

# Your Family's Energy Guide

A special publication of Minnkota Power Cooperative and the associated systems

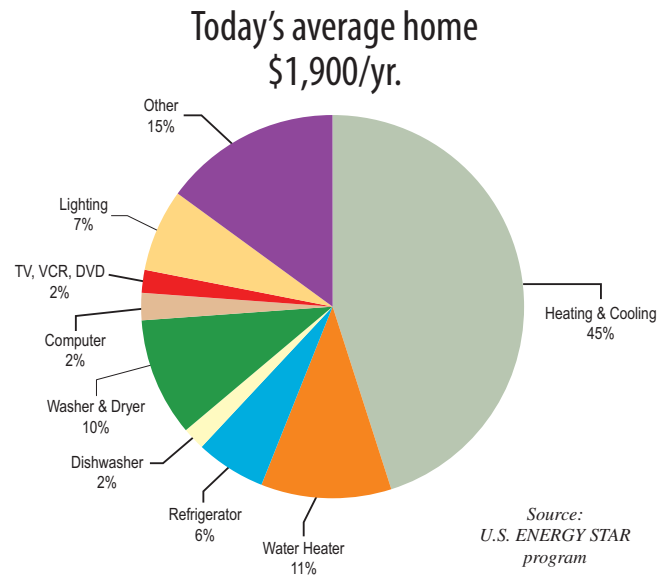


The introduction of electricity set a new standard of living for Americans. But because electricity and its millions of uses are such a prevalent part of our lives, it is sometimes hard to gauge exactly how much of it we use as we work and play.

This guide is a starting point to get you on the way toward better energy management for your home. It will provide you with the information you need to estimate your electric use. You'll also find valuable tips to create greater home comfort and improve performance.

# Evaluating your home's energy usage

*In an era of rapidly rising energy costs, having an energy efficient home is important. The size of your home and your family's lifestyle are key factors in the amount of energy consumed. Your local cooperative or municipal work hard to hold down energy prices. You, too, can play an important role in controlling your energy costs by evaluating your home and taking simple steps to trim unnecessary energy consumption. Let's take a look at the main factors that can impact your electric energy usage:*



## Family size

Your family is unique. A direct relationship exists between the number of people living in a home and the amount of energy used. In addition, if friends and relatives are visiting, you can expect to use more energy for cooking, baking, laundry and hot water.

## Home heating and cooling

Because heating and cooling account for nearly half of your electric usage, here are a few simple suggestions you can try to help save you some dollars on your next electric bill:

- Turn down the thermostat. Reduce the temperature from 70 degrees to 65 degrees while you're home. Turn it down to 60 degrees or 55 degrees while you're away or asleep, and cut your heating bill by 25 percent.
- Open shades to let in the sun's warmth – close them at night to keep heat inside.



- Lock windows. It tightens the seal to stop heat leaks.
- Heating ventilation and air conditioning systems should be checked to verify they are moving the correct amount of air. A qualified technician can assist you.
- Heat pump and air conditioning systems should be checked annually to verify they are properly charged, strictly in accordance with manufacturers' guidelines.
- Inside and outside coils should be kept clean and free of debris.
- Gas furnaces should be tuned for maximum combustion efficiency.



- Return filters should be changed monthly.
- Have a technician check carefully for duct leaks. Leaks that are found should be sealed with fiberglass and mastic sealant.



## Windows

A considerable amount of heat transfers through windows. If you have single-pane windows, consider doing the following:

- Tighten and weather-strip your old windows and then add storm windows.
- Compare the above cost with replacing your old single-glazed windows with new double-glazed windows.
- In colder climates "low-e" coatings on glass can help reduce heat loss through windows.
- In warmer climates, consider adding solar screening to west-facing windows that catch a lot of heating late in the day.



## Insulation

- If you have R-19 or less insulation in your attic, consider bringing it up to R-38 in moderate climates, R-49 in cold climates.
- In cold climates, if you have R-11 or less floor insulation, consider bringing it up to R-25.

## Air infiltration

Air that transfers in and out of homes through cracks, crevices and holes can increase energy consumption. Here are some helpful tips to avoid air infiltration:

- Seal around pipe penetration coming through the walls.
- During hot and cold weather, ensure windows are closed tightly and locked.
- Ensure that the weather-stripping around doors and windows is tight.
- When your fireplace is not operating, its flue should be closed tightly, with a sign hanging from the flue handle warning it is closed.
- Check the ceiling behind the crown molding of built-in bookshelves for holes cut during construction.
- Drop-down stairways should fit tightly into the ceiling and be carefully weather-stripped.
- Whole-house attic fans should be sealed tightly during the winter.
- Make sure the outside dryer vent door closes when the dryer is not in use.



# Using energy efficiently



*Home appliances and electronics can be big energy users. Appliances can account for about one-fifth of all the energy used in the home. Cell phone chargers, iPods, remote-controlled televisions, DVD players and even washing machines use electricity even when they are turned off. Forty percent of the electricity consumed by these appliances is used when they are idle.*

*Saving energy in your home doesn't require a major investment of money – even your time. Here are a few ideas that will cost you little or nothing. Some will save you a lot of money, others perhaps only a few dollars a year. But add them up and you could reduce your annual energy bill by 25 percent or more.*

## **Water heating**

Your water heater works with many of your home's other systems:

- Make sure your water heater is set at the lowest point. Try setting it to 120 degrees.
- Try washing clothes with warm water and rinsing with cold water.
- Overfilling your washer can increase your energy use.
- Operate washers and dishwashers only when there is a full load.
- Hand washing dishes with a lot of hot water can cost more than using a dishwasher.

- Repair leaky faucets immediately so they don't drip and waste hot water.
- Take brief showers.
- Install low-flow shower heads and faucet aerators.
- Clean your shower head periodically; scaling and sediment can collect and reduce water flow, using more hot water than needed.
- If your water heater is located in an unconditioned space, consider installing a thermal wrap around it. Take care to install it in accordance with the tank and wrap manufacturer's instructions.



## Refrigeration

Your refrigerator's energy use can be trimmed:

- Make sure refrigerator and freezer seals fit tightly with the doors closed.
- Keep outside coils clean. Dirty coils make your refrigerator compressor work longer to remove heat.
- Setting your refrigerator below 37 degrees uses extra energy.
- Setting your freezer below 0 degrees uses extra energy.
- Replace aging, inefficient appliances. Even if the appliance has a few useful years left, replacing it with a top-efficiency model is generally a good investment.



## Lighting

Take a look at the lights you burn. Consider these points:

- A 100-watt lamp costs roughly a penny an hour to operate.
- Consider replacing incandescent with energy-saving compact fluorescent lamps. They use a fraction of the wattage, last much longer and give off less heat.
- A 13-watt compact fluorescent bulb is equal to a 60-watt bulb, saving you 47 watts.
- When you finish cooking, turn off the kitchen lighting and the range exhaust fan.
- Don't leave unnecessary lighting on during the day.
- Take a look at the lighting you use at night for security. Check with your local cooperative or municipal to see if they can help you save money by installing a pole-mounted outdoor light.



## Dryers

Drying clothes can use a fair amount of energy:

- Don't over-dry your clothes. If 50 minutes works, don't set it to 70 minutes.
- Make sure to clean the inside lint filter before each drying cycle.
- Periodically check your flexible metal dryer vent hose to ensure it is still tightly connected and not kinked.



## Home electronics and small appliances

- In the average home, 40 percent of all electricity used to power home electronics is consumed while the products are turned off. If you don't intend to use it soon, unplug it until your next use.



- Use small appliances where possible; a larger cooking appliance will use more energy and may not be required.
- An electric kettle uses less energy than stove top boiling.
- Use electric blankets that have dual settings for each side. Turn your blanket on just prior to bedtime, then turn off when going to bed.
- Coffee makers with an automatic shut-off can save you energy dollars.
- LED Christmas lights use up to 90 percent less energy than traditional lights, last for many years and require no bulb changes.
- Use motion sensor, photo cell or LED lights, which can provide security lighting while saving energy.
- Plug your vehicle into a programmable outdoor timer – your vehicle's block heater requires only a few hours.

## We're here to help

As you can see, electricity touches nearly every part of our lives. The good news is that you control your electric usage.

The even better news is that your local electric cooperative or municipal is willing and ready to do whatever it takes to help you make your home, farm, school or business as energy efficient as possible.

Off-peak electric heating, for example, is one of the best cost-saving options available for heating your home. Your family can enjoy the convenience of electric heat and save money, too, by installing off-peak electric heating in your new or existing home.

For more information about energy savings and off-peak electric heating, contact your local electric cooperative or municipal system.

For more money-saving energy efficient ideas, visit these Web sites:

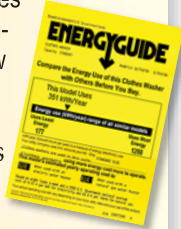
[www.aceee.org](http://www.aceee.org)  
[www.eere.energy.gov](http://www.eere.energy.gov)  
[www.energystar.gov](http://www.energystar.gov)  
[www.ftc.gov](http://www.ftc.gov)  
[www.energy.gov](http://www.energy.gov)

# Replace old, inefficient appliances with energy efficient models

## EnergyGuide labels

If you live in a typical U.S. home, the appliances in your home are responsible for about one-fifth of your energy bill. Electric appliances like refrigerators, freezers, clothes washers, dryers, dishwashers, ranges and ovens are the primary energy-using appliances in most households. Taking steps to save energy while using these appliances, and replacing old, inefficient appliances with modern ones, can save you money.

In the United States, all refrigerators, freezers, clothes washers and dishwashers are sold with yellow EnergyGuide labels to indicate their energy efficiency. These labels provide an estimated annual operating cost for the appliance and also indicate the cost of operating the models with the highest annual operating cost and the lowest annual operating cost. By comparing a model's annual operating cost with the operating cost of the most efficient model, you can compare their efficiencies.



## ENERGY STAR labels

Another label to help you identify energy-efficient appliances is the ENERGY STAR® label.

Promoted by the Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA), the ENERGY STAR is only awarded to appliances and lighting products that significantly exceed the minimum national efficiency standards.

The ENERGY STAR label can help make purchasing decisions easier. These products not only save energy, they can also save money, frequently with better performance.



# Appliance energy usage

The average monthly kilowatt-hour consumption figures shown on this chart are based on normal use. Your electrical consumption may be higher or lower, depending on how you and other people in your home and on your farm use the various appliances and equipment.

## Residential/household

	Typical wattage	Estimated hours used per month	Estimated monthly kWh	Cost per month at \$.08/kWh
Air conditioner (central – 8.5 SEER, 2.5 tons)	3,500	100	300	24.00
Air conditioner (room – 9,000 Btu)	1,050	360	360	28.80
Blanket	150	120	18	1.44
Block heater (8 hrs./day)	500	248	124	9.92
Clothes dryer	5,000	16	80	6.40
Clothes washer (doesn't include hot water)	500	16	8	0.64
Computer	200	240	48	3.84
Dehumidifier	350	240	84	6.72
Dishwasher (doesn't include hot water)	1,800	15	20	1.60
Freezer (frostless 15 cu. ft.)	335	334	112	8.96
Furnace fan – variable speed motor (24 hrs./day)	75	744	56	4.48
Furnace fan – conventional blower (24 hrs./day)	400	744	298	23.84
Hot tub/spa heater (4-person, 120-volt)	1,800	40	72	5.76
Hair dryer	1,000	5	5	0.40
Iron	1,000	10	10	0.80
Microwave oven	1,500	10	15	1.20
Radio	25	100	3	0.24
Range with oven	3,500	15	188	15.04
Refrigerator/freezer (14 cu. ft.)	300	300	150	12.00
Refrigerator/freezer (frostless, 16-18 cu. ft.)	400	250	154	12.32
Space heater	1,500	248	372	29.76
Television – 34" (6 hrs./day)	250	180	45	3.60
Television – 32" LCD (6 hrs./day)	114	180	21	1.68
Television – 42" plasma (6 hrs./day)	360	180	65	5.20
Toaster	1,000	3	3	0.24
Vacuum cleaner	800	6	6	0.48
Water heater (varies widely)	4,500	90	405	32.40
Water pump (deep well)	1,000	15	15	1.20



## Energy efficient Light bulb comparisons



**Bulb life**  
Incandescent: 800-2,000 hours  
CFL: 6,000-10,000 hours

Watts Incandescent	Watts CFL	Annual Cost Incandescent	Annual Cost CFL	Annual Savings
100	23	\$16.00	\$3.68	\$12.32
75	20	\$12.00	\$3.20	\$ 8.80
60	13	\$ 9.60	\$2.08	\$ 7.52
40	9	\$ 6.40	\$1.44	\$ 4.96

*Example:*

$$\frac{\text{wattage (100)} \times \text{cost per kilowatt-hour (.08)} \times \text{average rated life (2,000*)}}{1,000 \text{ (watts per kilowatt)}} = \text{Annual Cost}$$

\*Average rated life is based on approximately five hours per day.



## Energy costs of electric motors

Find the horsepower (h.p.) rating on the nameplate of the motor. Multiply kilowatts (kW) of corresponding horsepower on the chart by the total number of hours the motor is used. This figure – kilowatt-hours (kWh) – multiplied by the applicable rate, will give you the cost of operation.

How much would it cost to operate a 10 h.p. motor 24 hours per day for three weeks?

EXAMPLE:

10 h.p. 230V 1Ø, 24 hours/day for 3 weeks.

ANSWER:

(assuming the electric rate is \$.08)

8.625 kW x 24 hours x 21 days = 4,347 kWh

4,347 kWh x \$.08 = \$347.76

*Note: No capacity charge included.*

Squirrel cage motors with average efficiency and power factor for each size.

1Ø = single-phase; 3Ø = three-phase.

h.p.	115V 1Ø kW @ Full Load	230V 1Ø kW @ Full Load	230V 3Ø kW @ Full Load
1/6	.329	.329	
1/4	.447	.447	
1/3	.571	.571	
1/2	.800	.800	.568
3/4	1.159	1.159	.774
1	1.380	1.380	.999
1 1/2	1.794	1.794	1.335
2	2.180	2.180	1.893
3	3.167	3.167	2.868
5		4.701	4.478
7 1/2		6.808	6.310
10		8.625	8.724
15			12.269
20			16.679
25			20.197
30			24.858
40			33.044
50			38.752
60			48.078
75			60.105
100			82.253

# How to estimate energy usage and cost

The wattage of appliances and equipment as well as the amount of operating time can vary greatly. The following information will show you how to determine where the energy dollars are going in your home.



## Step 1

Since the cost of electricity is determined by the number of kilowatt-hours (kWh) used during a billing period, the first step is to determine your average cost per kilowatt-hour.

$$\text{Avg. kWh cost} = \frac{\$ \text{ amount of electric bill}}{\text{kWh used}}$$

$$\text{EXAMPLE: } \frac{\$96}{1,200 \text{ kWh}} = \$0.08 \text{ per kWh}$$

## Step 2

Since the wattage of an appliance or electrical equipment determines the electrical usage per hour, the second step is to determine the wattage.

The wattage of an appliance is found on the serial plate. It is possible that electrical equipment will be expressed in volts and amperes rather than watts. If so, multiply volts times amperes to determine the wattage.

MICROWAVE OVEN			
AMPS	12.1	VOLTS	120
HERTZ	60	WATTS	1,452
FORM NO.	00000	MODEL NO.	0000
CODE	0	SERIAL NO.	000000

EXAMPLE:

$$120 \text{ volts} \times 12.1 \text{ amps} = 1,452 \text{ watts}$$

## Step 3

Use the formula shown in the following example to estimate usage and cost.

EXAMPLE:

A light uses 100 watts and is left on 15 hours. How many kWh are used and what does it cost you?

$$\text{kWh use} = \frac{100 \text{ watts} \times 15 \text{ hrs.}}{1,000 \text{ watts}} = 1.5 \text{ kWh}$$

$$\text{Your cost} = 1.5 \text{ kWh} \times \$0.08 = \$0.12$$

## Step 4

To find your daily cost for electricity, divide your bill by the number of days in the month.

$$\text{EXAMPLE: } \frac{\$96}{30 \text{ days}} = \$3.20 \text{ which is your daily cost.}$$

To find the daily cost per person in your family, divide the daily cost by the number in your family.

$$\text{EXAMPLE: } \frac{\$3.20}{4} = \$0.80 \text{ per person per day.}$$



# Meter monitor chart



Daily reading	kWh used daily	Record of daily activities that affect your energy use
1		
2		
3		
4		
5		
6		
7		
Weekly Total		
8		
9		
10		
11		
12		
13		
14		
Weekly Total		
15		
16		
17		
18		
19		
20		
21		
Weekly Total		
22		
23		
24		
25		
26		
27		
28		
Weekly Total		
29		
30		
31		
Extra Days Total		
Monthly Total		

Using this meter monitor chart, take a few minutes each day (preferably at the same time) and jot down your electric meter reading. Start the first of the month.

By subtracting the previous day's reading from the current reading each day, you get the number of kilowatt-hours used during that 24-hour period. By adding the daily figures into a weekly total, you can see how much and when your family used power during that month.

As you know from reading this guide, your energy use will fluctuate with your daily activities. Monitoring your kilowatt-hours is the first step to understanding your electric use.



# Advantages of off-peak electric heating

Your family can enjoy the value and convenience of electric heat and save money, too, by installing an off-peak electric heating system in your new or existing home.

An off-peak system consists of an electric heating source as its primary component. A supplemental heating source will need to operate 400 hours or more during the winter season.

Off-peak heating loads are generally controlled during the coldest months of the year, when the demand for electricity is high. Load control hours can also occur for a variety of reasons, including unscheduled power plant outages, transmission constraints outside of the Minkota service area and extraordinarily high wholesale energy market prices.

The ability to interrupt the flow of electricity to the electric portion of your off-peak system allows your power supplier to operate generating plants more efficiently and avoid making costly power pool purchases. By voluntarily enrolling in the program, the savings are passed on to you through the low off-peak electric rate, which is approximately half of the regular retail rate.

For more information about energy savings and off-peak heating, contact your local electric cooperative or municipal system listed below.

## Total Annual Heating Costs

50 Hours Control	Off-peak heat 500 Hours Control	625 Hours Control	Propane Only
\$709	\$778	\$798	\$1,088

### ASSUMPTIONS:

- Average 1,500 sq. ft. home
- 17,520 kWh/yr. heating needs
- 7 kW/hr. average demand
- 4¢/kWh off-peak electric rate
- 3,413 Btu/kWh
- Propane \$1.50/gal.
- Furnace efficiency – electric 100%, propane 90%

### EXAMPLE CALCULATION: (Off-peak heat, 500 hours of control)

Electric furnace cost:		
17,520 kWh – (500 hours x 7 kW/hr.) x 4¢/kWh	=	\$561
Backup propane furnace cost:		
500 hrs. x 7 kW/hr. x $\frac{3,413}{.9}$ ÷ 91,600 Btu/gal. x \$1.50/gal.	=	\$217
	Total	= \$778

## COOPERATIVES

Beltrami Electric Cooperative  
Bemidji, MN • (218) 444-2540

Cass County Electric Cooperative  
Kindred, ND • (701) 356-4400

Cavalier Rural Electric Cooperative  
Langdon, ND • (701) 256-5511

Clearwater-Polk Electric Cooperative  
Bagley, MN • (218) 694-6241

Nodak Electric Cooperative  
Grand Forks, ND • (701) 746-4461

North Star Electric Cooperative  
Baudette, MN • (218) 634-2202

PKM Electric Cooperative  
Warren, MN • (218) 745-4711

Red Lake Electric Cooperative  
Red Lake Falls, MN • (218) 253-2168

Red River Valley Cooperative  
Power Association  
Halstad, MN • (218) 456-2139

Roseau Electric Cooperative  
Roseau, MN • (218) 463-1543

Wild Rice Electric Cooperative  
Mahnommen, MN • (218) 935-2517

## MUNICIPALS

Bagley Public Utilities  
(218) 694-2300

Baudette Municipal Utilities  
(218) 634-2432

Fosston Municipal Utilities  
(218) 435-1737

Grafton Municipal Utilities  
(701) 352-2180

Halstad Municipal Utilities  
(218) 456-2128

Hawley Public Utilities  
(218) 483-3331

Park River Municipal Utilities  
(701) 284-6150

Roseau Municipal Utilities  
(218) 463-1542

City of Stephen Utilities  
(218) 478-3803

Thief River Falls Municipal Utilities  
(218) 681-4145

City of Warren Water and Light  
(218) 745-5343

Warroad Municipal Utilities  
(218) 386-1873