

Those types of **Energy sources** which can be renewed again and again are called **renewable sources of energy**. They are available in very large amount and probably they will never exhaust.

These are most popular types of renewable sources of energy

- **Solar energy**
- **Wind energy**
- **Hydro energy**
- **Tidal energy**
- **Geothermal energy**
- **Biomass energy**

How these various types of renewable energy sources are work

Solar energy

Solar [energy](#) is the most readily available source of energy. "**Solar**" is the Latin word for "sun" and It is a wonderful and powerful source of energy. It does not belong to anybody and is, therefore, free.

That is to say without it there will be no life. The sun energy which reaches the surface of earth is actually the half (about 47%) of energy which falls on the top earths surface.

On the other hand rest of the energy is reflected back into the space. The sun energy reaches the earth gets absorbed by land, plants and water bodies like rivers, lakes and oceans.

Sun energy can be made use of in two ways

Thermal route

Using heat for drying, heating, cooking, or generation of electricity.

Photovoltaic route

Which converts solar energy into electricity that can be used for various purpose For example lighting, water pumping and generation of electricity. With its pollution-free nature, virtually inexhaustible supply, and global distribution.

Wind energy

Wind energy means the kinetic energy carried by the wind. It has been used as a source of energy on earth since long back. It is being used by humans for many mechanical works.

Such as milling grains, water pumping, and power generation. The electric power is generated through the use of kinetic energy of wind to rotate the turbine similar to **water-driven turbines**.

Although technology is growing after 1980, it took a good position after 2000. It happens because the cost of manufacturing and installation of wind turbine unit was dropped to a reasonable value.

And the efficiency to generate the electric power from kinetic energy of wind was increased to an optimum level. The wind speed is generally high at seashores. Therefore the installation of the wind-based turbines at these places is very demanding.

About 196GW energy is being exploited until the end of 2010. When equator of earth is got heated because of solar radiations then low pressure region is created. Because the warm air is lighter and it rises above the equator.

When this warm humid air reaches the troposphere, air in northern hemisphere moves toward northwards. Air in southern hemisphere air gets cool, when it reaches up to latitude of 30 degree.

Because of accumulation air at this high pressure region is created (dry weather) at around these latitude world most deserts are found.

If any kind of air get reached at this latitude is bounces back to low pressure region. The wind blowing in this pattern is called trade winds. When these trade winds reach the equator.

These causes circulatory motion like close loops these loops are called Hadley cells. If air further moves towards pole it forms Ferrel cell and polar cell. After pole when it interact with the cold air it bounced back and moves toward 30 latitude.

The wind motion of earth is also disturbed by phenomenon called Coriolis force. This cause the bending of wind/fluid in northern hemisphere to right and southern hemisphere to left.

Hydro energy

Definition Hydro energy - The [kinetic energy](#) process by flowing water can be converted into electricity. This types of renewable sources of energy is often used by many country in the world. The power is then used for direct mechanical purposes or more frequently, for generating electricity.

Hydropower is the most established and widely used in a formal resource for electricity generation. Hydropower now accounts for about 20% of the world's electricity generation.

Output depends on rainfall and the land. Hydroelectric generation for various countries and regions indicates the Global increase. In about one-third of the world, hydropower produces more than half of the total electricity.

In general, the best sites are developed first on a national scale, so the rate of exploitation of total generating capacity tends to diminish with time. By the 1940s, most of the best sites had already been exploited. Almost all the increase in hydroelectric generation is in developing countries, notably India, China, and Brazil.

However, Global estimates can be misleading for local hydropower planning, since the potential for hydro generation from the run-of-river scheme (i.e. with only very small dams) is often underestimated.

In a hydroelectric power plant, a dam on the river is used to store water in a reservoir. Water released from the reservoir spins the turbine, which in turn activates a generator to produce electricity.

But all hydroelectric power does not require a large Dam. Some of them just use a small canal to channel the river water through a turbine.

Another type of hydroelectric power plant is called a pumped storage plant. The power is sent from a power grid into the electric generator. The generator then spins the turbine backward, which causes the turbine to pump water from the lower reservoir to an upper reservoir, where the water is stored.

The water is released from the upper reservoir back down into the river or lower reservoir. This spins the turbine forward, activating the generator to produce electricity.

Ocean energy

Ocean energy has been developing itself for the last decade as an innovative **renewable source of energy**. Since water covers nearly 70% of the earth's surface. So water mass is a larger receiver of solar radiation on earth.

The energy in the ocean waves is a converted form of concentrated solar energy. The energy which comes from the sun is transferred through Complex wind **electromagnetic wave interactions**.

The effect of Earth's temperature variation due to solar heating combined with a multitude of atmospheric phenomena (variation in temperature and pressure). It is used to power generation or wind current, around the globe.

Ocean wave generation, propagation and direction are directly related to these wind currents. On the other hand, Ocean tide are cycle variation in seawater elevation (tidal height). And flow velocity as a direct result of the earth motion with respect to the moon and the sun. Combined with the interaction of their gravitational force.

A number of phenomena relating to Earth rotational with tilting at rotation Axis. The rate of spinning, and interaction among gravitational and rotational forces cause. The tide conditions to vary significantly over time.

Tide conditions are more Apparent in coastal areas there constrained channels to augment the water flow and increase the energy density.

Geothermal energy

Geothermal is a combination of two words Geo which means earth and thermal which means heat. So, geothermal energy means energy pulled out from interior of the earth. From its birth, earth has been radiating heat from its centre.

Temperature close to the centre of earth is around 5500°C, it is expected to remain as such for billions of years to come. Since heat coming out of earth is endless, thus geothermal energy is renewable resource.

Since the study of renewable sources is to find the cost effective forms of energy that will never threat to pollution and global warming.

If we compare the heat flowing through the earth small as compared to solar heat energy, but still there are many places on the earth where the heat flow is sufficiently concentrated at resource of naturally heated water or steam at shallow depth, which can be used for electric generation. Such types of sources are called high enthalpy resources.

Enthalpy is the energy(heat) contents per unit mass of a substance, which is function of pressure, volume and temperature. Enthalpy (H)= E + PV where E is the internal energy, P is pressure and V is the volume of the substance. The internal energy E is the function of temperature.

The technique for exploiting the resources uses a very simple principle. It is similar to well established techniques for extracting oil and natural gas. In this principle, one or more bore well are drilled into reservoir, the hot fluid flows or is pumped out to the surface and then used in the conventional steam turbine. The typical drilling depth is 700-4000m. It may vary if source is deep.

Geothermal energy is a true renewable resource because geothermal is natural flow rather than stored energy.

Biomass energy

Biomass is a stored form of energy transferred from solar energy. The solar is absorbed by the process of photosynthesis and stored in the growing plant.

Biomass is a carbon fuel source (compounds of carbon, hydrogen and oxygen), because carbon dioxide is released when biomass is burnt. In combined heat and power plant (CHP), the municipal waste, waste wood or landfill gas are usually small typically in the output range of 50kW to 100kW.

They are connected to the system at 11kV to 33kV. Many small CHP are not using man power and are fully automatic. Apart from occasional breakdowns, the CHP are reliable source and their electricity is same as that produced by any other hydro power plant or nuclear plant.

What are the types of renewable resources

Solar energy

Wind energy

Hydro energy

Tidal energy

Geothermal energy

Biomass energy