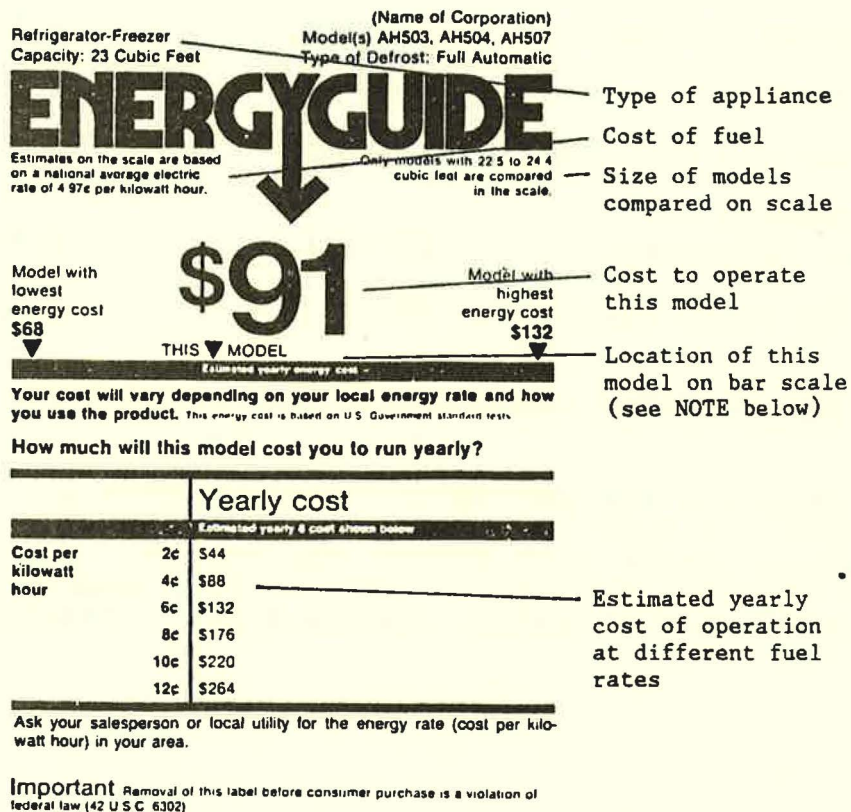
Water Heaters
Refrigerators
Refrigerator/Freezers
Freezers

Clothes Washers
Dishwashers
Air Conditioners
Furnaces and Heat Pumps

These labels help you compare the energy costs and energy efficiency rating of appliance models in a similar size range. The information on the label is based on a standardized efficiency test conducted by independent, nationally recognized testing labs.

All new appliances must bear EnergyGuide labels, even the most energy wasteful ones. When shopping for new appliances, give close scrutiny to the energy guide labels. You may find that an appliance which is inexpensive to purchase is more costly to operate when compared to another model of the same size. Sometimes it will make sense to spend more money initially to purchase an energy efficient appliance if it will save you money in the long run.

The information provided on the label is explained below.



NOTE: The EnergyGuide label has a bar scale that shows the models with the lowest and highest energy costs. It is recommended that you not use this scale for comparing models because it has not been updated since 1982. Most of today's models are more energy efficient than those produced in 1982.

TABLE 2. ESTIMATED ENERGY USE FOR MISCELLANEOUS APPLIANCES

Appliance	Typical Energy Use (kWh/year)	Cost (\$/year)
Waterbeds	800-2000	\$36-\$90
Well pumps	200-800	\$ 9-\$36
Pool pumps	700-3000	\$32-\$135
Other pool equipment	300-900	\$14-\$41
Saunas, spas, and hot tubs	1000-2000	\$45-\$135
Attic fans and whole-house fans	20-500	\$.90-\$23
Furnace Fans	500-900	\$23-\$41
Aquariums, terrariums, and special pet facilities	200-1000	\$ 9-\$45
Home computer systems	100-300	\$ 5-\$14
Dehumidifiers	200-1000	\$ 9-\$45
Greenhouses and grow-lights	200-1000	\$ 9-\$45
Heat exchangers (and their defrosters)	200-400	\$ 9-\$18
Instant hot water dispensers	100-400	\$ 5-\$18

SOURCE: Energy Auditor and Retrofitter, Nov/Dec 1987.

Not all homes use the appliances listed in Table 2. If your home does however, it might be helpful to note the energy use and cost of operating these less common appliances. Waterbeds, for example, can use the same or more energy than a range-oven, refrigerator, clothes washer, clothes dryer or dishwasher.

Water Heaters

There are many different types of water heaters: conventional gas and electric, high efficiency gas and electric, demand water heaters, heat pump water heaters, solar and wood systems. These are discussed in other WEES publications referenced at the end.

Most people have older conventional tank water heaters. To increase their efficiency or to help conserve hot water:

- Insulate the tank on sides, top and bottom.
- Set back the thermostats to 120°F.
- Install heat traps on the hot and cold water lines to reduce heat loss through the water pipes.
- Insulate all hot water pipes, and first three feet of cold pipe to tank.
- Install energy efficient showerheads and faucet aerators on all taps in the home.
- Fix leaky faucets.

When replacing an old water heater, it makes sense to pay extra to get a new energy efficient one. Follow these tips.

- Look for a unit with R-16 to R-20 insulation.
- Compare the EnergyGuide Label for operating cost information.
- Size it to your water heating needs. If the tank is too large, energy will be wasted keeping it warm.
- When replacing an electric water heater, contact your local utility and inquire about an energy efficient tank replacement rebate program. Some utilities offer these to help pay for the extra cost of an efficient tank.

Refrigerator/Freezer

The refrigerator/freezer is the third greatest consumer of energy in the home. Frost free models typically cost about \$80 a year to operate. To reduce energy costs:

- Locate the refrigerator/freezer away from the stove, dishwasher or direct sunlight.
- Leave space for air to circulate around the condenser coils (usually located in the back of the unit).
- Check the inside temperature with a thermometer. The refrigerator compartment should be between 35°F and 38°F and the freezer compartment between 0°F and 5°F.
- Defrost manual units when frost build up is 1/4 inch or more.
- Keep the coils clean. Dust makes the unit use more energy.
- Replace leaky or broken door seals.
- Use "power saver" or "energy miser" switches unless excessive moisture buildup on outside surfaces occurs.

● Cool hot food on counter before storing.
The efficiency of refrigerators has increased substantially in recent years. The average refrigerator/freezer built today uses 34% less energy than the average 1972 model.

When selecting a new refrigerator/freezer, it pays to shop around. Follow these tips.

- Call 1-800-654-LIST for "The Top 15% Energy Efficient Refrigerators and Freezers" list published by the Bonneville Power Administration.
- Compare energy guide labels.
- Select the right size. One large refrigerator is less expensive to operate than two smaller units.
- Side by side refrigerator/freezers use 15% more energy than top freezer models.
- Chest freezers are more efficient than upright freezers because cold air doesn't spill out when they're opened.

Ranges

Electric and gas ranges cost about the same to operate--\$38 per year. Careful use can reduce these costs.

- Cook with lids on pots. This keeps the heat in and speeds up cooking time.
- Use pots and pans with flat bottoms on electric ranges.
- Turn electric elements off a few minutes ahead of time. The hot element will offer residual heat.
- Fit pots and pans to the size of the burner or element.
- Keep reflector pans clean.
- Minimize oven preheating time. Preheating isn't necessary for casseroles or roasts, but should be done for baked goods.
- Don't be an "oven peeker". It loses energy and increases cooking time.
- When cooking small meals, use toaster ovens, microwave ovens, plug in fryers and "crock pots" instead of the range.

When selecting a new range, look for specific energy efficient features. Ranges are not labeled with energy guide labels. Gas units should have electric ignition instead of a pilot light. Convection ovens in both gas and electric units circulate air evenly and reduce cooking temperatures and times.

Clothes Washers

Clothes washers typically cost \$50-\$60 per year to operate. This includes the cost of hot water. Up to 90% of the energy used to wash clothes goes toward hot water. To reduce this cost:

- Use all temperature laundry detergents and choose a cool

or warm wash for most loads. Use hot water for very dirty loads only.

- Always rinse with cold water.
- Match the water level to the size load you use (ie., low water level for small loads).

When selecting a new clothes washer:

- Use EnergyGuide labels to compare models.
- Look for models with water level and water temperature controls.
- Select a model with a rinse water re-use feature.
- Consider front loading models. They use less hot water than top loading units.

Clothes Dryers

Clothes dryers cost \$25-\$50 per year to operate. To reduce this cost:

- Air dry clothes whenever possible. Hang outside or use "Air Dry" setting.
- Shorten drying time. If you have a moisture sensor control, use it. Moisture sensors prevent overdrying.
- Dry only full loads.
- Clean the lint screen between loads
- Always exhaust the dryer to the outdoors. If not, serious moisture problems can occur.
- Check the venting system once a year. Clean if necessary.

When selecting a new clothes dryer, look for a moisture sensor control, a cool down cycle and electric ignition instead of a pilot light (gas models). Moisture sensors prevent overdrying and cut energy use by 10-15%. A cool down cycle tumbles clothes in cooler air during the last 5 to 10 minutes of operation, and reduces wrinkling.

Dishwashers

Dishwashers cost \$40-\$50 per year to operate. Up to 60% of this is for hot water. To reduce energy costs:

- Install the dishwasher away from the refrigerator or freezer, or with a layer of insulation between them. This reduces heat transfer from the dishwasher to the refrigerator.
- Wash only full loads.
- Don't pre-rinse by hand. Just scrape dishes clean of food. If you must pre-rinse, use cold water; then run dishwasher on a "short-cycle" setting.
- Use short cycles for easy-to-clean loads.
- Use the "air dry" or "power saver" switch regularly.

This shuts the heat off during drying and reduces energy use.

The most energy efficient dishwasher costs half as much to run as the most inefficient dishwasher. When choosing a new dishwasher:

- Compare EnergyGuide labels.
- Look for a booster heater feature. This raises the water temperature to the necessary 140°F for dishwashing while letting you set back the central water heater to 120°F.
- Look for short cycle and air dry selections.

Portable Space Heaters

Portable space heaters can reduce home energy bills if you set back the thermostat for the central heating system and focus heating in the rooms where you are active. There are two types of portable space heaters: electric and kerosene. They cost about the same to operate. Unvented kerosene space heaters (both new and old models) create indoor air pollution and moisture build up. For this reason, we recommend against using unvented kerosene heaters. Vented units are fine to use, but are permanently mounted.

When using space heaters, safety precautions must be taken. Keep them away from curtains and bedding, and position them in an area where they cannot be turned over. Remember, when using them, you'll only save energy if you reduce the furnace setting. For each one degree furnace setback, you'll save 3% on fuel use.

When selecting a portable space heater:

- Look for tipover switches, temperature controls for heat output, and grills which limit access to elements or flame.
- Consider electric heaters with on-off signal lights and timers. Timers can preheat spaces that are left cold when unoccupied or during night setback.

Lighting

Lights in the home may cost \$40-\$60 a year to operate. There are many ways to reduce lighting costs.

- Don't overlight. Use task lighting (desks, reading and food preparation areas) whenever possible.
- Buy efficient incandescent bulbs.
 - "Energy Miser" or "Super Saver" bulbs use 5-13% less electricity.
 - "Capsylite" bulbs use 33% less electricity and last four times longer.
- In lighting multi-lamp fixtures, use one high wattage bulb

- instead of two or more lower wattage bulbs.
- Long-life incandescents are less efficient than standard bulbs. Use them only in hard to reach places.
 - Switch to fluorescents in areas of your house that are used most. They're 3 to 4 times more efficient, and last 8 to 15 times longer. Select "warm white" bulbs.
 - New compact fluorescents are expensive (\$10-\$20/bulb) but provide a warmer color of light like incandescents. They last 10 times longer, and use 70% less electricity than incandescents.
 - Avoid light buttons, advertised to reduce energy costs. They can extend bulb life but reduce light output drastically. If you want less light, switch to lower wattage bulbs.
 - Replace incandescent outdoor security lighting with low wattage, mercury vapor, metal halide or high pressure sodium lamps.
 - Use timers on security lighting.

WEES Publications

- FS1301 Hot Water Conservation
- FS1302 Demand Water Heaters
- FS1607 Solar Domestic Water Heating
- FS1705 Water Heating With a Woodstove
- UD1301 Calculating Your Hot Water Costs
- UD1302 Setting Back the Water Heater Thermostat

Suggested Reading

- The Most Energy Efficient Appliances Directory, and
- Saving Energy and Money with Home Appliances, available from the American Council for an Energy Efficient Economy, 1001 Connecticut Avenue NW, Suite 535, Washington, D.C. 20036.

Much of the information contained within this publication was derived from the American Council for an Energy Efficient Economy.

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