

Topic 6 Resource management - energy

Component	Key idea	Detailed Content	Core Knowledge & Understanding	Keywords	Skills	Icons
Natural resources	A natural resource is any feature or part of the environment that can be used to meet human needs.	Natural resources can be defined and classified in different ways (biotic, abiotic, renewable and non-renewable)	<p>Biotic (living) – obtained from the biosphere – capable of reproduction (e.g. animals and plants)</p> <p>Abiotic (non-living) – obtained from the lithosphere, atmosphere and hydrosphere (e.g. soil, sunlight and water)</p> <p>Non-renewable – takes millions of years to form and cannot be 'remade' (e.g. coal, oil and gas)</p> <p>Renewable resources – can be naturally replenished and last forever (e.g. wind, solar and hydro-electric power).</p>	<p>Biotic</p> <p>Abiotic</p> <p>Non-renewable</p> <p>Renewable</p> <p>Lithosphere</p> <p>Biosphere</p> <p>Atmosphere</p> <p>Hydrosphere</p> <p>Replenished</p>		
		Ways in which people exploit environments in order to obtain water, food and energy (extraction of fossil fuels, fishing, farming and deforestation)	<p>Deforestation – threatens biodiversity and causes soil erosion. Palm oil plantations destroy habitats such as those in the Amazon</p> <p>Overfishing – fishing provides a source of protein and jobs, but cod numbers have fallen in the North Sea</p> <p>Oil extraction – toxic water pollutes rivers that indigenous peoples rely on for washing, cooking and fishing</p> <p>Farming – intensive farming reduces biodiversity</p>	<p>Deforestation</p> <p>Overfishing</p> <p>Oil extraction</p> <p>Farming</p> <p>Plantations</p> <p>Habitats</p> <p>Intensive</p>		
		How environments are changed by this exploitation (reduced biodiversity, soil erosion and reduced water and air quality).	<p>Reduced biodiversity - through deforestation, building of roads for transportation of resources, air and water quality reduction</p> <p>Soil erosion - caused by flooding, drought and wind erosion due to a lack of forest cover</p> <p>Water and air quality reduction - a result of increased use of chemicals in farming, construction and manufacturing, increased extraction of water supply and pollution from chemicals, increased emissions of greenhouse gases reducing air quality</p>	<p>Biodiversity</p> <p>Soil erosion</p> <p>Flooding</p> <p>Drought</p> <p>Wind erosion</p> <p>Extraction</p>		
	The patterns of the distribution and consumption of natural resources varies on a global and a national scale	Global and UK variety and distribution of natural resources (soil and agriculture, forestry, fossil fuels, water supply, rock and minerals).	Natural resources are not evenly distributed. Fossil fuels like coal are found in sedimentary rock regions such as the USA and Canada. Gold is often found in past tectonically active areas such as Australia. South America has huge reserves of copper along with South Africa In the UK, high precipitation in the north and west along with upland areas mean that hill sheep farming is common. Warm summers and flatter land, along with fertile soils, make East Anglia perfect for arable farming. Oil and gas are extracted from the North Sea.	<p>Distribution</p> <p>Tectonics</p> <p>Precipitation</p> <p>Fertile</p>	Use and interpretation of UK and world maps showing the distribution of resources	
Global patterns of usage and consumption of food, energy and water		Usage and consumption are not evenly distributed around the world. Energy usage - higher in more developed countries, is rising in China and India, and is low in less developed countries. Food consumption - higher in wealthy countries like the USA and low in many African countries. Water usage – water consumption is greater in more developed countries and lower in less developed countries	<p>Usage</p> <p>Consumption</p>	Using different choropleth maps and data visualisations such as Gapminder.		

Topic 6 Resource management - energy

Component	Key idea	Detailed Content	Core Knowledge & Understanding	Keywords	Skills	Icons
Energy resources	Renewable and non-renewable energy resources can be developed	Energy resources can be classified as renewable and non-renewable	<p>Non-renewable – takes millions of years to form and cannot be 'remade' (e.g. coal, oil and gas)</p> <p>Renewable resources – can be naturally replenished and last forever (e.g. wind, solar and hydro-electric power).</p>	Non-renewable Coal Oil Gas Renewable Wind Solar Tidal Hydroelectric (HEP) Geothermal Biomass Solar Long-term sustainable energy Nuclear		
		Advantages and disadvantages of the production and development of one non-renewable energy resource	<p>Non-renewable (coal): Coal is a sedimentary rock formed when dead plant matter decays into peat and is converted into coal by the heat and pressure of deep burial over millions of years. Coal is extracted through both deep and surface mining and is often used through burning to heat water to spin a turbine to generate electricity</p> <p>Advantages - still large quantities available in over 70 countries, technically easy to extract and relatively cheap, used around the world, efficient and generates large amounts of electricity</p> <p>Disadvantages - burning coal releases harmful greenhouse gases, causing air pollution and increasing climate change through global warming, mining coal is dangerous and open-cast mining can have huge impacts on wildlife habitats</p>	Sedimentary Turbine Greenhouse gases Climate change Global warming Open-cast Mining		
		Advantages and disadvantages of the production and development of one renewable energy resource	<p>Renewable (wind): Wind turbines convert air movements into electricity. In the UK wind speeds are consistent and so this is a good way to generate electricity. The UK generates more wind energy using turbines on the land (onshore). As an island nation, the UK could build more turbines in the sea (offshore) though these are more expensive than onshore turbines.</p> <p>Advantages - clean fuel that does not pollute or emit greenhouse gases, low priced energy, can be built on agricultural land providing income for landowner and new technology means they are more efficient and make less noise</p> <p>Disadvantages - aesthetically unpleasant, energy only produced when it is windy, cannot store the energy for calm days and offshore wind farms need expensive transmission lines to connect to mainland</p>	Offshore Onshore Aesthetics		

Topic 6 Resource management - energy

Component	Key idea	Detailed Content	Core Knowledge & Understanding	Keywords	Skills	Icons
UK's energy resources	To meet demand, countries use energy resources in different proportions. This is called the energy mix	The composition of the UK's energy mix	The UK uses different energy resources called the 'energy mix' to meet demand. This includes coal, oil, gas, bioenergy and renewables. Fossil fuel consumption is decreasing, and renewables are on the increase.	Energy mix	Use and interpretation of UK and world maps showing the distribution of resources	
		How global variations in the energy mix are dependent on a number of factors: population, wealth and the availability of energy resources	Global variations in the energy mix are dependent on several factors: Population – China has a huge population and therefore relies on the energy mix whereas Iceland has a small population using hydroelectricity and geothermal energy. Some parts of the world are experiencing rapid population growth. Wealth – the USA can afford to invest in a range of energy types whereas poorer countries cannot afford renewable energy types. Availability – Iceland has a high percentage of geothermal energy in its energy mix due to its location. Other countries must import coal and oil.	Population Wealth Availability Reliability		
Energy resource development	There is increasing demand for energy that is being met by renewable and non-renewable resources	How and why global demand and supply has changed over the past 100 years due to human intervention: world population, growth increased wealth and technological advances	There are three key reasons why demand and supply have changed in the past 100 years. Rapid population growth (e.g. Brazil and China). Rising wealth – people are more able to afford goods that require fuel e.g. cars. Advances in technology – more electrical goods (e.g. mobile phones), more efficient renewable energy and new energy sources.	Supply Demand	Use and interpretation of line graphs showing the range of future global population projections, and population in relation to likely available energy resources	
		How non-renewable energy resources (coal, oil, natural gas and uranium) are being developed and how this can have both positive and negative impacts on people and the environment	People: Coal – mining is dangerous and can cause subsidence Oil – creates jobs but chemicals harmful to people Natural gas – safer than coal and oil Uranium – expensive and risk of exposure to radiation Environment: Coal – causes air and water pollution Oil – land clearance and spills pollute groundwater Natural gas – fewer emissions but contributes to global warming Uranium – produces less CO ₂ but waste is highly radioactive.	Radioactive		
		How renewable energy resources (hydro-electric power (HEP), wind power and solar power) are being developed and how this can have both positive and negative impacts on people and the environment	People: Hydroelectric power (HEP) – provides jobs and encourages tourism but can displace people during construction. Wind power – wind farms can power homes, but they look ugly Solar power – government investment in solar power is creating jobs but they require large amounts of land (farmland) Environmental: Hydroelectric power (HEP) - non-polluting, but deforestation often takes place during construction. Wind power - do not produce CO ₂ but they affect bird migration. Solar power - construction uses toxic metals that can harm the environment			
		How technology (fracking) can resolve energy resource shortages.	The development of fracking using new technology could provide the UK with shale gas, reducing the need to import natural gas. Water mixed with sand and chemicals are injected into a well which releases shale gas. The chemicals are polluting, and it uses a lot of water	Fracking Shale gas		

Topic 6 Resource management - energy

Component	Key idea	Detailed Content	Core Knowledge & Understanding	Keywords	Skills	Icons
Energy management	Meeting the demands for energy resources can involve interventions by different interest groups	<i>How attitudes to the exploitation and consumption of energy resources vary with different stakeholders (individuals, organisations and governments)</i>	An example is fracking in the UK. Individuals protest against the exploitation of shale gas due to the impacts on the environment. However, the UK government and businesses see fracking as a financial benefit, generating money for industry and services. Environmental pressure groups such as Greenpeace are against the burning of fossil fuels, fracking and nuclear energy, preferring the use of renewables	Exploitation Consumption		
	Management and sustainable use of energy resources are required at a range of spatial scales from local to international	<i>Why renewable and non-renewable energy resources require sustainable management</i>	Sustainable management is ensuring present needs are met without compromising resources in the future. According to scientists, dependency on fossils fuels could have permanent impacts from climate change. Growing populations and rapid economic development must encourage governments to increase the use of renewable energy sources.	Sustainable management	Calculation of carbon and ecological footprints	
		<i>Different views held by individuals, organisations and governments on the management and sustainable use of energy resources</i>	Individuals – more people are using energy efficient products and solar panels, but many people believe they are still too expensive and look ugly. Organisations – businesses see using renewables are good for public relations, but they are expensive for smaller companies. McDonald's reuse cooking oil for their lorries and use LED bulbs in their restaurants. Governments – shared targets by world leaders' and pledges to reduce global warming (UN Climate Change Summit), such as adoption of sustainable transport, bicycle schemes and congestion charges.	NGO's COP26		
		<i>How one developed country and one emerging country or developing country have attempted to manage their energy resources in a sustainable way</i>	Sustainable China: China burns more coal than the USA, Europe and Japan combined, producing 29% of global carbon emissions. Strategies to manage energy resources include: HEP – the Three Gorges Dam. Solar power – the leading solar power producer. Coal restrictions – laws restricting the use of coal. Sustainable Germany: One third of Germany's electricity comes from renewable resources . People are paid for the renewable energy they produce for electricity. Further strategies include: Massive solar parks and offshore wind farms that will reduce CO ₂ emissions further, reducing the impact of global warming. Further reduction in the reliance of foreign gas and oil supplies, increasing their use of renewable energy	Developed Emerging Developing		