THE CSS POINT

Yes We Can Do It!

Energy & It's Types

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Definition Of Energy:

"Energy is an agent which is responsible to do work."

OR

"The capacity or ability of doing some work is known as energy."

Kinds OR Types Of Energy:

i) Kinetic energy: The energy due to motion of a body is called Kinetic Energy.
Example: i) Moving ball can break a glass window ii) A striking hammer can drive a nail.

ii) Potential Energy: the energy which is possessed by a body by means of its position is known as potential energy.

iii) Mechanical Energy: Energy of an object due to its motion or position
OR
A combination of kinetic and potential energy resulting from the force of gravity or the movement or release of a machine component, such as a spring, clamp, or wheel.

iv) Chemical energy: energy in a substance that can be released by a chemical reaction. For example: coal, petroleum are the source of chemical energy.

v) Electrical energy: energy made available by the flow of electric charge through a conductor.

- **vi) Heat energy:** a form of energy that is transferred by a difference in temperature.

  vii) Solar energy: Radiant energy emitted by the sun.

  viii) Hydropower energy: The energy in flowing water is called Hydropower Energy.

  ix) Nuclear energy: The energy released by a nuclear reaction, especially by fission or fusion.

Energy Resources:

Energy resources can be divided into two categories.

1) Renewable Resources Of energy
2) Non-Renewable Resources Of energy

Renewable Resources Of Energy:

- Renewable energy is energy which is generated from natural sources i.e. sun, wind, rain, tides and can be generated again and again as and when required.
- They are available in plenty and by far most the cleanest sources of energy available on this planet. For e.g.: Energy that we receive from the sun can be used to generate electricity. Similarly, energy from wind, geothermal, biomass from plants, tides can be used this form of energy to another form.

Types of Renewable Resources Of Energy

- **i) Solar energy:** Solar energy is the energy derived from the sun through the form of solar radiation.

  ii) Wind energy: Wind power is the conversion of wind energy into a useful form of energy, such as using wind turbines to make electricity, wind mills...

  iii) Hydropower energy: Energy in water can be harnessed and used. Since water is about 800 times denser than air, even a slow flowing stream of water, or moderate sea swell, can yield considerable amounts of energy.

  iv) Tidal energy: Tidal power, also called tidal energy, is a form of hydropower that converts the energy of tides into useful forms of power - mainly electricity.

  v) Geothermal energy: Geothermal energy is power extracted from heat stored under the earth's crust. This power source is generally cost effective, usually reliable, mostly sustainable, and generally environmentally friendly.

Non-Renewable Resources Of Energy:

- Non-Renewable energy is energy which is taken from the sources that are available on the earth in limited quantity and will vanish fifty-sixty years from now.
- Non-renewable sources are not environmental friendly and can have serious effect on our health.
- They are called non-renewable because they can not be re-generated within a short span of time.
- Non-renewable sources exist in the form of fossil fuels, natural gas, oil and coal.

Types of Non-Renewable Resources

- **i) Coal:** Coal is a combustible black or brownish-black sedimentary rock formed from fossilized plants. Coal consists of amorphous carbon with various organic and some inorganic compounds and is normally occurring in rock strata in layers or veins called coal beds.

- **ii) Gas:** Natural gas is a combustible mixture of hydrocarbon gases that occurs with petroleum deposits consisting primarily of methane. It is found with other fossil fuels and in coal beds and is created by the decay of methanogenic organisms in marshes, bogs, and landfills. Lower temperatures are likely to produce more petroleum, and higher temperatures are likely to produce more natural gas.

- **iii) Oil:** Petroleum, also known as crude oil, is a naturally occurring toxic combustible liquid primarily made up of hydrocarbons. Petroleum is the result of partial decay of living organisms occurring in the rock strata of certain geological formations.

- **iv) Nuclear fuels:** Nuclear power is produced by controlled nuclear fission (splitting atoms). In most cases nuclear power plants use nuclear fission reactions to heat water, using the steam to produce electricity. Uranium, specifically, uranium -235, is one of the few elements easily fissioned.

- **v) Wood:** Wood and wood products used as fuel, including round wood (cord wood), limb wood, wood chips, bark, sawdust, forest residues, charcoal, pulp waste, and spent pulping liquor.

Non-Conventional Sources Of Energy:

- Non-conventional sources of energy are those sources of energy which are not in common use at this time but are being considered or explored to bring to routine use in the future.
- With the exhaustion of conventional sources of energy the search for non-conventional sources of energy have been intensified.
- Conventional sources of energy are coal, gas, oil, wood and nuclear fuels. These sources are in routine use nowadays.
- Non-conventional sources of energy are solar energy, geothermal energy. Wind energy, tidal energy and ocean thermal gradient.

Kinds of Energy

- **Solar Energy:**
  The energy of the sun is called solar energy.
- It has been estimated that on the average 180,000 kilowatts solar energy is falling per square kilometre of the earth.
- Solar energy is utilized in two ways.
  A solar furnace contains thousands of mirrors to focus the sun rays. In this solar heater produces heat used in industry or houses. The heaters heat up water or air.

  Solar energy can also be used indirectly. Solar cells made up of panels of semi-conductors (usually silicon) are used which when illuminated by sun generate electricity. These kinds of cells have frequently been used in space probe. They have not become popular in domestic side due to high cost.

Wind Energy:

- Energy obtained from wind by using wind mills is called wind energy.
- The wind rotates generated which produce electricity.
- Previously wind mills were used for grinding grains. The rotating wings of a wind mill can be attached to a magnet which gives an electric current with rotation.
- Low power, high cost and uncertainties of weather had not made power generation through wind power.

Kinds of Energy

- **Geothermal energy:**
  Heat energy obtained from the hot molten metals inside the earth crust serves as the source of thermal energy.
- This type of energy is present in the form of hot water and steam.
- Geothermal electricity plants change the geothermal energy into electricity.
- Hot water of springs is being used for power generation particularly in USA, Italy, and Japan etc. furthermore; hot springs are used as geysers for heating the houses.

- **Nuclear Energy:**
  The most concentrated form of energy is in the atomic nuclei.
- This energy can be released by the processes of fission or fusion.
- Fusion reactions have been producing electricity in commercial quantities for about 30 years.
- In Pakistan we have got only one fission nuclear reactor located at Karachi which generates 137 megawatt of power to meet our future domestic and industrial needs, we will have to generate electricity from nuclear plants using (Uranium U-235) and plutonium as fuel.

- **Tidal Energy:**
  Energy which is obtained through the tidal waves of the sea is called tidal energy.
- Tidal waves of sea strike the shore constantly.
- These waves are used to run electric generators which produce electricity.
- The kinetic energy of the tides is also used to produce other forms of mechanical work.
- Tidal power station traps high tides behind a barrage.
- The water flows through turbines.