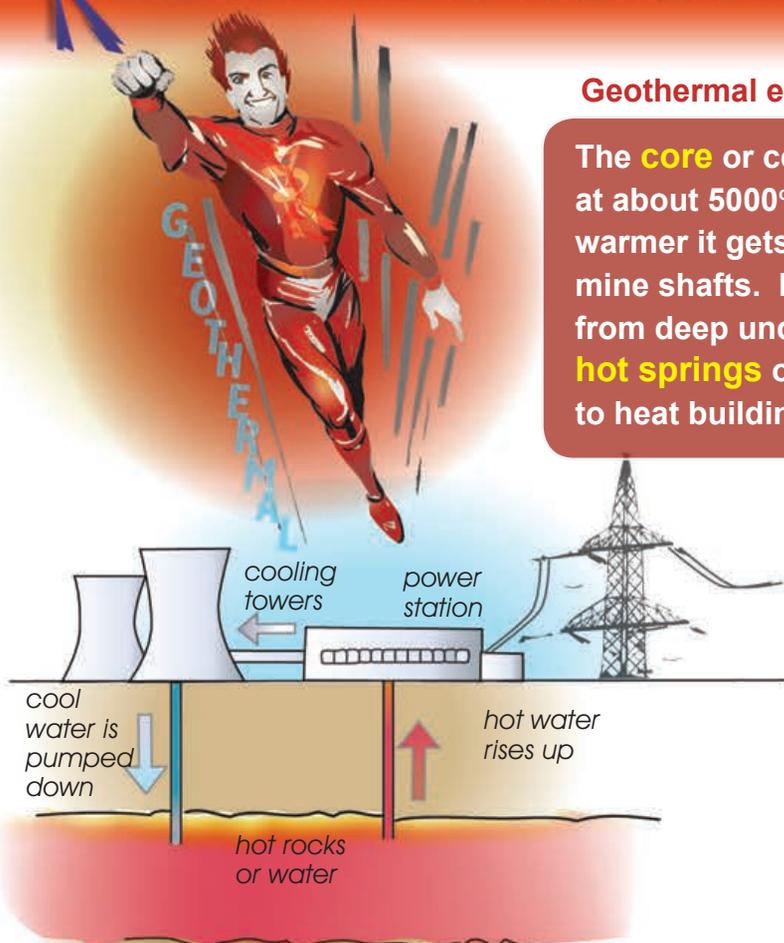


GEOHERMAL ENERGY - FACT SHEET 8

SIDE A

Geothermal energy is heat energy from the Earth.

The **core** or centre of the Earth is made of molten rocks at about 5000°C. So the deeper you dig into the Earth the warmer it gets. The air can be about 50°C at the bottom of mine shafts. In some places in the world, heated water, from deep under the ground, rises up to the surface as **hot springs** or **geysers**. Geothermal energy can be used to heat buildings or generate electricity.



GEOHERMAL POWER STATIONS

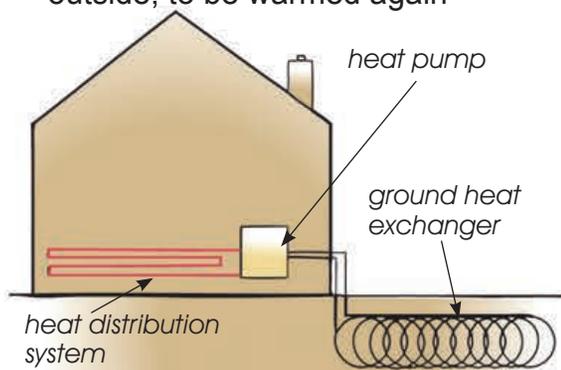
Geothermal energy can be taken from the surface at a **hot spring**, or a **borehole** drilled to reach the heat.

- ◆ Two shafts are drilled down into the Earth to reach hot rocks or a hot underground lake
- ◆ Cold water is pumped down underground, where it is heated by the rocks or lake
- ◆ The boiling hot water rises or is pumped back up to the power station and becomes steam
- ◆ The steam turns a generator to make electricity

GROUND SOURCE HEAT PUMPS

Individual homes can be fitted with ground source **heat pumps** which use the energy from the Earth in their **gardens!**

- ◆ Coils of water pipes are laid in trenches or in boreholes
- ◆ The ground heats the water in the pipes to about 11-12°C
- ◆ The water is pumped into the house to a heat exchanger, where the energy is taken out of the water
- ◆ The cold water is re-circulated back outside, to be warmed again



GEOHERMAL ENERGY FACTS

Where is the UK's only geothermal power plant?	Southampton in England
How deep is the borehole in the power plant in Southampton?	1.8km
How hot is the water from the borehole in Southampton?	76°C
Where are there many geothermal power stations?	Volcanically active countries like Iceland and New Zealand
How warm is the Earth at about 2m below our feet in the UK?	A constant 11-12°C

PLEASE RETURN THIS CARD TO THE FACT SHEET POUCH

diagrams adapted from <http://www.berr.gov.uk/energy/sources/renewables/schools/index.html>



Pipes in a 2-metre deep trench for a ground source heat system.



Andrew Engineering Ltd www.andrew-eng.co.uk

Mammoth Hot Springs in Yellowstone National Park.

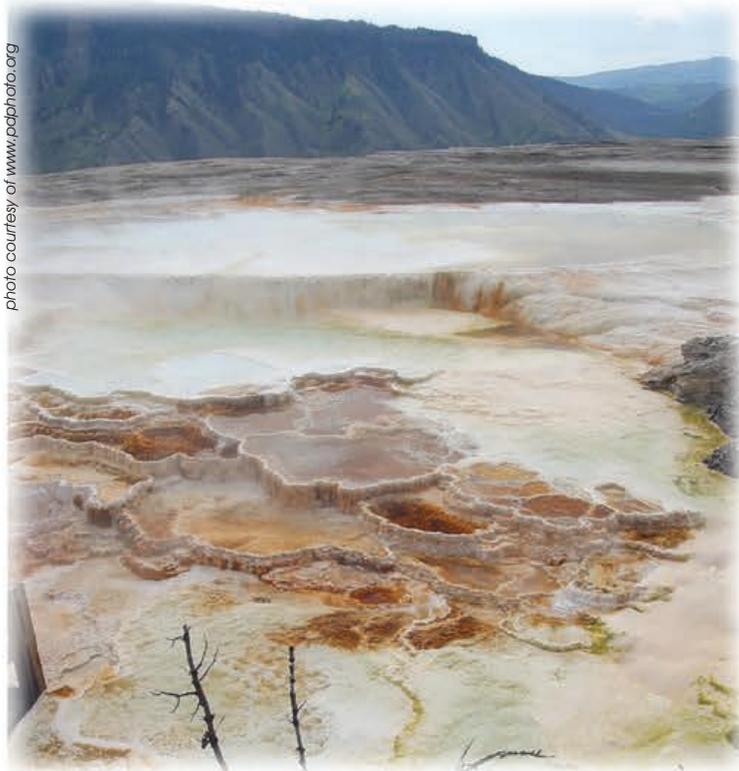


photo courtesy of www.pdphoto.org



photo courtesy of www.pdphoto.org

The geyser Old Faithful, in Yellowstone National Park, Wyoming USA. High pressure steam erupts every 45 minutes from deep below the Earth's surface.



ADVANTAGES OF GEOTHERMAL ENERGY

- ◆ Geothermal energy is renewable, it will never run out.
- ◆ Geothermal energy causes very little pollution and is quiet.
- ◆ A geothermal power station has very little impact on the environment, most of the power station is hidden away underground.
- ◆ Once the power station is built the energy is almost free.
- ◆ Ground source heat pumps can be used all over the World.



DISADVANTAGES OF GEOTHERMAL ENERGY

- ◆ Geothermal power stations are limited to certain places in the World where the heat is near the surface of the Earth.
- ◆ Only a few places in the UK have underground heat sources close enough to the surface for a geothermal power plant.
- ◆ Some hazardous gases and minerals may come up with the hot water and may be difficult to dispose of safely.
- ◆ Ground source heat pumps are currently expensive to install.