

Energy & Power

Unit 1 Topic 3 Electricity

Energy consumed by an electrical device is measured differently than mechanical energy. Energy consumed by an electrical device is a product of the voltage, current and the length of time that the device is on.

Electrical power is the product of the voltage multiplied by the current being consumed by an electrical device.

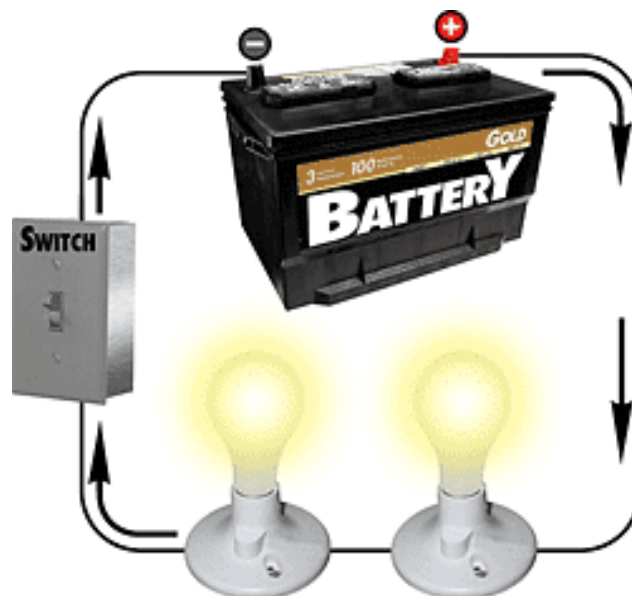
The Volt (v) is the unit of measure of electrical potential difference. An electric potential difference must exist for current to flow in an electric circuit.

The symbol for current is I. Current is the measure of electrons flowing through a conductor (wire). The unit of measure of the power of the current is the ampere or amp.

Electric current can be either direct or alternating. Direct current (DC) flows in the same direction at all points in time. In an alternating current (AC), the flow of charge carriers reverses direction periodically.

Electrical current flows in a loop, or a circuit. The image shows a simple electrical circuit. The circuit has four important parts: a power source (a battery, in this case), a conductor (the wire), the load (the lightbulbs), and a switch.

Current flows from the positive side of the battery, through the bulbs, and back to the negative side of the battery. As the electric current makes a complete loop, both bulbs will light.



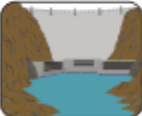









Sources of Energy

Where does energy come from?

We use many different energy sources to do work for us. Energy sources are classified into three groups—renewable, non-renewable and inexhaustible.

Renewable energy is energy that we can replace. For instance, wood. If we cut down a tree it can be replanted and will grow back in a certain number of years. Non-renewable is energy that we cannot replace. For instance oil. It takes millions of years for the earth's organisms to break down and form oil. Inexhaustible is energy that is available now and will be for many centuries to come ie: solar The sun will keep shining day in and day out. Unless we do something to fool up our atmosphere it will continue to shine on earth for ever. These energy sources can be converted into secondary energy sources like electricity.

	BIOMASS <i>renewable</i> Heating, electricity, transportation		PETROLEUM <i>nonrenewable</i> Transportation, manufacturing
	HYDROPOWER <i>renewable</i> Electricity		NATURAL GAS <i>nonrenewable</i> Heating, manufacturing, electricity
	GEOHERMAL <i>renewable</i> Heating, electricity		COAL <i>nonrenewable</i> Electricity, manufacturing
	WIND <i>renewable</i> Electricity		URANIUM <i>nonrenewable</i> Electricity
	SOLAR & OTHER <i>renewable</i> Light, heating, electricity		PROPANE <i>nonrenewable</i> Manufacturing, heating

Sources of energy - chemical (sugar, gasoline, batteries), mechanical (rolling stone, windmill, running water, water, waves, sound), electromagnetic (lightning, microwaves, light), thermal (geothermal, solar), nuclear (fusion, fission)

There are many ways that energy can be converted from one form to another.

Turn a flashlight on - chemical to electrical to light.

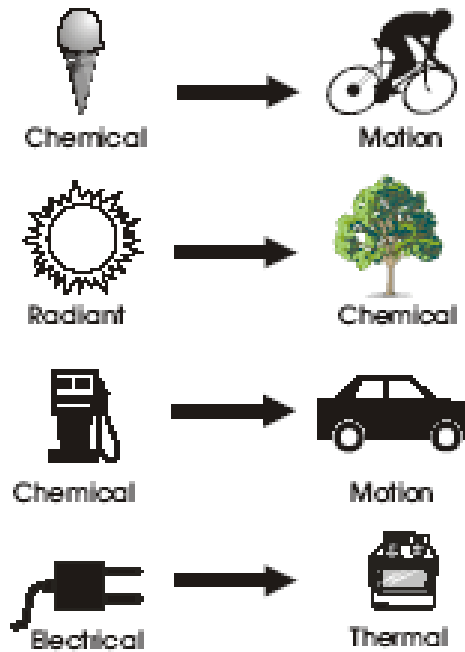
Plant growing - solar to chemical energy.

Pouring water into a pan - potential to kinetic energy - add a turbine to produce electrical energy.

Rubbing two sticks together to start a fire – mechanical energy
Using a magnifying glass to ignite a piece of paper – light to heat energy.

<http://www.energyquest.ca.gov/story/index.html#table>

Energy Transformations



Assignment:

Select one of the forms of energy listed below.

Biomass	Wind	Natural Gas	Propane
Hydropower	Solar	Coal	Other??
Geothermal	Petroleum	Uranium	

Answer the following questions about the selected form of energy.

- **Where does this form of energy occur?**
- Is it a renewable or non-renewable source of energy?
- How does society use it?
- Are there any detrimental effects when this source of energy under goes its transformation when it is put to practical use?

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