

Kill-A-Watt Information Manual

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For questions or comments, please email Lindsey Schiller at lindsey@cityofsitka.com

Why Use The Kill-A-Watt?

The Kill-A-Watt is a tool to help Sitkan residents evaluate their electricity use, become more energy efficient, and save money. Specifically, you can use the Kill-A-Watt to:

- Pin-point which electric devices are using the most electricity in your home
- Calculate hourly, daily, weekly, monthly, or yearly costs for running an electric device
- See if your electric devices are running efficiently and operating properly

Understanding Electricity: The Difference between Watts and kWh

Electricity can be measured as either power or energy. Power is a *rate* of electricity use and is measured in Watts. Energy is a unit of *total electricity* consumed over a given period of time, and is measured in Kilowatt-hours (kWh). On your electricity bill, you are charged by the Kilowatt-hour. One Kilowatt is equal to 1,000 Watts. One Kilowatt-hour is equivalent to using 1,000 Watts for 1 hour.

To use a simple analogy, think of the miles you drive in your car: Watts would be equivalent to the speed at which you are driving (miles/hour); kilowatt-hours would be equivalent to the total miles you have driven, measured on your odometer.

The Kill-A-Watt can display the electricity consumption of any plug-in device in various electrical measurements including:

- Voltage (Volt)
- Current (Amp)
- Watts (Watt)
- Kilowatt Hours (KWH)
- Frequency (Hz)
- Volt Amps (VA)
- Power Factor (PF)
- Elapsed Time

Converting Watts to kWh:

$$\mathbf{(Watts / 1000) * Hours = kWh}$$

For example, if you use a 100 Watt light bulb for 10 hours the total energy used is 1 kWh.

$$\mathbf{(100 W / 1000) * 10 Hours = 1 kWh}$$

Most commonly used, and easiest to understand, are Watts and Kilowatt-hours. To calculate how much total electricity the appliance uses over a period of time, use Kilowatt-hours, following the steps below. To calculate how much electricity the appliance is using at a given moment, use Watts. Watts can be converted to Kilowatt-hours, or can be used to evaluate an appliance's efficiency, following the steps below.

Calculating Electricity Use: kWh

1. First, plug the Kill-A-Watt into any outlet in your home. Plug any appliance or electronic device with a wall inlet into the Kill-A-Watt, and turn the appliance on.
2. The KWH button can show either total energy consumption or time. Press the KWH button once to get a reading of the *cumulative energy* consumption since power was applied to the unit, in Kilowatt-hours (kWh).
3. Press the KWH again to get a reading of the cumulative *time* since power was applied to the unit, recorded in hours and minutes.
4. RECORD THESE NUMBERS WHILE THE KILL-A-WATT IS PLUGGED IN. The Kill-A-Watt does not save data.

For example, to see how much electricity is consumed by a refrigerator, leave the refrigerator plugged into the Kill-A-Watt for 24 hours. At first, the Kill-A-Watt will display 0.00 KWH. Over time, this number will increase as the unit cycles on and off during normal cooling operations. After a day, the Kill-A-Watt will record the total amount of electricity the fridge uses in a day, in kWh. You may then extrapolate this to determine how much electricity it uses over longer time periods, like a month.

When To Use Kilowatt-hours:

- *For appliances that don't run constantly, such as TVs, heaters and chargers.*
- *For appliances that don't run at full power all of the time, such as refrigerators. (Note: though refrigerators are plugged in all of the time; they only run at full power about 5% of the time.)*

Calculating Electricity Use: WATTS

1. First, plug the Kill-A-Watt into any outlet in your home. Plug any appliance or electronic device with a wall inlet into the Kill-A-Watt, and turn the appliance on.
2. Press the WATT button to get an instant reading of how much electricity it is using at a given moment.
3. RECORD THIS NUMBER WHILE THE KILL-A-WATT IS PLUGGED IN. The Kill-A-Watt does not save data.
4. To convert Watts to Kilowatt-hours, divide by

When to use Watts:

- *When electronics are running at full power for a known period of time*
- *To see if your electronics are running efficiently (see "Are Your Electronics Efficient?", below)*

1000. This is how much total energy the appliance will use in 1 hour. To calculate how much total electricity the appliance will use over a longer period of time, such as one month, multiply by number of hours the appliance is used each month.

For example, an average electric heater may use 900 Watts when turned on. If you estimate that you use this heater 100 hours per month, the calculation is as follows:

$$900 \text{ Watts} / 1000 = .9 \text{ Kilowatt-hours (kWh) in one hour}$$

$$.9 \text{ kWh in one hour} * 100 \text{ hours per month} = 90 \text{ kWh per month}$$

Calculating the Cost of Running Appliances and Electric Devices

Once you have calculated the Kilowatt-hours it takes to run an appliance or electric device, it is easy to calculate the cost of running that device. In Sitka, the average cost per Kilowatt-hour is \$0.092. For the electric space heater in the example above, the cost is as follows:

$$90 \text{ (kWh /month)} * 0.092 \text{ (\$/kWh)} = \$8.28 \text{ /month}$$

Comparatively, a standard toaster that runs for 3 minutes will use about .06 kWh, and will thus cost \$0.005, or about 0.5 cents to run once.

To compare the cost of running your household appliances to the average Sitka resident, visit the Electric Department's Energy Usage Estimator, found at: www.cityofsitka.com/government/departments/electric/

Are Your Electronics Efficient?

Energy efficiency can be simply stated as using less energy to provide the same amount of energy service. Efficiency is compared using Watts, the *rate* the appliance is using electricity (just as cars' mileage is compared by miles/gallon, not by total miles). There are a couple of ways to tell if your electric devices are running efficiently:

1. Compare the Kill-A-Watt reading of the appliance with other appliances. Because the Wattage of an appliance will vary by the model and how old it is, use the list below to see where your appliance falls on the scale of efficiency (data from the US Department of Energy).

Typical Wattages of Various Appliances:

- Clock radio = 10 Watts
- Coffee maker = 900–1200 W
- Clothes washer = 350–500 W
- Clothes dryer = 1800–5000 W

- Dishwasher = 1200–2400 W (using the drying feature greatly increases energy consumption)
- Dehumidifier = 785 W
- Electric blanket- *Single/Double* = 60 / 100 W
- Fans
 - Ceiling = 65–175 W
 - Window = 55–250 W
 - Furnace = 750 W
 - Whole house = 240–750 W
- Hair dryer = 1200–1875 W
- Heater (*portable/ Space Heater*) = 750–1500 W
- Clothes iron = 1000–1800 W
- Microwave oven = 750–1100 W
- Personal computer
 - CPU - awake / asleep = 120 / 30 or less
 - Monitor - awake / asleep = 150 / 30 or less
 - Laptop = 50 W
- Radio (*stereo*) = 70–400 W
- Refrigerator (*frost-free, 16 cubic feet*) = 725 W
- Televisions (color)
 - 19" = 65–110 W
 - 27" = 113 W
 - 36" = 133 W
 - Flat screen = 120 W
- Toaster = 800–1400 W
- Toaster oven = 1225 W
- VCR/DVD = 17–21 / 20–25 W
- Vacuum cleaner = 1000–1440 W
- Water heater (*40 gallon*) = 4500–5500 W

2. Another way to test the efficiency of appliances is to compare the Kill-A-Watt reading with the appliance label. Most appliances have a label Wattage, printed directly into the plastic or metal, which states *the maximum rate* of electricity the appliance will use.¹

¹ If the label only gives the number of Amps, you can convert Amps to Watts by multiplying Amps by 120.

(Another way to think of this rating is the nameplate mileage of a car.) You may have to hunt for the label, which is often on the side or underneath the appliance. If the Kill-A-Watt reads a Wattage that is significantly higher than the label Wattage when the power is on, then you know that your appliance is not running at its maximum efficiency. If this is the case, the appliance may be dirty or need a new filter if it has one.

Save Money by Conserving Energy

There are many ways you can reduce your electricity consumption.

- Turn appliances off when not in use. For example, turn your computer off when you are not using it, rather than putting it on sleep or standby mode.
- Replace your appliances with more efficient ones. The ENERGY STAR label is an easy way to find products that use less energy than similar products. ENERGY STAR products have met energy efficiency standards set by the U.S. Environmental Protection Agency. Alaskan residents with disabilities who replace old appliances with certain ENERGY STAR appliances (refrigerators, freezers, dishwashers, clothes washers) are eligible for a rebate through the Alaska Housing Finance Corporation. For more information, go to the AHFC website (www.ahfc.state.ak.us).
- Weatherize your home. If you use an electric space heater, proper insulation can greatly reduce the electricity required for heating, often the largest use of electricity for Sitkan residents. Alaskan residents are eligible for rebates for weatherization projects through the Alaska Housing Finance Corporation (AHFC). For more information, go to the AHFC Home Energy Rebate webpage (www.ahfc.state.ak.us/energy/home_rebate.cfm) or see the AHFC Home Energy Rebate Factsheet at the back of this manual.

Additional Resources

- www.michaelbluejay.com/electricity/ A great resource for energy conservation and efficiency, this private website goes into much more detail about all of the topics above
- www.energysavers.gov/ This is a comprehensive resource on how to conserve energy put out by the US Department of Energy
- www.cityofsitka.com/government/departments/electric/EnergyUsageCalculator.html
The City of Sitka Electric Department's Energy Usage Estimator can be found by at www.cityofsitka.com → Government → Electric Department → Energy Usage Estimator
- Alaska Housing Finance Corporation Home Energy Rebate information:
http://www.ahfc.state.ak.us/energy/home_rebate.cfm

Become a part of the Energy Conservation Conversation:

Please help us out! If you use the Kill-A-Watt successfully, please take the time to record your findings below. This will help the City of Sitka develop a more accurate understanding of how Sitkans are using electricity, and thus how we can conserve energy and our natural resources. Sheets in the back are available for your own records.

For questions or additional comments, please email Lindsey Schiller at lindsey@cityofsitka.com.

LIBRARY COPY:

Name (Optional):		Date:	
Address (Optional):			
Appliance/ Device	Year of Appliance	Wattage of Appliance	Total Estimated kWh the appliance uses per month
How do you heat your home (e.g. oil, wood, electric space heater)?			
Are you interested in energy efficiency improvements or weatherization projects?			
Comments:			

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