

<http://www.darvill.clara.net/altenerg/>

## 1. Introduction

How long have we used hydroelectric power? \_\_\_\_\_ for thousands of years \_\_\_\_\_

What has it been used for? \_\_\_\_\_ to grind corn \_\_\_\_\_

## 1. How it works

### Tidal barrage

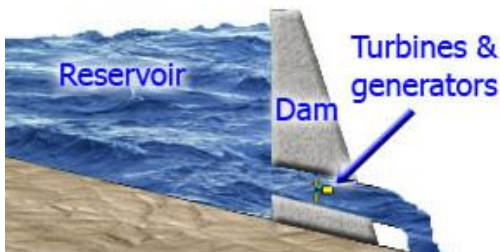


Where does the running water come from?

The Sun evaporates water from the sea and lakes, which forms clouds and falls as rain in the mountains, keeping the dam supplied with water. For free.

Explain how it works

A dam is built to trap water, usually in a valley where there is an existing lake.



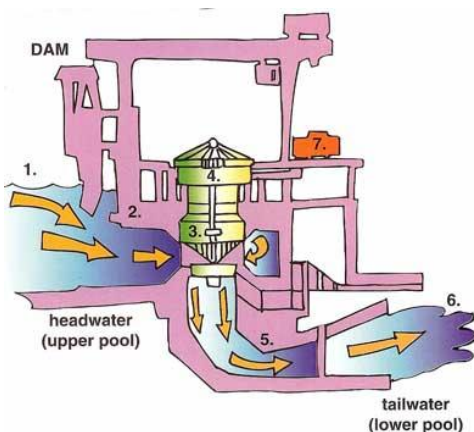
Water is allowed to flow through tunnels in the dam, to turn turbines and thus drive generators.

Notice that the dam is much thicker at the bottom than at the top, because the pressure of the water increases with depth.

Hydro-electric power stations can produce a great deal of power very cheaply.

Although there are many suitable sites around the world, hydro-electric dams are very expensive to build. However, once the station is built, the water comes free of charge, and there is no waste or pollution.

### Flowing water



Falling water from the reservoir (1) passes through the penstock (2) to enter the powerhouse. The flowing water turns the propeller-like water wheel, or turbine (3), which is connected by a shaft to the generator (4), which spins and produces electricity. *Turbine*. The same water that flowed through the turbine (3) is then discharged through the draft tube (5) where it enters the tailrace (6) and returns unaltered to the river below the dam. The electricity produced by the spinning generator (4) is conducted to the power transformer where the voltage is increased. The high-voltage electricity is then fed into transmission lines for distribution to electricity customers.

## 2. Advantages and disadvantages

# Correction

Advantages:	Disadvantages:
<ul style="list-style-type: none"> <li>• Once the dam is built, the energy is virtually free.</li> <li>• No waste or pollution produced.</li> <li>• Much more reliable than wind, solar or wave power.</li> <li>• Water can be stored above the dam ready to cope with peaks in demand.</li> <li>• Hydro-electric power stations can increase to full power very quickly, unlike other power stations.</li> <li>• Electricity can be generated constantly.</li> </ul>	<ul style="list-style-type: none"> <li>• The dams are very expensive to build. However, many dams are also used for flood control or irrigation, so building costs can be shared.</li> <li>• Building a large dam will flood a very large area upstream, causing problems for animals that used to live there.</li> <li>• Finding a suitable site can be difficult - the impact on residents and the environment may be unacceptable.</li> <li>• Water quality and quantity downstream can be affected, which can have an impact on plant life.</li> </ul>

## 2. Summary

- Hydro-electric power means getting energy from flowing water
- Usually we build a dam, and let the water turn turbines & generators as it goes through pipes in the dam
- Renewable
- No pollution, no fuel needed, no waste
- Expensive to build
- Building a dam means flooding a lot of land

## Quiz:

Hydroelectric power means using **flowing** water. Nowadays this turns a turbine which runs a **generator** to make electricity. This can be done with a water wheel and a fast-flowing stream, but a modern **hydroelectric** power station has a huge **dam** which creates a deep **lake**, which stores lots of **gravitational** potential energy in the water so it flows fast through the turbines.

The **Hoover** dam on the Colorado river in the USA provides **electricity** for the city of Las Vegas.

Hydroelectric power is **renewable**, needs no **fuel** and produces no **pollution**. However, the dams are **expensive** to build and you need to **flood** a large area to create the lake, with environmental consequences.