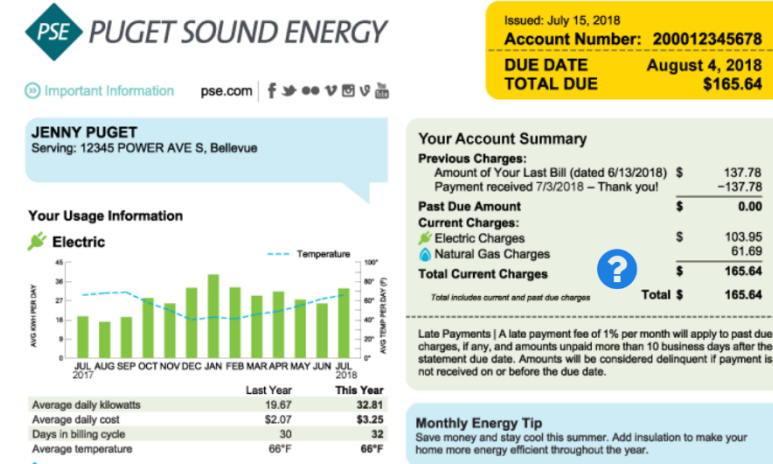


Cost of Electric Power**Part 1: Understanding an Electric Bill**

This is an example bill from Puget Sound Energy. We are going to analyze the Electric Usage information to understand we pay for electric energy in our homes.

- Find the following information from the bill.
 - Average daily kilowatts used:
 - Average daily cost of electric:
 - Kilowatt Hours (kWh):
 - Cost per kWh for first 600 kWh Used:

Used:

Part 2: What is a kilowatt?

A kilowatt (kW) is a unit of power. Remember, power is the rate at which an object uses energy. You can calculate the power output of a electrical device, measured in watts (1 kW= 1,000 W) using the equation $P=IV$ (power = current (in amps) x voltage (volts)). For incandescent light bulbs, they operate between 100-60 watts, where the high watt bulb will be brighter. For LED bulbs, they can get the same brightness between 8-16 watts, making them a lot more energy efficient.

Equations

Power (chapter 9): $P = \frac{\Delta E}{\Delta t}$

P = power (watts, W)
 E = energy (joules, J)
 t = time (seconds, s)

Electrical power: $P = IV$

P = power (watts, W)
 I = current (amperes, A)
 V = voltage (volts, V)

- A 100 watt light bulb lights up your room. It is plugged into the wall, which supplies 120 V of potential. What current is running through the light bulb?
- A flashlight operates with a current of 3.0 A and a power of 4.5W. What is the voltage of the flashlights battery?
- Your dishwasher pulls 12.5 Amps of current from the wall, which supplies 120 V. What is the power rating of the dishwasher in watts? In kilowatts?

Part 3: What is a kilowatt hour?

Your local energy company charges you for the electrical energy it supplies, measured in kilowatt hours. A kilowatt is equivalent to 1000 Joules per second, so by multiplying the amount of power (in kilowatts), but the time (in hours), you can see the total energy, in Kilowatt hours, aka kilojoules. The electric company bills your family for the number of these kilowatt hours used in your home.



1. Look at the bill above. Explain in 3-5 sentences how the cost of the electricity was calculated using the numbers provided.
2. The current in a 120-V reading lamp is 2.6 A. If the cost of electrical energy is 0.075 per kilo-watt hour, how much does it cost to operate this lamp per hour?
3. Timmy likes waffles for breakfast. How much energy is used by a waffle maker that has a power rating of .7501 kW and is operated for 3.6h?
 - a. Using the current cost of electricity in Tier 2 (11.09 cents per kWh) , how much did it cost to run the waffle maker?
4. A 615 W fridge runs 24 hours/day. How much energy would it use in the month of December (31 days)
 - a. What would it cost to run? (price per kWh is 11.09 cents)
5. Challenge problem! Your mom is constantly telling you to turn off your lights in your room. In your room, you have a ceiling fan that has three 60- watt light bulbs in it. Based on the electric bill, using a rate of \$0.092 per kilowatt hours, how much does it cost if you leave these lights on for 8 hours a day for the entire month- 30 days?