Power and Electricity

1

Electric Power

- The rate at which charge carriers do _____
- The rate at which electrical energy is used or _____ to another form of energy, or for electrical power,

$$P = IV$$

2

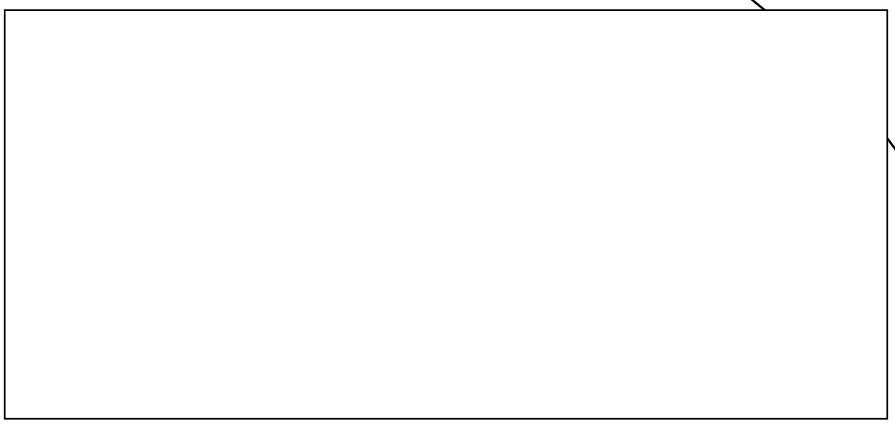
Watts

- SI Unit of Power
- Most commonly found on light bulbs and audio equipment.
- Tells us the amount of energy used each _____
- Higher wattage = _____ energy use
  = _____ bulb or
  = _____ louder sound

3

Sample Problem

- A hair dryer is rated at 1500 W. How much current does the hair dryer use while plugged into a 120 V outlet?



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Thermal Energy in Circuits

- All wires have _____ and therefore produce thermal energy
- The amount of thermal energy per second is usually found using:

$$V = IR \; and \; P = IV$$

- In _____ energy this energy is considered waste.
- However, in certain applications (electric stoves, hair dryers, etc.) this thermal energy is the desired outcome.

5

Sample Problem

- An electric space heater is connected across a 120V outlet. The heater dissipates 3400 W of power in the form electromagnetic radiation and heat. Calculate the resistance of the heater.

6

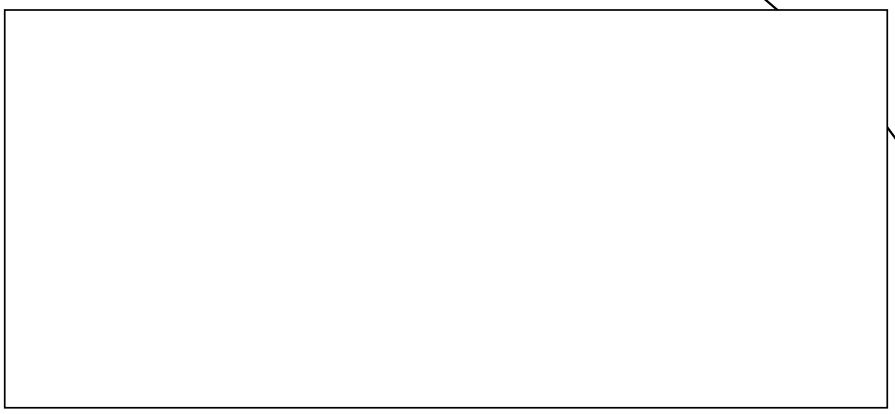
The Electric Company

- To reduce waste, the current carried along the wire is _____
- Voltage is _____ and current is decreased to transmit adequate power with less waste
- Transformers are set up to convert the high voltage low current power into _____ current, lower voltage power.
- The kilowatt hour (kWh) is the amount of energy equal to 1000 Watts of power delivered for 3600 seconds or 3.6×10^6 J
- Price per kilowatt hour (kWh):
  - Power Company – from 5 to 20 cents
  - AA Battery – approximately 260 dollars

7

Sample Problem

- How much does it cost to operate a 100.0 W light bulb for 24 hours if electrical energy costs 8 cents per kW•h?



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