GEO.KS37 Impacts of Energy Insecurity and Strategies to Increase Supply

Total Marks

AQA 8035 · Calculators not allowed · about 40 minutes

Name: _____ Date: ____ / ____ / _____

Answer in full sentences for questions worth 3 marks or more. Allow about 40 minutes for the whole pack.

1 Describe one impact of rising domestic energy bills on a UK household in winter.

(Total for Question 1 is 1 mark)

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2 Explain how energy insecurity can increase costs for food production on farms in the UK, giving two linked points.

(Total for Question 2 is 2 marks)

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3 Compare two environmental concerns associated with extracting fossil fuels from increasingly difficult or sensitive areas, naming the type of impact and an example for each, and state one clear comparison.

(Total for Question 3 is 3 marks)

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4 Describe briefly how carbon capture works as a strategy to reduce emissions from fossil fuel power stations, mentioning capture and storage or use.

(Total for Question 4 is 2 marks)

5 Give two reasons why some countries explore for oil and gas in arctic or deep-sea locations despite environmental risks, naming one economic and one security reason.

(Total for Question 5 is 2 marks)

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6 Explain TWO ways that rising wholesale energy prices can have knock-on effects on UK industry and international trade.

(Total for Question 6 is 3 marks)

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7 Explain how the potential for international conflict over energy supply could arise, using at least two linked factors such as geopolitics, transit routes and resource scarcity.

(Total for Question 7 is 3 marks)

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8 Describe one difference between renewable and non-renewable energy sources, referring to availability or emissions.

(Total for Question 8 is 2 marks)

9 Compare the advantages and disadvantages of renewable and non-renewable energy sources. Refer to environmental, economic and reliability factors where relevant.

Compare the advantages and disadvantages of renewable and non-renewable energy sources.

(Total for Question 9 is 6 marks)

Mark scheme · GEO.KS37 Impacts of Energy Insecurity and Strategies to Increase Supply

Question 1

- **B1** e.g. household cuts heating, leading to colder rooms and possible health problems for vulnerable people, oe
- **Answer: A household may cut back on heating to save money, leaving rooms colder and increasing health risks for elderly or young people.**

Question 2

- **B1** energy is needed for heating greenhouses, running machinery and refrigeration, oe
- **B1** if energy prices rise, farm production costs increase and food prices may rise, oe
- **Answer: Farms use energy for heating greenhouses, machinery and refrigeration; when energy prices rise production costs increase, which can push up food prices.**

Question 3

- **B1** concern 1 with example, e.g. oil spills from offshore drilling can pollute coastlines and harm marine life, oe
- **B1** concern 2 with example, e.g. deep coal or tar sands extraction can destroy peatland habitats and release stored carbon, oe
- **B1** a clear comparative phrase showing difference or similarity, e.g. both damage habitats but one mainly affects marine ecosystems while the other releases large amounts of stored carbon on land, oe
- **Answer: Offshore oil drilling risks spills that pollute coastlines and harm marine life, while extracting coal from peat or tar sands destroys terrestrial habitats and releases stored carbon; both damage ecosystems but in different environments and with different long-term carbon impacts.**

Question 4

- **B1** carbon dioxide is captured from flue gases at the power station or industrial plant, oe
- **B1** the CO2 is then transported and stored underground or used in industry so it does not enter the atmosphere, oe
- **Answer: CO2 is captured from flue gases at the power station, then transported and stored underground or used commercially, so it does not enter the atmosphere.**

Question 5

- **B1** economic reason, e.g. the potential for large revenue from selling fuel and creating jobs, oe
- **B1** security reason, e.g. to increase domestic energy security and reduce reliance on imports, oe
- **Answer: Economic: the potential for large revenue from selling fuel and creating jobs. Security: to increase domestic energy security and reduce reliance on imports.**

Question 6

- **B1** way 1, e.g. higher production costs for energy-intensive industries such as steel or chemicals, oe
- **B1** linked detail for way 1, e.g. this can make UK products more expensive, reducing competitiveness abroad, oe
- **B1** way 2, e.g. higher transport and input costs can increase the price of exported goods, or cause firms to relocate production to countries with cheaper energy, oe
- **Answer: Higher wholesale prices raise production costs for energy-intensive industries like steel and chemicals, making UK products more expensive and less competitive; they also raise transport and input costs, which can increase export prices or encourage companies to move production to countries with cheaper energy.**

Question 7

- **B1** factor 1, e.g. competition for scarce resources in regions with oil or gas, oe
- **B1** linked factor, e.g. control of transit routes or pipelines can give strategic advantage and lead to disputes between states, oe
- **B1** linked detail showing how these combine to increase conflict risk, e.g. sanctions or blockades may be used to restrict rivals' supplies, raising tensions, oe
- **Answer: Competition for scarce oil and gas resources can increase tensions between states; control of transit routes or pipelines gives strategic advantage and can cause disputes, and combined measures such as sanctions or blockades to restrict supplies can escalate tensions towards conflict.**

Question 8

- **B1** point 1, e.g. renewables are naturally replenished (wind, solar), whereas non-renewables are finite (coal, oil, gas), oe
- **B1** linked detail, e.g. non-renewables release greenhouse gases when burned while many renewables produce little or no direct CO2 emissions, oe
- **Answer: Renewable sources are naturally replenished, such as wind and solar, while non-renewable sources like coal and oil are finite; non-renewables release greenhouse gases when burned, whereas many renewables produce little or no direct CO2 emissions.**

Question 9

- **Level 1** (1-2): Simple statements about advantages or disadvantages of renewable or non-renewable sources with little detail or comparison, showing limited understanding.
- **Level 2** (3-4): Clear comparison that includes at least two advantages and two disadvantages across the two types, with some development, covering environmental, economic or reliability factors.
- **Level 3** (5-6): Detailed, balanced comparison that evaluates environmental, economic and reliability aspects of both renewable and non-renewable energy, including specific examples and a reasoned concluding comment on their relative strengths or trade-offs.
- **Indicative content:**
  - Advantages of renewables: low direct CO2 emissions during operation, sustainable supply, lower air pollution, and potential for local job creation in deployment and maintenance.
  - Disadvantages of renewables: variable output (intermittency) from wind and solar, need for storage or backup, and sometimes high upfront costs or land use impacts.
  - Advantages of non-renewables: currently reliable base-load power, established infrastructure and often lower short-term costs per unit of energy for some industries.
  - Disadvantages of non-renewables: finite resources leading to long-term supply limits, high CO2 and pollutant emissions, environmental damage from extraction and potential for price volatility.
  - Economic trade-offs: renewables can reduce fuel import bills and create green jobs but require investment in grids and storage; non-renewables can be cheaper short term but risk future supply shocks and environmental costs.
  - A strong answer may conclude that a mix of both is often used while transitioning, or evaluate which is preferable depending on priorities such as decarbonisation, reliability or short-term cost.