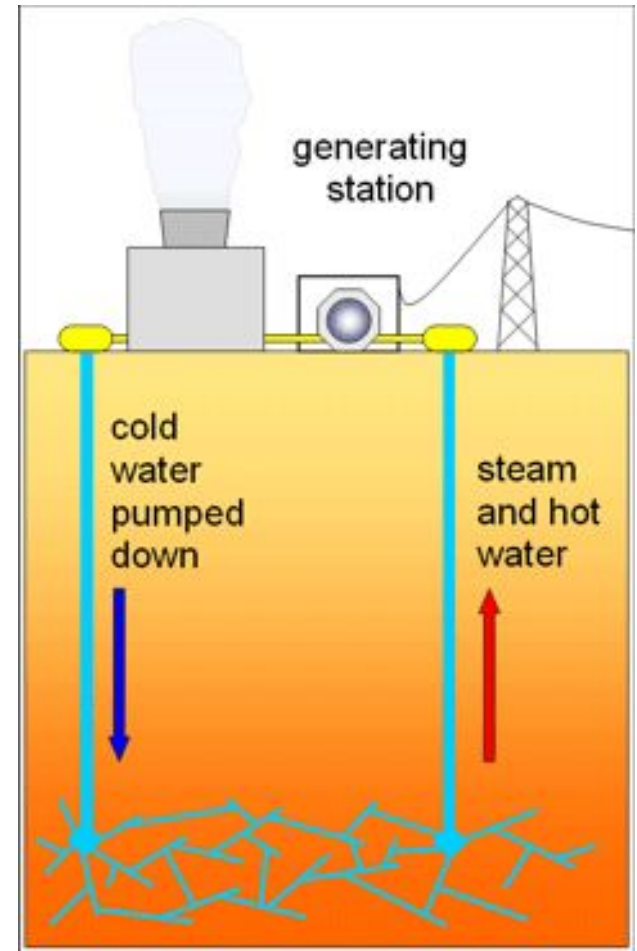


Geothermal Energy - energy from the Earth

Deep underground, the Earth's rocks are naturally very hot. We can turn their **heat energy** into **electrical energy** to use in our homes - we call this 'geothermal energy'.

1. Cold water is pumped below the ground.
2. Hot rocks heat the water, turning it into steam.
3. The steam is used to generate electricity.

- + **Renewable**
- + **No pollution, because nothing gets burned**
- + **Doesn't damage the environment**
- **Very few places in the world where you can do this**
- **Costs a lot of money to drill deep into the ground**



Wave Energy - energy from sea waves

The sea's waves have **kinetic energy**. Using machines that bob up and down in the waves, this energy can be turned into **electrical energy** which we can use in our homes.



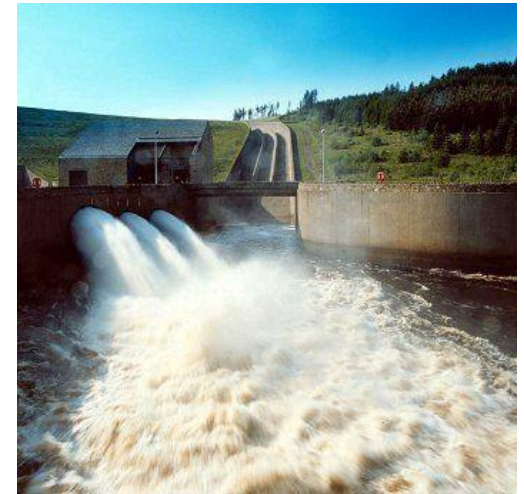
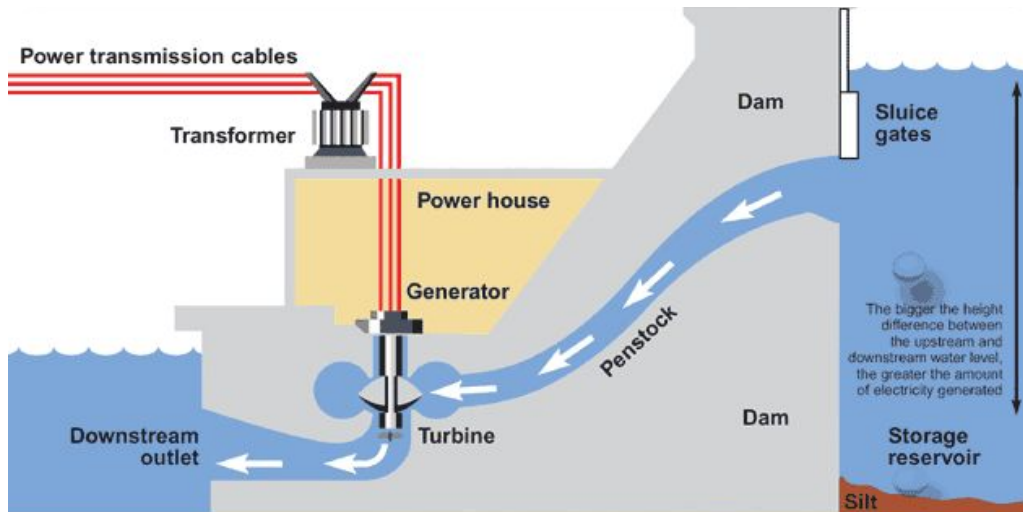
wave energy
machines bobbing
up and down in the
waves

- + Renewable
- + No pollution, because nothing gets burned

- Need lots of machines to get a reasonable amount of energy
- The machines costs a lot of money
- The machines can look ugly
- The machines can be damaged by storms

Hydroelectric Energy - energy from rivers

The water flowing in a river has **kinetic energy**. We can turn this into **electrical energy** to use in our homes. We usually need to build a dam, and let the water flow through it gradually.



- + Renewable
- + No pollution, because nothing gets burned
- + We can store the water up high, and then whenever we need the energy we can let the water out

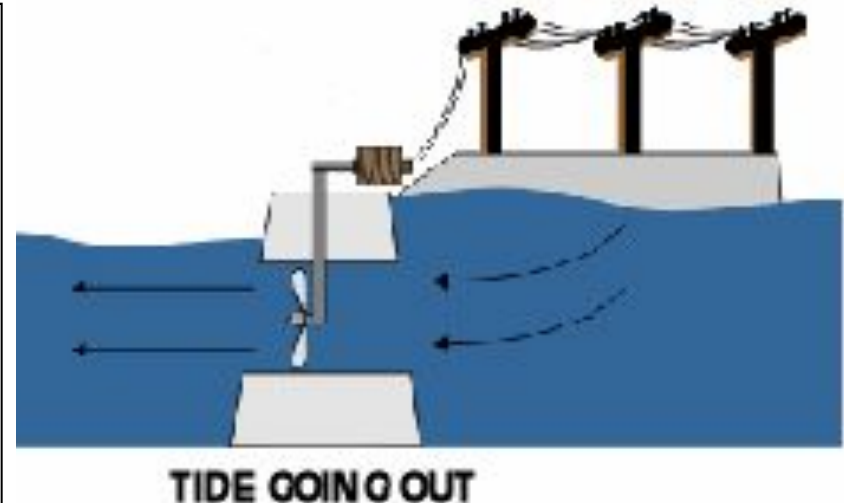
- Costs a lot of money to build a dam
- The dam can ruin the local environment, because it changes where the water naturally flows. Some animals and plants may die.

Tidal Energy - energy from sea tides

If you've ever been to the coast, you may have noticed that the sea level goes up and down, because of *tides*. When the tide is high, the water has lots of **gravitational potential energy**, which we can turn into **electrical energy** to use in our homes.

1. At high tide, we trap the water behind a dam.
2. At low tide, the water is released, and its energy is used to generate electricity.

- + Renewable
- + No pollution, because nothing gets burned
- + Reliable, because there are always two tides every day
- + Cheap to run, once it's built
- Costs a lot to build the dam
- The dam may cause local flooding



Solar Energy - energy from the Sun

The Earth gets **heat and light energy** from the sun all the time. Can we use it - yes we can! The Sun's energy can either be:

1. changed into **electrical energy** to use in homes, using *solar cells*;
2. or used to **heat water** for homes, using *solar panels*.

- + **Renewable**
- + **No pollution, because nothing gets burned**
- **Solar cells and solar panels are expensive**
- **Only works if it's sunny!**



Wind Energy - energy from the wind

Using *wind turbines*, we can turn the **kinetic energy** of the wind into **electrical energy** which we can use in our homes. This is 'wind energy'.

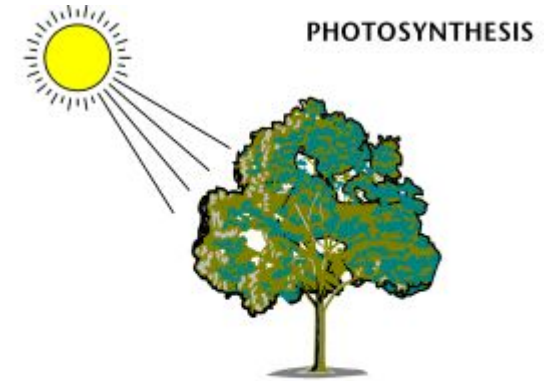
- + Renewable
- + No pollution, because nothing gets burned
- + Turbines are quite cheap and easy to build, so they can be used even in poor countries
- Turbines can be ugly and noisy
- Only works if it's quite windy!
If the wind stops, you get no energy.



Biomass Energy - energy from plants

The **chemical potential energy** stored in things that were once alive (e.g. trees) can be turned into **heat energy** by burning them. (We can also turn it into **electrical energy** to use in our homes.)

1. Trees absorb the sun's energy. The trees change this energy into chemical energy, which they store inside themselves.
2. When we burn wood, we turn this energy into heat, which is useful for cooking and heating.



- + Renewable - as long as we keep planting trees to replace the ones we cut down
- + Doesn't need any special equipment, so it can be used very easily, even in poor countries
- + Doesn't add to the greenhouse effect
- Large areas of land are needed to grow enough trees

