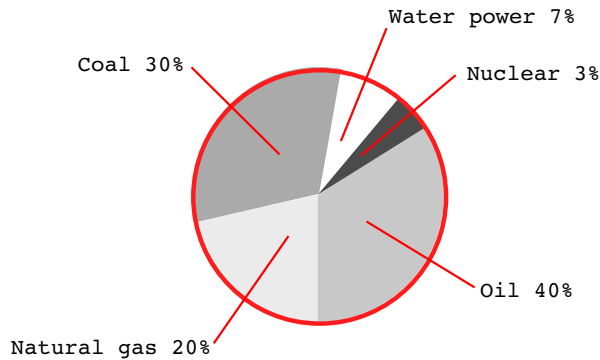


GCSE Energy resources

Name & Set



1 (a) The pie chart shows five sources of energy used by a country.



The table shows the proportional use and estimated reserves of coal, oil and natural gas.

	Relative estimated reserves	Relative quantity used/year
Coal	500	1.25
Oil	100	3
Natural gas	90	1.5

(i) Explain why it is always difficult to make accurate predictions of how long reserves will last.

[4]

(ii) Why will the pie chart be likely to be different in about 20 years' time?

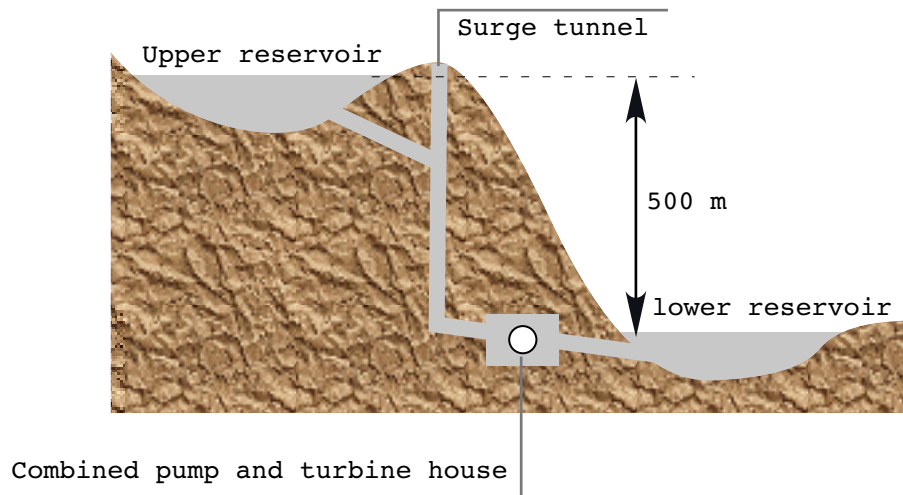
[2]

(iii) Explain the economic, environmental and social benefits of using nuclear energy as the main source of providing electrical power.

[4]

(b) Pumped storage power stations are used to produce electricity during periods of peak demand. Water is stored in one reservoir and allowed to flow through a pipe to another reservoir at a lower level. The falling water is used to turn turbines which are linked to generators.

In one such power station 400 kg of water passes through the turbines every second after falling through 500 m. The gravitational field strength is 10 N/kg. Assume that no energy is wasted.



(i) What is the weight of 400 kg of water?

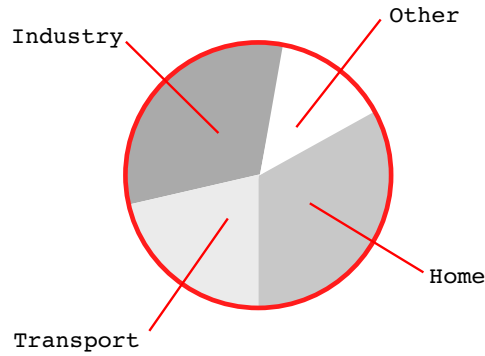
[2]

(ii) Calculate the decrease in gravitational energy when 400 kg of water falls 500 m.

[2]

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2 (a) The pie-chart shows the distribution of energy use in the UK.



(i) One important use of energy in the home is for cooking. Give two other important uses of energy in the home

1. _____ [1]

2. _____ [1]

(ii) Approximately what percentage of energy is used for transport in the UK?

_____ [1]

(b) Most energy needed for transport comes from oil. An alternative is ethanol which is made from sugar cane. In Brazil about 20% of all cars use ethanol fuel.

(i) Oil is a fossil fuel. Name one other fossil fuel.

_____ [1]

(ii) There are about 10,000,000 cars in Brazil. How many use ethanol fuel?

_____ [1]

(iii) Is the energy source for ethanol renewable or non-renewable? Explain your answer.

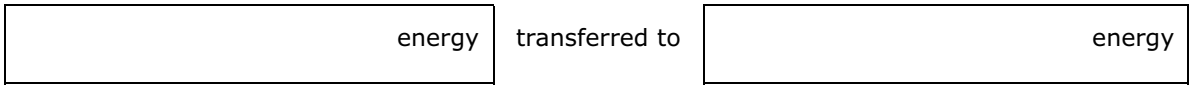
_____ [2]

(iv) Why is it important to use alternative fuels such as ethanol for cars?

_____ [2]

3 A "wind farm" is a site where several wind turbines have been set up. The turbines supply energy to the National Grid. 49 wind farms are planned for the whole country. It is expected that they will produce a total of 83.3 megawatts (MW) of power.

(a) Complete the following boxes to show the useful energy transfer that a wind turbine makes.



(b) 1 megawatt = _____ watts. [1]

(c) Calculate the average power output of each wind farm planned for this country. Clearly show how you get to your answer.

_____ [2]

(d) Suggest and explain one advantage and one disadvantage of using wind farms to generate electricity.

Advantage _____

_____ [2]

Disadvantage _____

_____ [2]

(e) (i) The wind is sometimes described as a "renewable" energy source. What does this blank mean?

_____ [1]

(ii) Give two more examples of renewable energy sources.

Example 1 _____ [1]

Example 1 _____ [1]

(iii) Give two examples of non-renewable energy sources.

Example 1 _____ [1]

Example 1 _____ [1]

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(f) On a wind turbine, the blades turn round when the wind blows because the pressure on one side of the blades is greater than the pressure on the other side.

In one design of wind turbine there are three blades. Each blade has an area of 2 square metres (m²). A wind causes a pressure difference of 24 000 pascals. Calculate the resulting force acting on the wind turbine.

Write down the equation you are going to use. Then clearly show how you get to your answer.

[4]

(g) Some of the energy from the Sun becomes the energy of a wind on Earth. Explain how this energy is transferred. (6 marks)

[6]