SOURCES OF ENERGY
Biomass, Wind Energy

WIND ENERGY:

Moving air is called wind. As the moving objects possess K.E. and as such they are capable of doing mechanical work by virtue of its motion. Wind also possess the ability of performing mechanical work because it is air in motion. So wind energy is the K.E. associated with large mass of air by virtue of its motion.
Solar energy is responsible for the blowing of air.
This can be explained as follows : The sunrays fall on the whole earth but eh intensity of sun-rays is much more stronger near equator of the earth than in the polar regions. Due to more intense sun-light, the air near the surface of earth in equatorial regions becomes quite hot. This hot air, being lighter, rises upwards. The cooler air form the polar regions of the earth start flowing towards the equatorial regions of the earth to fill the space vacant by the hot rising air. In this way air flows from the higher pressure regions to the lower pressure regions of the earth. This flow of air from one place to another constitutes wind.

(a) Advantages of Wind Energy:

(i) use of wind energy is not a source of pollution.

(ii) Wind energy is available free of cost.

(iii) The source of wind energy i.e. air is an inexhaustible and reversible source.

(b) Disadvantages of Wind Energy:

(i) One of the most important limitations of wind energy is that it may not be available at all times.

(ii) The windmill and sail-boats remain unoperational and no useful work can be done unless there is a plenty of fast blowing wind.

(iii) The speed of the wind at a place varies with time and season.

(iv) The K.E. of the wind can be utilized only at the site.

(v) There is no guarantee that we will get wind energy when required, since there is no place in the world where wind blows all the time.

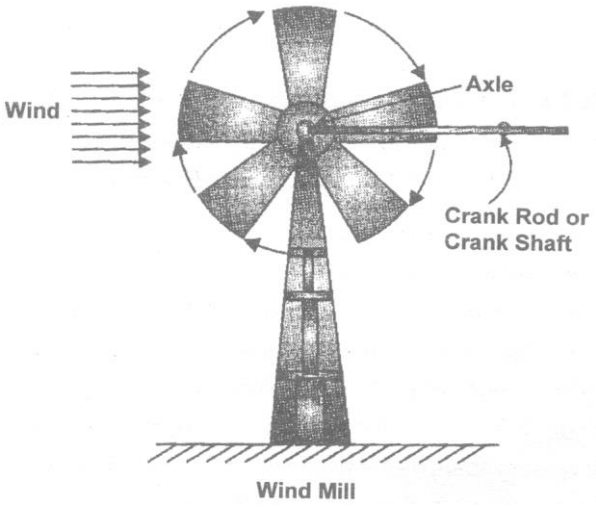
(vi) The wind is not predictable.

(c) Practical Devices Making use of Wing Energy:

(i) Wind mill

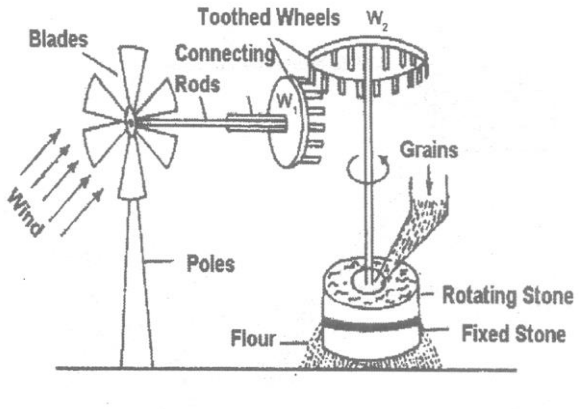
A windmill is a machine, which works with the energy of blowing air or wind. It consists of large blades to catch the wind. When the wind strikes against these blades, They start rotating. The motion can then be passed on the other connected parts & is used to do useful work. A windmill consists of a system of big blades (or vanes) capable of rotating about a horizontal axis. The system of vanes is mounted on the top of a high tower. The system of blades in connected to one end of the rod called shaft. The other ends of the shaft is connected to a pump rod in case of water pump. This end is bend in form of inverted V and is connected to the free and of the pump rod of the water pump. When the wind blows, it rotates the bladed of the windmill.

The shaft turning about its axis rotates the crank. The rotates the blades of the windmill. The shaft turning about its axis rotates the crank. The rotation of the crank moves the piston rod of the water pump up and down & draws water from the well.



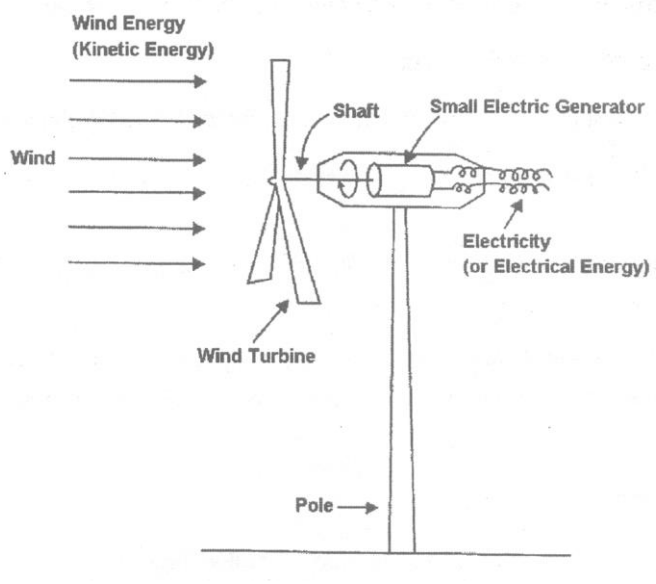
(A) Windmill to operate flourmill:

It is similar to one used to grind grains by suitable arrangements of toothed wheel & shafts. The other end of the shaft is connected to a toothed wheel. Grinding arrangement of flour mill has a fixed mill stone A and another heavy will stone B. B is capable or rotating by a shaft rod (W_2) having a toothed wheel (W_2). The wheel (W_1) is coupled with the wheel (W_2) such that the rotation of wheel (W_1) about a horizontal axis rotates the wheel (W_2) about a vertical axis. The wheel (W_1) rotates as the shaft (W_1) connected to blades rotates due to rotation of blades of windmill. Thus the K.E. of wind by virtue of this motion rotates the windmill which in turn operates a flourmill and is able to grind grains.



(B) Wind generator:

A modern generator, which is used to generate electricity by using wind energy is wind generator. When the fast moving wind strikes the blades of wind turbine, then the wind turbine starts rotating continuously. The coil of a small electric generator is attached to the shaft of wind turbine. So when the wind starts rotating and generates electricity. The electricity generated by a single wind turbine is quite small. So, in order to generate a large amount of electricity, a large amount of wind turbines are erected over a big area of land. Such a set-up of having a large number of wind turbines working at a place to generated electrical energy on a large scale is called a wind energy farm.



ENERGY FROM BIOMASS

Biomass is any organic matter from which we can get energy on a renewable basis. It includes agricultural residues, wood, animal excreta, wastes from food processing and municipal wastes. Agricultural residues include straw, hay and husk. Waste from food processing includes bagasse, which is the residue left after extracting the juice from sugar cane. Cow dung (gobar) has been a traditional biomass fuel in our country, Since plants trap solar energy in the form of food, and animals eat plants, the ultimate source of biomass energy is the sun