



**General Certificate of Education (A-level)
January 2013**

Geography

GEO4B

(Specification 2030)

Unit 4B: Geographical Issue Evaluation

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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General Guidance for GCE Geography Assistant Examiners

The mark scheme for this unit includes an overall assessment of quality of written communication. There are no discrete marks for the assessment of written communication but where questions are "Levels" marked, written communication will be assessed as one of the criteria within each level.

- Level 1:** Language is basic, descriptions and explanations are over simplified and lack clarity.
- Level 2:** Generally accurate use of language; descriptions and explanations can be easily followed, but are not clearly expressed throughout.
- Level 3:** Accurate and appropriate use of language; descriptions and explanations are expressed with clarity throughout.

Marking – the philosophy

Marking is positive and not negative.

Mark schemes – layout and style

The mark scheme for each question will have the following format:

- a) Notes for answers (nfa) – exemplars of the material that might be offered by candidates
- b) Mark scheme containing advice on the awarding of credit and levels indicators.

Point marking and Levels marking

- a) Questions with a mark range of 1-4 marks will be point marked.
- b) Levels will be used for all questions with a tariff of 5 marks and over.
- c) Two levels only for questions with a tariff of 5 to 8 marks.
- d) Three levels to be used for questions of 9 to 15 marks.

Levels Marking – General Criteria

Everyone involved in the levels marking process (examiners, teachers, students) should understand the criteria for moving from one level to the next – the “triggers”. The following general criteria are designed to assist all involved in determining into which band the quality of response should be placed. It is anticipated that candidates’ performances under the various elements will be broadly inter-related. Further development of these principles will be discussed during the standardisation process. In broad terms the levels will operate as follows:

Level 1: attempts the question to some extent (basic)

An answer at this level is likely to:

- display a basic understanding of the topic
- make one or two points without support of appropriate exemplification or application of principle
- give a basic list of characteristics, reasons and attitudes
- provide a basic account of a case study, or provide no case study evidence
- give a response to one command of a question where two (or more) commands are stated e.g. “describe and suggest reasons”
- demonstrate a simplistic style of writing perhaps lacking close relation to the terms of the question and unlikely to communicate complexity of subject matter
- lack organisation, relevance and specialist vocabulary
- demonstrate deficiencies in legibility, spelling, grammar and punctuation which detract from the clarity of meaning.

Level 2: answers the question (well/clearly)

An answer at this level is likely to:

- display a clear understanding of the topic
- make one or two points with support of appropriate exemplification and/or application of principle
- give a number of characteristics, reasons, attitudes
- provide clear use of case studies
- give responses to more than one command e.g. “describe and explain..”
- demonstrate a style of writing which matches the requirements of the question and acknowledges the potential complexity of the subject matter
- demonstrate relevance and coherence with appropriate use of specialist vocabulary
- demonstrate legibility of text, and qualities of spelling, grammar and punctuation which do not detract from the clarity of meaning.

Level 3: answers the question very well (detailed)

An answer at this level is likely to:

- display a detailed understanding of the topic
- make several points with support of appropriate exemplification and/or application of principle
- give a wide range of characteristics, reasons, attitudes
- provide detailed accounts of a range of case studies
- respond well to more than one command
- demonstrate evidence of discussion, evaluation, assessment and synthesis depending on the requirements of the assessment
- demonstrate a sophisticated style of writing incorporating measured and qualified explanation and comment as required by the question and reflecting awareness of the complexity of subject matter and incompleteness/ tentativeness of explanation
- demonstrate a clear sense of purpose so that the responses are seen to closely relate to the requirements of the question with confident use of specialist vocabulary
- demonstrate legibility of text, and qualities of spelling, grammar and punctuation which contribute to complete clarity of meaning.

Mechanics of marking

- Various codes may be used such as: 'rep' (repeated material), 'va' (vague), 'NAQ' (not answering question), 'seen', etc.
- Unless indicated otherwise, always mark text before marking maps and diagrams. Do not give double credit for the same point in text and diagrams.

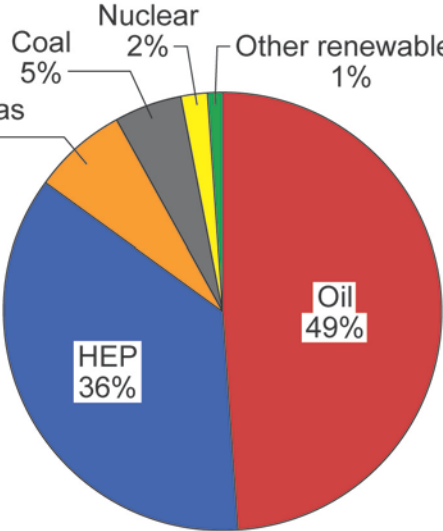
Annotation of Scripts

It is most important that examiners mark clearly, according to the procedures set out below.

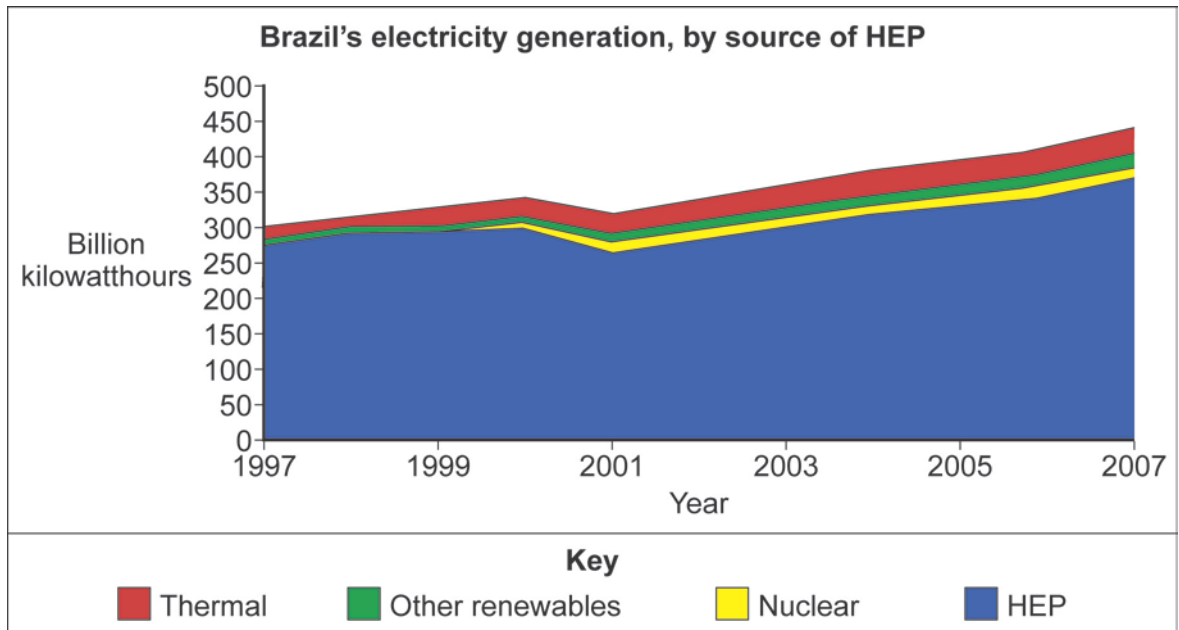
- The right hand margin should be used for marks only.
- Where an answer is marked using a levels response scheme, the examiner should annotate the scripts with 'L1', 'L2', or 'L3' at the point where that level has been reached in the left hand margin. At each point where the answer reaches that level, the appropriate levels indicator should be given. In addition, examiners may want to indicate strong material by annotating the script as "Good Level... ". Further commentary may also be given at the end of the answer. Where an answer fails to achieve Level 1, zero marks should be given.
- Where answers do not require levels of response marking, the script should be annotated to show that one tick equals one mark. The tick should be positioned in the part of the answer which is thought to be creditworthy. For point marked question where no creditworthy points are made, zero marks should be given.

Other mechanics of marking

- All errors and contradictions should be underlined.
 - Various codes may be used such as: 'rep' (repeated material), 'va' (vague), 'NAQ' (not answering question), 'seen', etc.
 - Use a wavy line to indicate weak dubious material (avoiding crossing out).
- Unless indicated otherwise, always mark text before marking maps and diagrams. Do not give double credit for the same point in text and diagrams.

<p>1</p> <p>AO3 – 12</p>	<p>Notes for answers</p> <p>These are the answers given in the EIA document and they are well suited for purpose.</p> <div data-bbox="368 394 1152 1010"><p>Total energy consumption in Brazil, by type (2006)</p><table border="1"><thead><tr><th>Energy Type</th><th>Percentage</th></tr></thead><tbody><tr><td>Oil</td><td>49%</td></tr><tr><td>HEP</td><td>36%</td></tr><tr><td>Natural gas</td><td>7%</td></tr><tr><td>Coal</td><td>5%</td></tr><tr><td>Nuclear</td><td>2%</td></tr><tr><td>Other renewables</td><td>1%</td></tr></tbody></table></div> <p>As the figures are shown in percentages and add up to 100 this is a very suitable technique. It is easy to show the relative proportions and it is visually pleasing. A pie chart is not easy to read accurately without a protractor, but when the percentages are added next to each segment, as here, this problem is overcome.</p> <p>A divided bar would also be useful. It would show proportion clearly. A standard bar graph would show amounts more clearly but proportions would not be so clear.</p> <p>No other technique would be as useful.</p>	Energy Type	Percentage	Oil	49%	HEP	36%	Natural gas	7%	Coal	5%	Nuclear	2%	Other renewables	1%	<p>(12 marks)</p>
Energy Type	Percentage															
Oil	49%															
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Nuclear	2%															
Other renewables	1%															

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(cont'd)



This shows the changing proportions over time. It is suitable because it shows running totals over a period. The compound nature allows the total energy generation to be seen clearly although it does make it more difficult to read the totals by source.

Separate line graphs for each source would also be valid, showing each source more clearly but not showing the total so well.

Compound bars for each year would be good, but would not allow interpolations to be made so easily.

No other technique would be as useful.

Give credit for diagrams when they develop beyond the text. They need not to be accurate but realistic.

Allow credit for sensible discussion of alternatives.

Candidates can gain credit for referring to use of a computer but this alone is basic – L1.

References to “putting data in a spreadsheet” etc., are clear – L2.

Annotate description with D and justification with J.

	<p>Mark scheme</p> <p>Assess the answer as a whole. The work on Figure P6 may carry more weight than Figure P3 because it deals with more complex data.</p> <p>Level 1 (1-5 marks) (mid-point 3) A technique is named and described in a basic way. If one sensible technique is named and described or named and justified in a basic way it can gain a maximum of 3 marks.</p> <p>If one sensible technique is described and justified in a basic way it can reach the top of the level – 5 marks.</p> <p>Basic justifications include points like:</p> <ul style="list-style-type: none">• easy to read• easy to draw• allow comparison between different sources. <p>Level 2 (6-10 marks) (mid-point 8) If one technique is described clearly, with some sensible justification or if it is described with clear justification, it can gain up to 8 marks.</p> <p>Clear justifications include points like:</p> <ul style="list-style-type: none">• easy to read because the angle of each segment is proportional to the total represented by that segment• easy to draw because all the data add up to 100% (pie chart)• allow both proportion and its change over time to be seen (compound line graph). <p>If both techniques are described and justified clearly, the mark can reach the top of the level.</p> <p>Allow credit when reasons for choosing one technique rather than another that would not have been quite as suitable.</p> <p>Level 3 (11-12 marks) Both techniques are described and justified thoroughly.</p> <p>The answer shows real geographical understanding.</p>	
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<p>2</p> <p>AO1 – 3 AO2 – 8 AO3 – 5</p>	<p>Notes for answers</p> <p>In the west of the country there are steep slopes from the Andes which can give a good head of water, but streams are not large here. Rainfall is high and reliable on the east facing slopes but catchment areas are comparatively small.</p> <p>However, in the rest of Amazonia, rainfall is very high and reliable. Over 1000mm falls from November - April and over 500mm falls from May – October. Catchment areas are large and, although slopes are not steep, dams can produce good heads of water for generation.</p> <p>In the south, rainfall is mostly over 1000mm p.a. and there are some good catchment areas. A number of schemes have been built here, including the Itaipu dam, the second biggest in the world.</p> <p>The north-east region has less reliable rainfall, especially from May – October but the catchment of the Sao Francisco is large, flowing into the dry Northeast from areas with higher rainfall which lie to the south, and the river has a comparatively steep gradient from the edge of the Brazilian plateau.</p> <p>It is the north-east which has the best conditions for the generation of solar power. The low rainfall indicates an absence of clouds and the region's proximity to the equator means that the sun will be overhead, or nearly so, for most of the year. This will concentrate the sun's rays and produce excellent conditions for generation of solar power.</p> <p>Most of the rest of the country has high temperatures but the high rainfall means high cloud cover which is not ideal for solar power, particularly not that which uses the heat of the sun to heat water and power turbines. However, it does not completely rule out the possibility of developing power with photo-voltaic cells – but this would need to be on a comparatively small scale.</p> <p>The south-east region has the best conditions for wind power generation with a steep scarp slope facing the sea and with reliable onshore winds blowing in towards the low pressure air region over Amazonia. The north-east coast also has fairly reliable onshore winds with a plateau close to the coast and directly in the path of the winds.</p> <p>Generation of electricity by HEP, solar, biomass or wind power can be seen as being more sustainable than use of finite resources such as coal, petroleum or natural gas. However, HEP can be seen as less sustainable because it uses land that was previously forested – so a carbon store – or farmed to produce food. Biomass can also be criticised as it also uses up land that could be used for food growing – and it can also use large amounts of finite resources as fuel for machinery or as agro-chemicals.</p> <p>Discussion can move on to a wider view of the role of renewables in the overall energy mix of the country: or to renewables and readiness for climate change.</p>	<p>(15 marks)</p>
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	<p>Mark scheme</p> <p>Level 1 (1-6 marks) (mid-point 4) Some relevant points are made but these are basic and do not show any developed understanding of the needs of the chosen means of generating power and the links between this form of power and the physical geography and climate of Brazil.</p> <p>Level 2 (7-12 marks) (mid-point 10) The needs of at least one form of generation are described clearly and there are some clear links to the climate and physical geography of the country. Clear discussion of the role of renewables in the whole energy mix is linked to physical geography.</p> <p>Level 3 (13-15 marks) (mid-point 14) The answer is thorough. A good geographical understanding is shown and the answer is synoptic with detailed links being made between physical factors and the potential for at least two kinds of generation. Detailed discussion of renewables in the energy mix is well linked to physical geography.</p>	
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<p>3</p> <p>AO1 – 2</p> <p>AO2 – 8</p> <p>AO3 – 5</p>	<p>Notes for answers</p> <p>People and groups expressing viewpoints could include:</p> <ul style="list-style-type: none"> • Local tribes such as the Kayapo who would: <ul style="list-style-type: none"> (i) lose their land, (ii) suffer a reduction of fishing resources from the river, (iii) lose autonomy and culture by being exposed to outside influences more than ever before etc. • Local farmers who might: <ul style="list-style-type: none"> (i) lose land (ii) lose irrigation water from the river (iii) have to move homes because of flooding etc. • Environmentalists who would object to: <ul style="list-style-type: none"> (i) damage to the ecosystem (ii) loss of plant and animal species that are only found in this area (iii) loss of forest leading to increased concentration of CO₂ in the atmosphere (iv) flooding of forests causing release of methane (v) changes to rainfall patterns (vi) a health risk – increased likelihood of malaria etc. • TNCs in bio-technology who might object to: <ul style="list-style-type: none"> (i) potential loss of sources of medicines in local vegetation (ii) potential loss of gene pool for plant breeding etc. <p>Viewpoints/issues could be opposed to the dam construction, the construction of the power station, the diversion of the river, the need for more dams upstream, the construction of infrastructure to build and maintain the dams and to export the power, the encouragement of further development of mining and industry and also, possibly, of large scale commercial agriculture, migration, malaria, impact on Almeira and so on.</p>	<p><i>(15 marks)</i></p>
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	<p>Mark scheme</p> <p>Level 1 (1-6 marks) (mid-point 4) At least one relevant issue/viewpoint is given and there is some basic consideration of the reasons for objections.</p> <p>Ideas are not developed in a clear geographical context, linked to this particular area.</p> <p>The answer may be vague with no precise factual support for opinions. The answer may consist largely of material lifted from the AIB with little development of the candidate's own ideas.</p> <p>Level 2 (7-12 marks) (mid-point 10) At least two issues/viewpoints are given with clear discussions of the reasons to object to the project. At least some of the objections are specific to the particular groups and not just generic objections.</p> <p>The answer shows a sense of place with clear, specific reference to the nature of the geography, ecosystem, economy, culture, etc., of this area.</p> <p>Opinions are supported with clear factual detail, in some places at least. The candidate shows evidence of his or her own thoughts and ideas and/or factual research in the answer.</p> <p>Level 3 (13-15) (mid-point 14) At least three issues/viewpoints are given with detailed discussions of the reasons to object to the project. Some of the objections are specific to the particular groups and not just generic objections.</p> <p>The answer shows a sense of place with precise, subtle references to the nature of the geography, ecosystem, economy, culture, etc., of this area.</p> <p>Opinions are supported with clear factual detail throughout. The candidate shows evidence of his or her own synoptic thoughts and ideas and research in the answer. The candidate shows ability to think like a geographer.</p>	
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<p>4 (a)</p>	<p>Notes for answers</p> <p>Most candidates will use evidence from the AIB but it is essential that they are also given credit for using their own knowledge to help answer this question.</p> <p>Evidence from the AIB includes:</p> <ul style="list-style-type: none"> • growth rate of GDP is 8.8% only one quarter given but that is a high figure and is unlikely to be a complete anomaly • link that to the GDP/capita which lies midway between many MDCs and LDCs, suggesting development • death rate is low at 6.35/thousand; BR is moderate at 18.11/thousand; and these figures are characteristic of countries in early Stage 3 of the DTM, which is often linked with a developing economy • labour force and GDP composition figures suggest a falling emphasis on primary production and employment. Services appear to be quite high and the 25.4% contribution of the secondary sector to GDP suggests expanding industry, compared to Brazil's reliance on primary production a few decades ago • all the information about the expansion of the energy sector reinforces the view of a growing, developing economy • but unemployment is still quite high and the 26% of the population below the poverty line shows that the country still has a long way to go in terms of development and/or income distribution. <p>Awareness that each set of data is taken from a point in time and so cannot, on its own, provide evidence of change, should enhance any answer.</p> <p>Mark scheme</p> <p>Level 1 (1-3 marks) (mid-point 2) Relevant information is presented, often lifted directly from the AIB, with little comment or development.</p> <p>Any attempts to see links between different aspects of the statistics or other data is basic and shows a low level of understanding.</p> <p>Level 2 (4-6 marks) (mid-point 5) Information may be taken from the AIB but is then used and developed by the candidate to make clear geographic points.</p> <p>Relevant links are seen between different aspects of the data.</p>	<p>(6 marks)</p>
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<p>4 (b)</p> <p>AO1 – 3 AO2 – 5 AO3 – 2</p>	<p>Notes for answers</p> <p>Most countries can only develop their economies if energy supplies are available and increasing. The only alternative for Brazil would be to make huge efficiency savings to allow it to develop, and this is unlikely to happen.</p> <p>The AIB and the other resources referenced make it clear that there are many different sources of energy available. Some are more economic than others, whilst some are more sustainable than others. However, candidates will probably consider the strengths and weaknesses of some or all of these sources and then show how they can be combined to given an energy mix that is either economically, or environmentally, sustainable or – better still – sustainable on both counts.</p> <p>Petroleum Very large deposits have been discovered and are being exploited off the southeast coast. These can be used for internal use and also for export, particularly to USA, to bring money into the economy for investment in other areas. However, they are in deep water where it will be expensive and dangerous to drill and exploit the resources. They present an environmental threat in terms of marine pollution and in terms of emissions into the atmosphere. This resource is finite and so not sustainable in the long term.</p> <p>This is important economically for powering Brazil’s transport – although ethanol means that Brazil is less reliant on oil than most countries. In the long term, alternatives must be found even for transport, as petroleum is finite.</p> <p>Natural gas Supplies are available to import from other parts of the continent. Imports from Bolivia are by pipeline, across very difficult terrain, so it might be impractical to increase these imports. Brazil does not have its own large-scale reserves proven, so this might not be a good choice from a strategic point of view. Gas is comparatively cheap at the moment and it is less damaging to the atmosphere and to the land and sea than oil. This resource is finite and so not sustainable in the long term.</p> <p>Bio-fuel/Ethanol Brazil is the world’s biggest producer. There is said to be scope to increase production but this might take land away from food production. Ethanol can be used to power cars. Other kinds of bio-fuel can be used to generate thermal electricity but again this might damage ecosystems, threaten food production and produce atmospheric pollutants.</p> <p>There are arguments over how economically and environmentally sustainable this resource is. It could lead to monocultures in large areas, and this could ultimately lead to soil exhaustion and erosion, or to increasingly expensive needs for artificial fertilisers.</p> <p>Nuclear Brazil developed nuclear power in the last 10 years, but this is still very limited and there is no evidence that it is increasing its contribution to the country’s energy mix.</p> <p>There are serious concerns over the long term viability of nuclear energy, particularly since the Japanese nuclear plant’s tsunami experience. Disposal of waste and closure of old plants has still not been made either cheap or reliably safe in the long term.</p>	<p>(12 marks)</p>
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	<p>Wind/solar There is some potential to develop both of these sources but at present they make up less than 4% of Brazil's total energy mix. Both would need serious investment and incentives from the government if they were to develop on a significant scale.</p> <p>These sources appear to be more sustainable in the long term than most others and probably cause less widespread environmental damage than fossil fuels and nuclear power.</p> <p>HEP The issues have been outlined in the Notes for Q2 and Q3 above.</p> <p>Coal Brazil's resources are not large and the environmental implications of developing coal make it unlikely.</p> <p>Overall There is a wide variety of potential sources of energy. Unfortunately many of these are in the wrong areas of the country and have other drawbacks that might limit their value. However, any ultimate decision depends on the country's and the world's long term political goals as far as energy development goes. These political decisions will be made by balancing economic and environmental needs in both the short and long term. Factors affecting the decisions that Brazil makes might include:</p> <ul style="list-style-type: none">• cost in both short and long term• reliability• strategic considerations – reliability of imports, etc• potential to pollute both locally and with regard to the global scale• pressures from other countries.	
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	<p>Mark scheme</p> <p>Level 1 (1-5 marks) (mid-point 3) There is a basic consideration of strengths and/or weaknesses of at least one source of energy and some suggestions as to how it/they could contribute to the country's energy mix.</p> <p>The answer may well be dominated by statements of fact and unsupported assertion. It may rely largely on material lifted from the AIB and not used or developed.</p> <p>Level 2 (6-10 marks) (mid-point 8) Bottom of Level 2 can be gained by showing how a balanced mix of sustainable energy can be achieved. To reach the middle of the level or higher, there must be links between the energy mix and a sustainable economy. Interrelationships between sources moves the answer up the level.</p> <p>There may be some recognition that it is extremely difficult to combine economic and environmental sustainability. If there is an explicit link to economic sustainability this raises the mark to the top of Level 2.</p> <p>The candidate may make use of research and develop his/her own ideas beyond what is provided in the AIB.</p> <p>Discussions of spatial variations across the country, or of short term v long term considerations, or of local v. global concerns are often indicators of answers reaching at least Level 2.</p> <p>A clear attempt is made to reach an overall conclusion supported by evidence and argument.</p> <p>Level 3 (11-12 marks) (mid-point 8) There are detailed links between full energy mix and a sustainable economy.</p> <p>The answer is well-structured and argued, drawing on a range of different sources and reaching a clear, well-argued conclusion.</p> <p>The candidate writes in a synoptic way and is able to think like a geographer.</p>	
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