

Hydroelectric Power

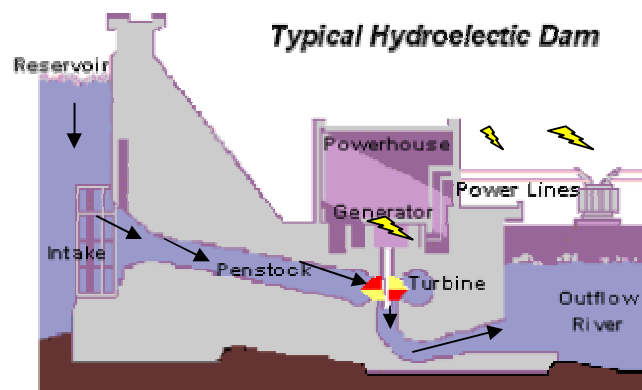
Hydroelectric power is one of the oldest methods of producing power. This works and is related to water energy. Huge water generators are placed inside dams. Dams are huge walls to stop water from flowing. Water flowing through the holes of the dams spin turbine blades and these turbine blades are connected to generators to generate electricity. Producing electricity by hydroelectric power, has advantages and disadvantages

Advantages:

- No fuel, coal or oil is burned so there is less pollution
- There is no cost to water since it is natural
- It's renewable. Rainfall disperses water into reservoirs so there is a continuous flow of water. So the water doesn't run out.

Disadvantages:

Hydroelectric power is great but not mainly used to produce all of our electricity. This is because you need the space to build a dam and you also need a continuous flow of water in a reservoir. This takes a lot of money, time and construction. Also you would need steep mountains or deep valleys and producing dams damages ecology. At first, hydro power was used to produce about half the world's electricity. Nowadays it only produces 10 percent. *The picture on the right shows a generator. These are very large containing magnets and wires.*



The diagram on the left shows a hydroelectric dam and how it works, as explained earlier.

Tidal Power

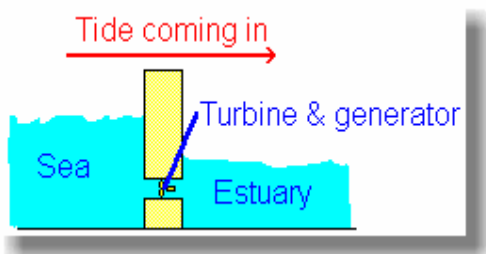
A lot of energy is also stored in the sea's tides. When the tides go in and out, tidal power stations can capture the energy. Tidal power stations are found in places that are affected by tides e.g. the beach.

A blockage is first set across a beach or river. When high tide comes in, water flows through a turbine to create electricity. But some of the water is still up behind the barrage. So a gate is lowered capturing the water and when low tides come in, this gate is opened and a lot of water flows out with energy transferred to the turbines.



There are many tidal power stations all around the world and tidal power helps a great deal in producing electricity.

But there are always some disadvantages:



The above diagram shows how it is used

- Tidal power stations need a lot of money to be built.
- Excess electricity is created which is not needed.
- There's a difference in the way tides move. The tides may be higher at times.
- Environmental problems caused at the power stations because the barrage kills the homes of animals and the turbines kill animals.

Wind Power

The earth's atmosphere is not directly heated by the sun but from the land and oceans below as well. Because land and water are warmer near the tropics than the poles, so the atmosphere is also unevenly heated and causes air to circulate. This creates winds. Wind energy is quite difficult to control because the amount of energy used depends on how much wind there is. In order to use wind energy, a lot of generators must be built. This is one of the disadvantages as well because you need a lot of space to build these windmills and they can get very noisy and irritating. But these are obviously built where winds are strongest. Wind energy is used all around the world mostly in Europe. It is quite cheap to use because wind is a natural source in the environment. This is why people may prefer to use it. At times wind can become strong and the electricity would increase. Winds can become strong near the tropics and often becomes focused into a spiral. When winds reach very high speeds, cyclones could be formed.



Geothermal Resources

Geothermal energy is a renewable source of energy and can be used to produce heat as well as electricity. Our earth's interior provides warmth (heat energy). The energy can produce power without polluting the environment. The heat from the earth's core is first conducted to the magma. This magma transfers the heat to the earth's crust through convection. The magma heats the water and land. Today, drilling brings hot water to the surface. Once the water is recovered, it can be used to produce energy saving electricity. In geothermal power plants, the steam from the hot water provides enough energy to spin turbines which are connected to generators and then the electricity is distributed through houses and offices. There are three types of reservoirs from which the water can be obtained : a dry steam reservoir, a hot water reservoir and reservoirs which have low water temperatures but can still be used.



Advantages of using geothermal energy to produce electricity:

- It's clean and non-polluting
- Less land required
- Very reliable source of energy because it won't run out and can resist hard weather conditions.
- Flexible – can be built in any types and sizes
- Not much money is used
- Since it is cheap, a lot of countries use it to grow.

Geothermal water can be used directly as a source of heat as well. This helps save energy. Some examples of using it as a heat source are: health spa, agriculture in greenhouses, industrial uses like pasteurising milk, normal heating at home or self uses. However geothermal energy might trigger off earth quakes because of the pressure but this happens in places that have earthquakes often.



Solar Heating Systems and Solar Cells

The sun is a very useful source of energy. A lot of people use the sun's heat to warm water at homes. But in order to obtain this heat, solar heating systems are required. Hot water demands are high and the advantage of solar heating systems is that you can shut it down at whatever time you want in the year. A better use of it would be in washing machines and dishwashers. Solar systems are developed in technology and there are a variety of types. They are placed on the roofs of houses to absorb maximum heat. The main part of the system is the collector which absorbs the radiation. It usually contains



an absorber which usually a layer of glass to trap the heat and a black layer to absorb heat. A heat conducting liquid flows through the absorber and in between the hot water tank and the collector. When the temperature of the collector is more than the one of the tank, a pump is switched on and heat is transferred from the collector to the tank. These systems can also be used to keep a pool warm. A solar heating system



gives out less pollution than a normal conventional heating system. This is because natural gas and oil, which are burned to heat our homes and water, are limited. Even electric water and space heaters cause air pollution indirectly, because coal and natural gas are burned to produce electricity in large power plants. So if more people begin to use solar heating systems, the amount of

pollution would decrease.

Solar Cells

As said before, the sun is very useful. Another thing which is used is called the solar cell which attracts sunlight to produce electricity. Solar cells contain semi-conducting materials that transfer heat and light into electricity but otherwise act as an insulator. These cells are called photovoltaic cells, also known as PV cells. It is very compatible in areas that don't have electric wires because they need electricity for their homes. The PV units usually involve using a meter, deep cycle batteries, and a regulator, to prevent over charging. An AC inverter is needed if you want to run ac appliances and lights. The concept of using solar power for heat and electricity has become popular nowadays.



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