

## The Cost of Using Electricity

### Objectives:

- To raise awareness about the electricity consumption of particular appliances
- To practice calculating the number of kilowatt hours of electricity used by appliances and how to determine the cost of that amount of electricity.
- To encourage the wise use of electricity and energy conservation.

### Background Information:

- The chart that follows on the next page lists some of the electrical appliances/devices that may be found in your home. The specific electricity consumption listed is an average value and may vary depending on the appliance. To check the electricity consumption ratings for specific appliances, see Natural Resources Canada <http://oee.nrcan.gc.ca/Publications/infosource/Pub/appliances/?text=N&printview=N>
- The powerWISE® website also has information about appliance and tips for saving electricity [www.powerwise.ca/index.shtml#](http://www.powerwise.ca/index.shtml#)
  - In Canada, electricity is sold in **kilowatt hours (kWh)**.

$$\boxed{1 \text{ kilowatt (kW)} = 1000 \text{ watts (W)}}$$

- To convert **watts** into **kilowatts** divide the number of watts by **1000**.

$$\boxed{\text{kW} = \text{W}/1000}$$

- To obtain **kilowatt hours (kWh)** = multiply **kilowatt (kW)** by the **number of hours**.

$$\boxed{\text{kWh} = \text{kW} \times \text{h}}$$

- Estimate how much the **time an appliance is used**.
- To convert **minutes** into **hours** divide the number of minutes by 60.

$$\boxed{\text{h} = \text{m} / 60}$$

- To determine the **cost of electricity** multiply the **kWh** by the **price per kWh**.

$$\boxed{\text{Cost} = \text{kWh} \times \$/\text{kWh}}$$

Check your electricity or utility bill to find what you pay for electricity, or example it may be shown as \$ 0.0755300 / kWh. Write this number in the last column in the chart that follows.

### Tasks

- Using information collected from your home and the equations listed above, complete the following table:
  - Number in house – Indicate the number of each appliance in your house
  - Time used – How much time is an appliance used in a week? For example:
    - The **clock, freezer, and refrigerator** that run continuously the electricity consumed is kWh/d, and 7 days per week is shown in the ‘Time used per week’ column. (Note: for the freezer and refrigerator, electricity is consumed only when the motor is running or when the light is on.)
    - The **clothes washer and dishwasher**, the electricity used is per load. Indicate the **number of loads**.
    - For **all the other appliances**, indicate the **hours, minutes, or number of pots** for coffee. Remember to convert the minutes used to hours.
  - Cost of electricity – multiply the **kWh used** by **cost per kWh** and round to the nearest cent.
- Answer the discussion questions that follow the chart.

## Calculating the Cost of Electricity Consumption per Week

Appliance/Electrical Device (average power rating in watts, W)	Electricity used per unit time (kWh/_)	No. in the house	Kilowatts (kW)	Time used per week (hours)	kWh used per week	Cost of electricity (kWh x \$/kWh) (\$0._____)
Clock (5 W)	0.12 kWh/d			7 days		
Hair dryer (1000 W)	1.0 kWh/h					
Radio (stereo) (30 W)	0.03 kWh/h					
Video Game System (250 W)	0.25 kWh/h					
Home Stereo/Theatre (800 W)	0.8 kWh/h					
32 inch Television (120 W)	0.12 kWh/h					
50 inch Television (200 W)	0.2 kWh/h					
Microwave Oven (1000 W)	1.0 kWh/h					
Freezer (350 W)	1.0 kWh/d			7 days		
Refrigerator (500 W)	1.2 kWh/d			7 days		
Dishwasher (1300 W)	0.6 kWh/load			loads		
Clothes washer (500 W)	0.5 kWh/load			loads		
Clothes dryer (5000 W)	5.0 kWh/h					
Air conditioner (window) (1000 W)	1.0 kWh/h					
Computer, monitor, printer (200 W)	0.20 kWh/h					
Table fan (120 W)	0.12 kWh/h					
Light bulb (CFB) 13 W	0.013 kWh/h					
Light bulb (CFB) 23 W	0.023 kWh/h					
Light bulb (Incnd) 40 W	0.04 kWh/h					
Light bulb (Incnd) 60 W	0.06 kWh/h					
Light bulb (Incnd) 100 W	0.10 kWh/h					
Light bulb (Incnd) 150 W	0.15 kWh/h					
Portable Vacuum (800 W)	0.12 kWh/h					
Central Vacuum (1600 W)	1.6 kWh/h					
Oven at 177°C (350°F) (3000 W)	3.0 kWh/h					
Range small element (1500 W))	1.5 kWh/h					
Range large element (2000 W)	2.0 kWh/h					
Toaster Oven (1250 W)	1.25 kWh/h					
Toaster (1150 W)	1.15 kWh/h					
Electric Kettle (1500 W)	1.5 kWh/h					
Coffee Maker (900 W)	0.275 kWh/pot			pots		
Electric Heater (1500 W)	1.5 kWh/h					
Outdoor Hot Tub (1000 W)	1.0 kWh/h					
<b>TOTAL ELECTRICITY CONSUMPTION AND COST</b>					<b>kWh</b>	<b>\$</b>

Your electricity bill will likely include other costs, such as transmission and distribution charges.

## Questions

1. How did the calculated electricity cost and the total electricity used compare to your electricity bill?  
\_\_\_\_\_
2. What three appliances/devices use the most electricity each week?  
\_\_\_\_\_
3. Why do you think the appliances/devices you listed in question 1 use so much electricity?  
\_\_\_\_\_
4. Describe two practical ways to reduce your home electricity consumption. Please be specific.
  - a. \_\_\_\_\_  
\_\_\_\_\_
  - b. \_\_\_\_\_  
\_\_\_\_\_
5. For one of the ways you mentioned in question 3, **calculate** how much money you could save in a week, if you were to follow that plan. (Please show your work)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. In a coal burning power plant **1 kg** of coal generates about **2.75 kWh** of electricity. How many kilograms of coal are required to produce the electricity used by your household in one week?  
\_\_\_\_\_
7. Assuming a coal-fired power plant releases **1 kg of carbon dioxide** per **1 kWh of electricity** produced, how much CO<sub>2</sub> would be released due to your household monthly consumption of electricity? By how much could you reduce your CO<sub>2</sub> emissions by the energy saving actions in #4?  
\_\_\_\_\_
8. Name **4 other** electrical devices (not battery powered) used in your home, from which you can obtain the power rating. Use the chart below to enter the information for each appliance/device.

Appliance/Electrical Device (average power rating in watts, W)	Electricity used per unit time (kWh/ _)	No. in the house	Kilowatts ( kW)	Time used per week (hours)	kWh used per week	Cost of Electricity (kWh x \$/kWh (_____))
<b>TOTAL ELECTRICITY CONSUMPTION AND COST</b>					<b>kWh</b>	<b>\$</b>