

Student Worksheet – Related Past Exam Questions

1 An eco-house is designed to be environmentally friendly.

Figure 1 shows a picture of an eco-house.

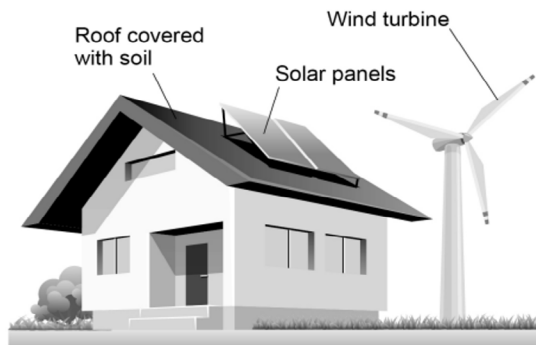


Figure 1

2 The solar panels and a wind turbine are used to generate electricity for the eco-house.

Solar and wind are both renewable energy resources.

What does renewable energy resource mean?

Tick (✓) one box.

[1 mark]

It can be replenished as it is used.

It is unreliable.

It has no fuel costs.

It produces no greenhouse gases.

- 3** Biomass, nuclear and natural gas are three other energy resources.
Complete the table to show whether each energy resource is renewable or non-renewable.
Tick (✓) **one** box for each energy resource.

[2 marks]

Energy resource	Renewable	Non-renewable
Biomass		
Nuclear		
Natural gas		

- 4** Moving air makes the wind turbine spin.
The wind turbine generates electricity which is used to charge a battery.
Complete the sentences.

Choose answers from the box.

[2 marks]

chemical	electrical	gravitational	kinetic
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When the wind turbine spins faster there is an increase in its _____ energy.

Charging the battery increases the _____ store of energy of the battery.

5 There are many different energy resources.
Which two energy resources are renewable?
Tick **two** boxes.

[2 marks]

Biofuel

Geothermal

Coal

Nuclear fuel

Gas

6 Some non-renewable energy resources are more reliable than others.
Which statement correctly describes a reliable resource?
Tick **one** box.

[1 mark]

It does not burn fuel.

It will never run out.

It is predictable.

It is cheap to use.

7 **Figure 2** shows a wind farm.

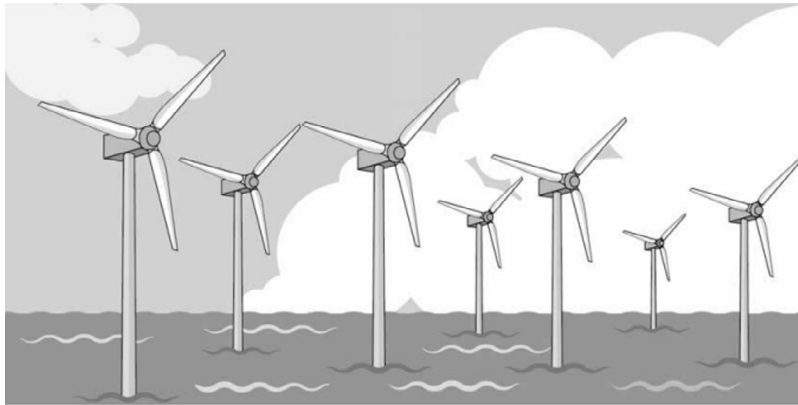


Figure 2

The total power output of the wind farm is 19.6 MW

All of the wind turbines have the same power output.

What is the power output of one wind turbine?

Tick **one** box.

[1 mark]

2.7 MW

2.8 MW

2.9 MW

3.2 MW

3.3 MW

8 Give **two** reasons why people might **not** like having wind turbines near their homes.

[2 marks]

1

2

9 **Figure 3** shows the electricity generated by different energy resources in the UK. The total amount of electricity generated was the same in 2014 and in 2015.

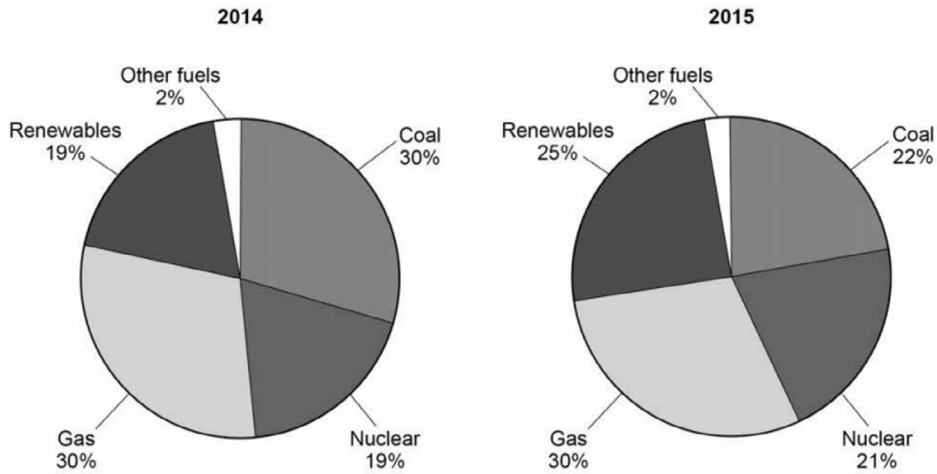


Figure 3

There are changes in the amounts of different energy resources used between 2014 and 2015.

Explain the environmental impacts of the changes.

[4 marks]

10 **Figure 4** shows a large wind farm off the coast of the UK.



Figure 4

The mean power output of the wind farm is 696 MW, which is enough power for 580 000 homes.

Calculate the mean power needed for 1 home.

Give your answer in watts.

[2 marks]

Mean power needed for 1 home = W

- 11** On one day the demand for electricity in the UK was 34000 MW.
Suggest **two** reasons why wind power was not able to meet this demand. **[2 marks]**

1

2

- 12** Some of the energy from the wind used to rotate a wind turbine is wasted.
An engineer oils the mechanical parts of a wind turbine.
Explain how oiling would affect the efficiency of the wind turbine. **[3 marks]**

- 13** In most homes in the UK there are many different electrical devices.
Explain why people should be encouraged to use energy efficient electrical devices. **[2 marks]**

14 **Figure 5** shows how electricity is supplied to consumers.

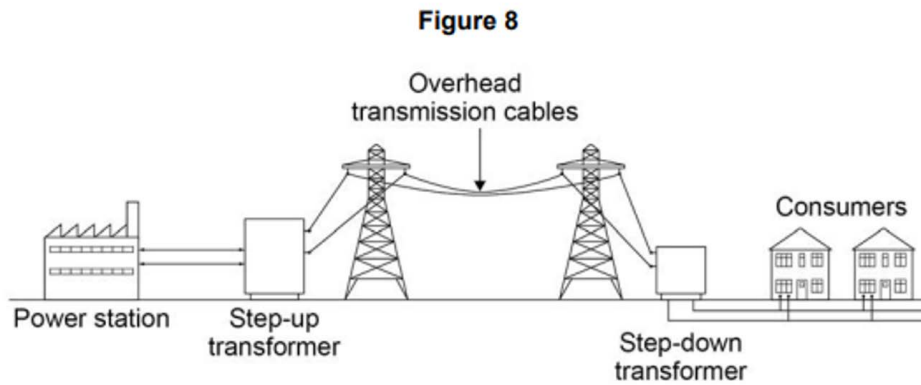


Figure 5

Electricity from the power station can be generated using renewable or non-renewable energy resources.

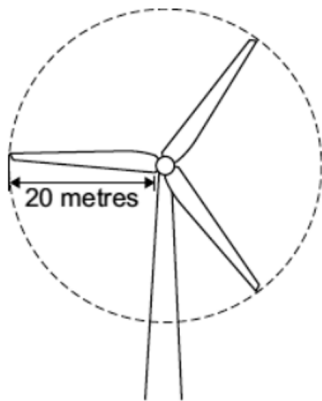
Complete the table to show which energy resources are renewable and which are non-renewable.

Tick **one** box in each row.

[2 marks]

Energy resource	Renewable	Non-renewable
Biofuel		
Coal		
Nuclear		
Tides		

15 The diagram shows a wind turbine.



The blades of the turbine are 20 metres long. On average, 15 000 kg of air, moving at a speed of 12 m/s, hit the blades every second.

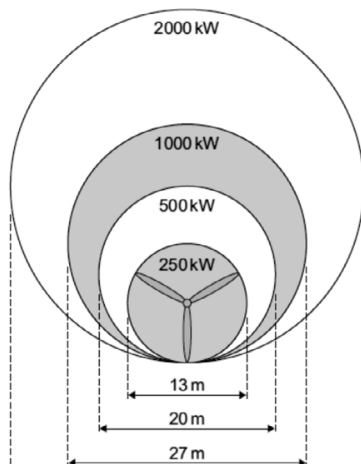
Calculate the kinetic energy of the air hitting the blades every second.

Show clearly how you work out your answer.

[2 marks]

Kinetic energy = J

16 Part of the kinetic energy of the wind is transformed into electrical energy.



The diagram shows that, for the same wind speed, the power output of a turbine, in kilowatts, depends on the length of the turbine blades.

Give a reason why doubling the diameter of the blades more than doubles the power output of a turbine.

[1 mark]