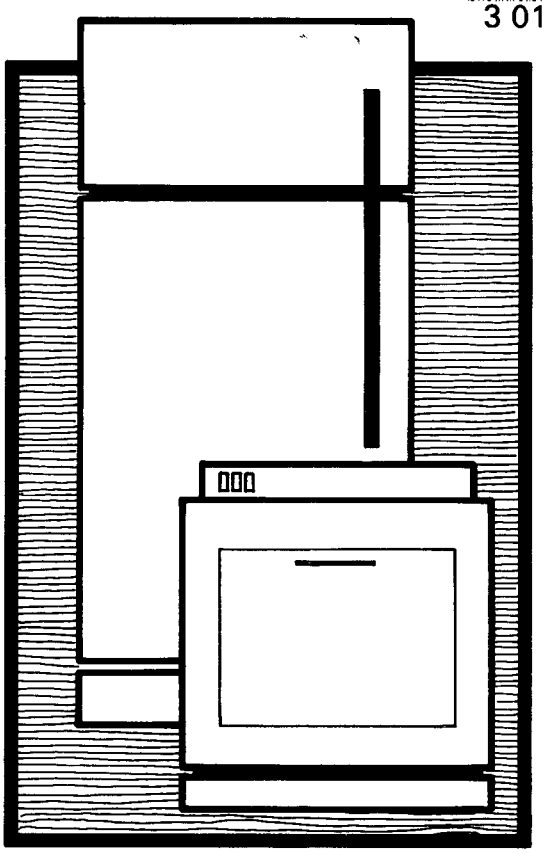
AE-1004



Energy Efficiency Labels

Harvey J. Hirning
NDSU Extension Agricultural Engineer

Energy labels have been required on refrigerators, refrigerator-freezers, freezers, clothes washers, dishwashers, water heaters, furnaces and air conditioners since 1980. The purpose of the labels is to help you make a better informed decision about the amount of energy you can expect an appliance to use during its lifetime.

Ranges and clothes dryers are labeled differently from other appliances because the way they are used has a greater effect than the differences between models and makes. These appliances do not require energy labels because the amount of energy they use is determined more by the user than by the manufacturer. The amount of moisture to be removed from clothing is the factor that most affects the amount of energy needed to dry clothes. How well the pot matches the heating element and the use of lids greatly affect the amount of energy used by the range.

Label Types

There are three types of labels used, based on the type of appliance and how it will be used. Air conditioners have a label that shows the seasonal energy efficiency rating of the model and the range of energy efficiency ratings for similar sized air conditioners (the energy efficiency rating refers to the btu/hr of cooling you can expect per watt of electricity consumed). An expected yearly operating cost, for a certain number of hours per year at various electrical costs, is included.

A furnace will have a general label indicating the efficiency rating of the model and a list of operating suggestions to show how to save energy.

Other appliances have a label showing the expected operating cost of the appliance and the range of operating costs for similar models at the

NDSU EXTENSION SERVICE
North Dakota State University, Fargo, ND 58105

DECEMBER 1990

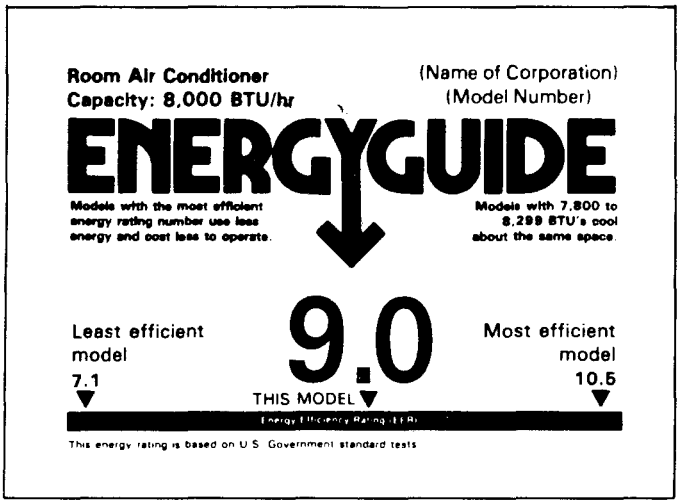


Figure 1. The top of the energy label for an air conditioner. This label shows a unit with an energy efficiency rating of 9. The least efficient model in this size range has a rating of 7.1 and the most efficient has a rating of 10.5.

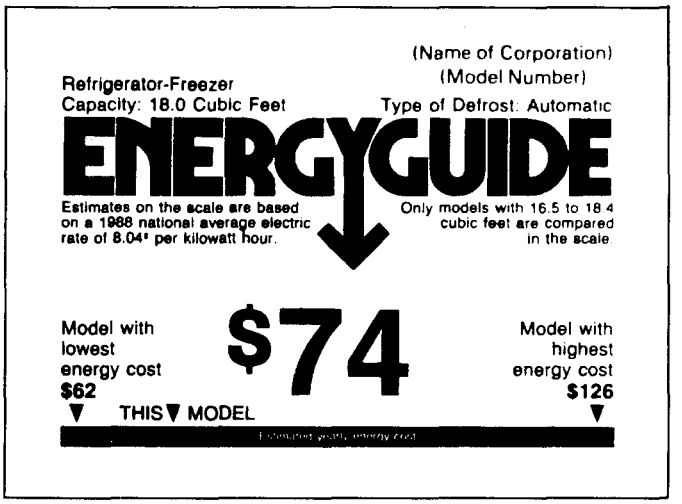


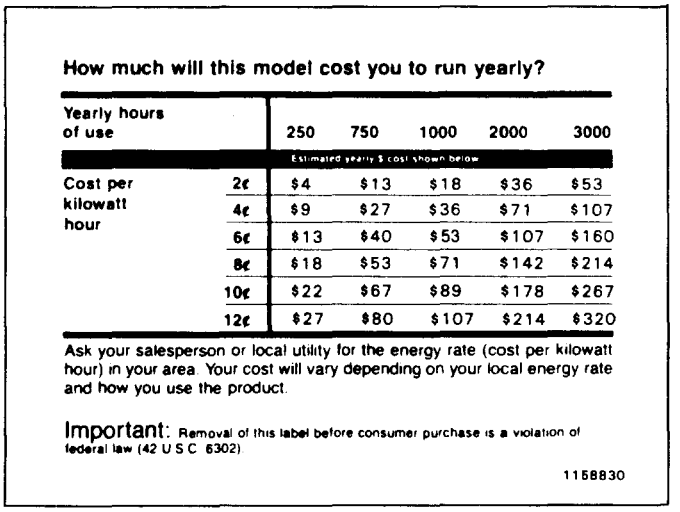
Figure 2. The label for a refrigerator-freezer is similar to other appliances. It shows the expected operating costs for this model and the most and least efficient models. Keep in mind that this is an average and your costs may be different because of usage patterns and energy costs.

national average electrical cost. Check the date under the word Energyguide to make sure that you are comparing labels with the same date and energy cost on them. A chart at the bottom of the label shows how much a change in the cost of electricity changes the cost of operating the appliance.

Comparing Appliances

The energy label lists the most efficient and least efficient appliances, along with the ranking of the appliance to which the label is attached. You may not be able to find the most efficient appliance listed in the local market because some makes and models are only marketed in limited areas. Your dealer may be able to determine what the most efficient model is by checking a directory provided by the Association of Home Appliance Manufacturers, or "The Most Energy Efficient Appliances" published by the American Council for an Energy Efficient Economy.

While operating costs are important in the decision of which appliance to purchase, you must also consider the service that is available and the number of hours of expected operation per year. For example, an air conditioner is only expected to operate about 500 hours per year in North Dakota. If the most efficient air conditions is appreciably more expensive than a less efficient unit, you may not be able to recover the extra cost in reduced operating costs.



How much will this model cost you to run yearly?

Yearly hours of use		250	750	1000	2000	3000
	Estimated yearly $ cost shown below					
Cost per kilowatt hour	2¢	$4	$13	$18	$36	$53
	4¢	$9	$27	$36	$71	$107
	6¢	$13	$40	$53	$107	$160
	8¢	$18	$53	$71	$142	$214
	10¢	$22	$67	$89	$178	$267
	12¢	$27	$80	$107	$214	$320

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area. Your cost will vary depending on your local energy rate and how you use the product.

Important: Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302).

1158830

Figure 3. The lower portion of the energy label shows how the cost of energy affects the operating cost of this appliance. For an appliance which could use gas or electricity, both energy costs will be listed.

Another factor to consider is the effect of inflation on operating costs. A small difference in operating costs now may be quite large in a few years if the inflation rate is larger.

While inflation rate predictions are highly inaccurate, you can develop your own prediction by multiplying the current energy rate by the inflation factor. If you anticipate a 12 percent inflation rate, you can expect that in the seventh year, operating

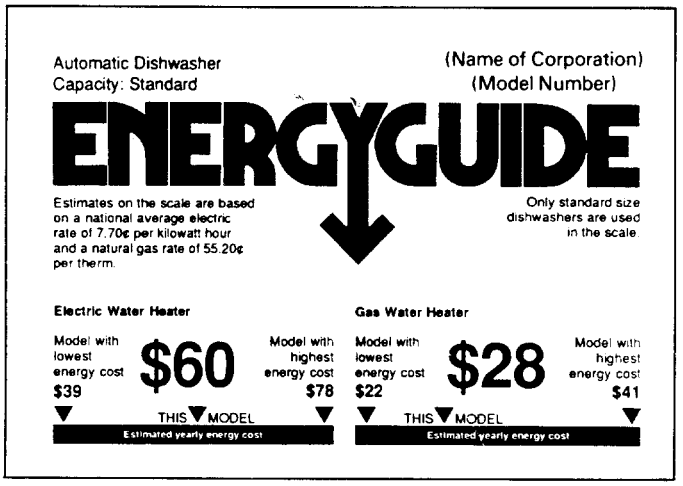


Figure 4. The label for a dishwasher includes the energy required to heat the water for the dishwasher. Since the energy for heating the water is a major portion of the operating cost, a unit which uses less hot water will have a lower expected operating cost.

costs will be double what they are now. Table 1 shows how operating costs are affected by a 5 percent inflation rate.

Table 1. Yearly cost to operate a freezer at a 5 percent inflation rate with an initial electrical cost of 5 cents per kilowatt hour (kWhr).

Year	Electricity Cost (c/kwhr)	Annual Cost ($/year)
1	5.0	91.57
2	5.25	96.15
3	5.51	100.96
4	5.78	106.00
5	6.07	111.30
6	6.38	116.87
7	6.70	122.71
8	7.04	128.85
9	7.39	135.29
10	7.76	142.04
Total for 10 years		$1,151.76

Understanding the Label

The top of the label contains information about the type of appliance, its size and the manufacturer. Below this is a bar indicating the operating cost or energy efficiency of this appliance, as it compares to others in its class. In the fine print is the estimated national average electrical cost.

Below the efficiency bar is a table that shows what the yearly operating cost is expected to be with various electrical costs. You will need to know your present electrical costs to estimate your annual operating cost. If you do not know your costs, your electric power supplier will be able to furnish this information.

Note: The number of hours of use must be considered when you estimate the yearly operating cost of an appliance.

There are also some hidden factors to consider in evaluating appliances. For example, clothes washer labels include the energy required to heat the water along with the energy required to operate the washer. Since front loaders use less water than top loaders, they will show up on the lower end of the energy efficiency scale. Refrigerators with a manual defrost will tend to use less energy than automatic defrost. However, the label does not show that unless the manual defrost refrigerator is regularly defrosted (whenever the frost exceeds 1/8 inch), they will use more energy than an automatic defrost unit.

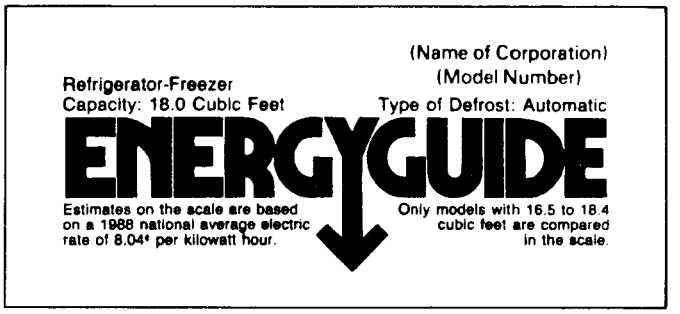


Figure 5. All labels show what the appliance is and the range of sizes of appliances to which the label applies. On this label for a refrigerator-freezer, only models in the 16.5 to 18.4 cubic feet are included in the operating cost range.

NAECA — 1987

The National Appliance Energy Conservation Act (NAECA) of 1987 sets standards for the maximum energy that major appliances can consume and sets design options for others. For example, refrigerators manufactured after January 1, 1990, must average less than 976 kilowatt-hours of energy per year. There is some variation allowed for different designs and sizes.

Room air conditioners must meet specified energy efficiency ratios (EER). On the average this means a total annual electrical consumption of 894 kilowatt-hours or less.

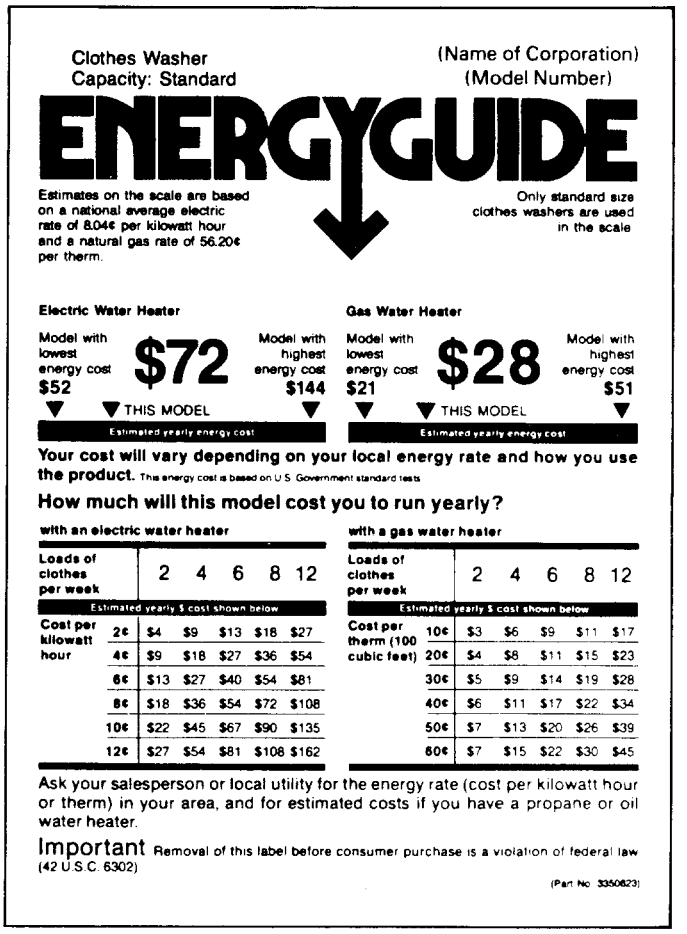
Other appliances have design specifications that must be met. Washers must have a cold rinse setting, dishwashers must have an air dry option and gas dryers and ranges must have electric ignition rather than standing pilot lights.

Techniques to Improve Efficiency

Each appliance has some unique opportunities to improve overall efficiency. Some are genuine energy savings, while others are less clear cut.

Improved spray arms and filtering systems have provided better washing action, with less hot water, in dishwashers. The air dry cycle, on the other hand, depends upon energy from some other source to improve the efficiency of the dishwasher. During the winter, the energy for drying the dishes comes from the furnace, while in the summer solar energy may be used.

Clothes washers are using more cold water to mix with the hot to achieve better energy efficiency. The result is that the warm cycles are considerably cooler than they were in the past. Many purchasers will be surprised by how cool the warm cycles are, even though they do save energy by reducing the amount of hot water used. If the temperature of the water heater is turned up to get the warm water to feel warm, there may not be any savings. **CAUTION**-- If you turn the temperature of the water heater up, there may be an increased risk of burns from the hot water at all hot water faucets and showers.



Clothes Washer
Capacity: Standard

(Name of Corporation)
(Model Number)

ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 8.04¢ per kilowatt hour and a natural gas rate of 56.20¢ per therm.

Only standard size clothes washers are used in the scale

Electric Water Heater

Model with lowest energy cost **$52**

$72

Model with highest energy cost **$144**

▼ THIS MODEL

Estimated yearly energy cost

Gas Water Heater

Model with lowest energy cost **$21**

$28

Model with highest energy cost **$51**

▼ THIS MODEL

Estimated yearly energy cost

Your cost will vary depending on your local energy rate and how you use the product. This energy cost is based on U.S. Government standard tests

How much will this model cost you to run yearly?

with an electric water heater

Loads of clothes per week		2	4	6	8	12
Estimated yearly $ cost shown below						
Cost per kilowatt hour	2¢	$4	$9	$13	$18	$27
	4¢	$9	$18	$27	$36	$54
	6¢	$13	$27	$40	$54	$81
	8¢	$18	$36	$54	$72	$108
	10¢	$22	$45	$67	$90	$135
	12¢	$27	$54	$81	$108	$162

with a gas water heater

Loads of clothes per week		2	4	6	8	12
Estimated yearly $ cost shown below						
Cost per therm (100 cubic feet)	10¢	$3	$6	$9	$11	$17
	20¢	$4	$8	$11	$15	$23
	30¢	$5	$9	$14	$19	$28
	40¢	$6	$11	$17	$22	$34
	50¢	$7	$13	$20	$26	$39
	60¢	$7	$15	$22	$30	$45

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour or therm) in your area, and for estimated costs if you have a propane or oil water heater.

Important Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302)

(Part No. 3350823)

Figure 6. A label for a standard sized clothes washer. Be sure to check the energy costs for your area before trying to compare operating costs. This label uses an electrical cost of 8.04 cents per kilowatt hour which is the national average. North Dakota electrical costs tend to be lower than the national average. Natural gas is listed at 56.2 cents per therm which is near the North Dakota average.

Automatic controls can reduce the amount of energy used by an appliance by reducing the probability of erroneous human actions. For example, a moisture sensor in the dryer can reduce the amount of overdrying of clothes and save energy, as well as possibly reducing the amount of ironing that may need to be done.

Helping You Put Knowledge To Work

NDSU Extension Service, North Dakota State University of Agriculture and Applied Science, and U.S. Department of Agriculture cooperating. William H. Pietsch, Director, Fargo, North Dakota. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. We offer our programs and facilities to all persons regardless of race, color, sex, religion, age, national origin, or handicap; and are an equal opportunity employer.

5M-12-90