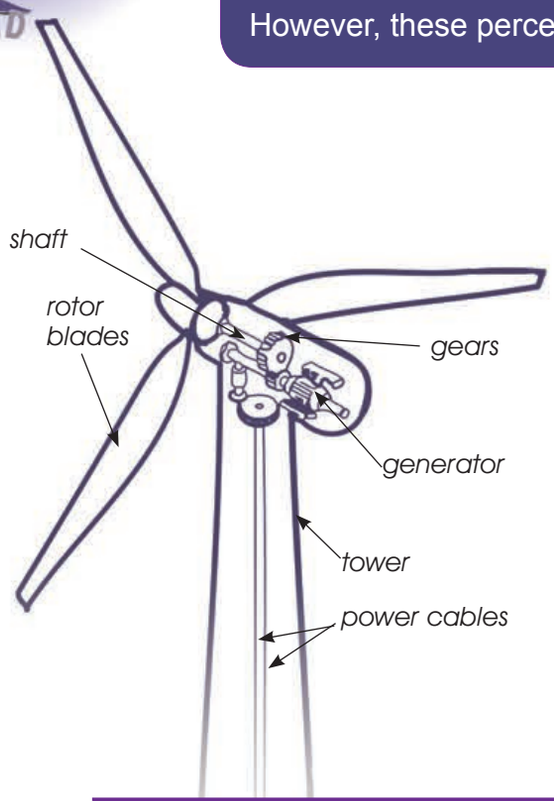
WIND ENERGY - FACT SHEET 7

SIDE A

Wind energy is the energy in moving currents of air.

People have used wind energy for hundreds of years to turn windmills which then power machinery such as grinding stones to mill grain. Now, much larger machines called wind **turbines** are being built to generate electricity. Wind turbines are usually grouped together in **wind farms**. At the moment just over 1% of the UK's and almost 5% of Scotland's electricity is made using wind power. However, these percentages are increasing every year.



- The **rotor blades** are angled so that they turn when the wind pushes against them
- The rotor spins a **shaft** which is connected to **gears**
- The gears are connected to a **generator**
- Coils of wire are spun around powerful magnets inside the **generator**. This generates electricity which flows along the **power cables**
- To catch the strongest winds, the **towers** are tall and the **rotors** face the direction of the most common winds

WIND ENERGY FACTS

How many wind farms are there in the UK?	176 (in 2008)
Will the number of wind farms increase?	Yes, more are being built and yet more are planned
How long are the rotor blades on wind turbines?	Up to 65 metres
What are the rotor blades made from?	Very strong plastics
The power output of most land based wind turbines	2-3 megawatts (MW) at maximum turning speed
What is different about the Beatrice wind farm, in the Moray Firth?	It's the World's first deep-water offshore wind farm (at a depth of 45m) and uses two, 5 MW turbines
Where is the largest wind farm in the UK currently being built?	Whitelee, near Glasgow - it will have 140 turbines each generating a maximum of 2.3 MW
How much energy will the Whitelee wind farm produce?	More than 2% of Scotland's electricity by 2009

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

Wind Energy - fact sheet 7 SIDE B

Wind farms can be built on the land (**onshore**) and also at sea (**offshore**).

Wind farms only generate maximum power when the wind is blowing steadily, at the ideal speed. Wind turbines usually produce between 1/4 and 1/2 of their maximum possible power each day because the strength of the wind changes all the time.

The best places for wind farms are in wild and windy places like the Highlands and Islands of Scotland and offshore in the open sea.

photo HIE

Vestas wind turbine factory in Campbeltown, Argyll.

photo HIE

The first Talisman Energy offshore wind turbine leaving the Cromarty Firth by barge on its way to the Beatrice Oil Field in the Moray Firth.

photo HIE

The Paul's hill wind farm, near Charleston of Abelour, Moray.

Advantages of wind energy

- Wind energy is renewable, it will never run out.
- Wind energy is clean, it causes no pollution.
- Wind energy is available all over the world.
- Electricity from wind energy is now similar in price to electricity from fossil fuels.
- The price of fossil fuels will increase, whereas the costs of using wind energy is likely to decrease.

Disadvantages of wind energy

- Wind turbines can cause noise disturbance.
- They can spoil wild, natural landscapes.
- New and larger pylon lines are needed to bring the electricity from the wind farms to the cities.
- Wind energy is only there when the wind is blowing, on calm days very little power is produced. Wind turbines also cannot work in very strong winds in case they are damaged.
- Offshore wind turbines and power cables leading to the shore, may cause a hazard to ships or be damaged by storms.