

Electrical Energy Costs

The kilowatt-hour (kWh) is the basic unit of electrical energy used in determining one's electrical utility costs. Since **POWER = WORK / TIME ($P = W/t$)**, the kWh is actually a unit of **WORK ($W = P \times T$)**, or **ENERGY**, and is not a unit of power, as it is commonly believed and referred to. Therefore, one kWh ("kilo-Watt hour") is equal to the total energy "consumed" (or "transferred") by an electrical device with a power rating of one kilowatt during each hour of use.

The electrical utility company will typically charge a home a set monthly rate for service plus an additional cost for each kWh used during the month. These rates vary by location, but generally fall between 8 and 15 cents (\$0.08 - \$0.15) per kWh. To find the total cost for using an electrical appliance in your home for one month, first find the number of kWh of energy used by multiplying its power (in kilowatts) by the total amount of time (in hours) used during the month. You may have to do some unit conversions to obtain this total. Then multiply this value by the cost per kWh to find the total cost.

Procedure:

- I. Find the total monthly cost for using these devices, given the estimated times of usage. Assume a 30 day month and \$0.10 per kWh.

Appliance	Power	Usage	Total Time	Total kWh	Cost
night light	5 W	9 hr/night			
porch light	60 W	12 hr/night			
radio	20 W	4 hr/day			
microwave	750 W	30 min/day			
television	88 W	6 hr/day			
central air	8200 W	15 min/hr			
clock	10 W	all day			
hair dryer	1800 W	5 min/day			
iron	1200 W	4 hr/week			
ceiling fan	12 W	8 hr/day			

- II. Make a chart similar to the one above and find out how much your family pays to use electrical devices each month by finding 15 (fifteen) examples in your own home. Be sure to make a realistic estimate of the actual amounts of time they are in use. Your 15 examples may include a maximum of 5 light fixtures or bulbs.

Believe it or not, several students in the past have copied others work or just made up something to turn in and have missed the benefit of this assignment. Therefore, you must have this paper signed by a parent or guardian before handing it in to verify your own original work.

"I verify that my child completed this assignment by finding actual examples in our home and doing his/her unique work."

Signature: _____

Date: _____