Unit 2c
The Challenge of Resource Management

AQA

L1: What are Resources?

Key term	Definition
Resources	Materials that have value for people. They may be needed for basic survival e.g. water, or appreciated as something that improves quality of life e.g. coffee.
Resource management	The control and monitoring of resources so they don't become depleted or exhausted.
Surplus	When there is more of a resource than is needed to meet demand.
Deficit	When there is not enough of a resource to meet demand.

L2: Global inequalities in the supply and consumption of resources

Food

- Average UK calorie consumption is 3200 calories per person per day.
- Average calorie consumption in Mali is 2590 calories per person per day.
- Areas of greatest population growth have highest levels of undernourishment.
- Demand depends on changing diets and increasing population.
- Supply depends on climate, soil and level of technology.

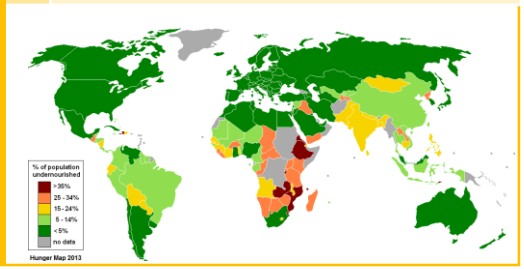
Water

- Fresh water is unequally distributed.
- Water footprint is the amount of water used per day.
- Global average is 1240 litres per day
- Bangladesh is 896 litres per day, USA is 2483 litres per day.
- Water scarcity (where demand is greater than supply) can be physical e.g. reduction in rainfall or economic e.g. lack of money to enable access to water.
- 1 in 5 (more than 1.2 billion people) live in areas of water scarcity.
- 1 in 3 (2.4 billion people) have no access to clean drinking water.

Energy

- The richest 13% of people globally use 50% of the world's energy.
- The poorest 13% of people globally use 4% of the world's energy.
- Countries import and export energy.
- Some countries do not have their own sources of energy.

Distribution of malnourishment



L3: The significance of food, water and energy to economic and social well being

Water food and energy are key for human wellbeing. All lead to social and economic benefits, which all increase the standard of living and quality of life.

Food

- Calories provide energy.
- Availability of food depends on climate, soil and level of technology.
- Malnourishment leads to disease and death. In children it can lead to underperforming at school which decreases economic wellbeing in life. In adults they will be less productive (less able to work).
- Globally more than 1 billion people are malnourished.
- 2 billion are undernourished (poor diet).
- Obesity is an issue in some areas, mainly HICs.

Water

- Used for survival, washing, food production, industry.
- Clean, safe water enables development and allows people to break free from the cycle of poverty.
- Globally 2 billion people drink from contaminated water sources. Over 500,000 people a year die because of diarrhoeal diseases linked to contaminated water supplies.

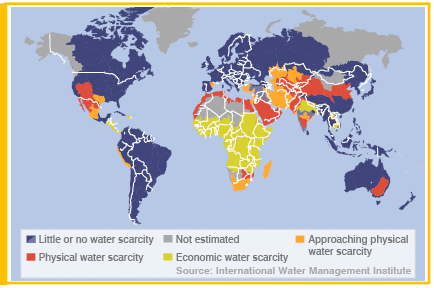
Energy

- Traditionally we get energy from oil, coal and wood.
- Many different sources are generated by changing technology.
- Used for electricity production, heating, transport and for water supply (e.g. wells).
- Supports industrialisation and development.

L4: Changing demand for Energy in the UK creates opportunities and challenges

The changing energy mix	UK Energy mix in 2015 : • Fossil fuels (65%) Coal 31%, Gas 25%, Nuclear 19%, Renewable sources 22%. In 1970 91% from fossil fuels. • The UK has invested in renewable energy e.g. solar energy and subsidies are given by the government.
Decreasing domestic supply of oil, coal and gas.	• Reserves of North Sea oil and gas are declining. • EU regulations on gas emissions has led to a decrease in fossil fuel use. • Energy efficient appliances and industry mean less energy is used in homes and industry.
Economic and environmental issues linked to energy use.	• It is cheaper to import coal into the UK than to mine it. • Nuclear Power Stations are being decommissioned and all current plants will close by 2023 – there are issues of contamination and disposal of nuclear waste. • Economic issues – costs, jobs, set up costs, research, reliability. • Environmental costs – ecosystems, waste, noise, emissions, pollution, radiation leaks.

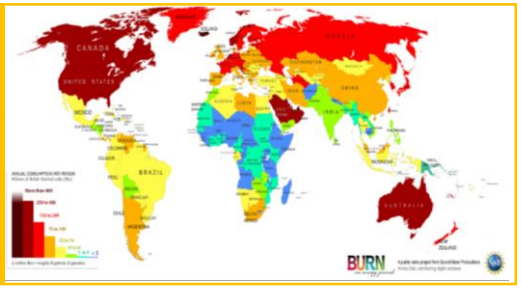
Distribution of water scarcity



L5: Changing demand for food in the UK creates opportunities and challenges

The growing demand for high value food exports from LICs and all year demands for seasonal food and organic produce.	• Food used to be seasonally and locally sourced. Now we eat globally sourced foods all year. • In 2013 47% of UK food was imported. • More disposable income has led to an increased demand for greater quantities and wider choice. • Not all foods can be grown the UK, and some foods can only be grown at certain times e.g. strawberries in July and August. • High quality products are five times the price of similar products e.g. Madagascan vanilla, gourmet coffee. • Positive impacts : Jobs and wages for those in LICs, more tax income leads to a better quality of life. • Negative impacts – less land for locals to farm for themselves, high water use and exposure to chemicals (pesticides and fertilisers). • Organic – no pesticides or fertilisers used. Since the 1990s there has been an increase in demand. Now worth £2 billion a year in the UK.
Larger carbon footprints due to the increased number of food miles travelled.	• Food can be grown more cheaply elsewhere. • Production and transport create a carbon footprint. • 17% of the UK's carbon footprint is due to food. • Tomatoes have less of a carbon footprint being grown in Spain and imported to the UK than if we grew them in the UK where greenhouses would have to be heated. • Annual food miles travelled by UK food imports is 18.8 billion miles. • 68% of food imported to the UK is from within the EU, 32% from the rest of the world. • UK are now encouraging buying local and having an allotment.
A trend towards agribusiness.	• Agribusiness is a farm run as a business with the main aim being profit. • Agribusiness has significant impacts on the environment as they are associated with heavy use of pesticides and fertilizers leading to reduction in wildlife and eutrophication. • East Anglia has a lot of agribusinesses.

Distribution of malnourishment



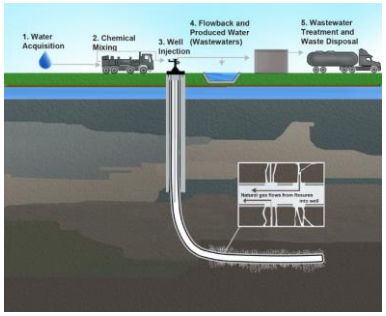
L6: Fracking – Opportunities and Challenges

Opportunities

- Shale gas is readily available in UK.
- Will act as a bridging fuel until alternative technologies are developed.
- Increased cost of fuel makes fracking now affordable.

Challenges

- Contaminated water is pumped back into the ground and can affect water supplies.
- Fracking uses a lot of energy.
- 3% of gas extracted is lost to atmosphere; this is methane, a greenhouse gas.



Energy EO PAPER 2 Unit 2C

M1: Why is energy consumption increasing?

Reason	This Means That…..
Population Increase: Rising population increases the pressure on energy supply.	**Providing energy for a growing population in NEEs and LICs is going to be extremely difficult in the future.**
Economic Development: Wealthy countries use more energy with domestic goods, toilets and industry. However, NEEs will account for 90% of energy demand by 2035.	**Peoples lifestyles changed increasing demand for energy. Increase in fossil fuel consumption has led to an increase in the release of greenhouse gases which has led to the greenhouse effect.**

M2: What factors affect energy supply?

Factor	This means that….
Cost of exploration: Some energy sources are costly to exploit. Oil rigs and pipelines require huge investment. Nuclear power is expensive to maintain.	**Wages count towards the overall cost of energy production. This has led to some resources being unprofitable, eg the UK has coal supplies, but its too expensive to exploit them.**
Physical Factors: The geology of an area determines the location and availability of fossil fuels. Coal is formed when vegetation is laid down over millions of years. Natural gas is trapped in layers of rock. Geothermal energy is produced in areas of tectonic activity	**New supplies of fossil fuels are difficult to find and only in places that have the right geology. Some countries can become very energy secure and can control prices and drive up the cost.**
Technology: Technology advanced have allowed energy sources to be exploited in places like the North Sea and Arctic. Technology has also developed fracking.	**Being able to use tech to extract resources in places such as the Arctic means we must be careful not to over exploit these areas and protect the environments so strict controls are needed**
Climate: The climate can influence wind and solar energy. Tidal power needs a large tidal range. Hydro Electric Power needs a suitable dam.	**Wind turbines and solar panels are becoming more efficient and so these are being used in more countries.**
Political Factors: Political instability and wars in the middle east means that oil consuming countries are looking at alternatives	**War can destroy energy resources or make them difficult to exploit. Corruption can mean that money is spent on things other than energy projects. This can lead to an increase in the cost of energy.**

M3: Why are the impacts of energy insecurity?

Impact	This means that….
Food Production Food production uses 30% of global energy. Energy is used to power farm machinery, and manufacture fertilisers. Agriculture also generates energy – biofuels.	The growth of the biofuel market has also led to crops being grown as a fuel, rather than as food. This can cause food shortages and push food prices up as supply falls lower than demand.
Industry Energy is essential for industry as a source of power and raw material. Some countries suffer power cuts. In Pakistan regular power cuts cost the economy 4% of its GDP. 500 companies have had to close in Pakistan's industrial city of Faisalabad.	When energy is in short supply, it costs more to buy. This makes manufacturing more expensive. Countries that experience energy insecurity usually have a lower industrial output.
Conflict Shortages of energy can lead to conflicts. The gulf and Iraq wars of the 90's and 00's were driven by the wests fear of global oil shortage. Russia controls 25% of the worlds natural gas supplies and can drive up prices.	If one country is too powerful it can mean more countries become energy insecure. Energy insecurity can then lead to even more conflict between countries.

M8 Local Sustainable Energy Scheme

Chambamontera micro-hydro scheme – Rural Peru

- Practical Action helped build a micro hydro scheme.
- High rainfall, steep slopes and fast river ideal place to exploit water power
- Cost was $52,000
- Some investment from Japan but local community pay a lot of the cost. $750 per person. Credit was given to help

The rural community in Peru needs energy as the community relies heavily on energy for subsistence farming. The population survive on $2 a day. It is a very isolated community.

ADVANTAGES:

- Provides renewable energy
- Low maintenance Lasts 25 Years Energy available all year
- Little environmental impact
- healthcare improved as medicine can now be stored in fridges
- Used local labour and materials
- Less risk of fire as no longer burning fuels.

M9: Extracting Natural Gas

Advantages

- Less risk of environmental accidents than oil.
- Employs 1.2 million people
- Easy to transport (pipes / tankers)
- Plentiful in supply
- Cleanest of the fossil fuels – 45% less CO_2 than oil.

Disadvantages

- Dangerous if handled poorly
- Produces CO_2 and methane
- Pipelines are expensive to build and maintain
- Fracking is controversial and lots of water is needed. Chemicals used could contaminate ground water

M4: Non Renewable energy sources

Fossil Fuels	Nuclear Power
Fossil fuels are formed from organic matter millions of years ago. Include COAL / GAS / OIL. Although limited there are still plenty of these resources left. They remain an important fuel despite C02 levels increasing. Carbon capture can reduce the environmental impact.(putting carbon back in ground	Nuclear power stations are expensive to build. However the cost of the raw material uranium is relatively low because small amounts are used. **BUT** nuclear waste disposal is dangerous and takes 1000s of years to become safe. There is also a risk of disasters like Fukushima in Japan in 2011.

M5: Reducing Energy Demand

- Financial incentives
- Raising awareness of the need to save and use energy more efficiency
- Greater use of off peak energy tariffs
- Using less hot water for domestic appliances
- Technical advances in car industry

M6: Resource Security

Key term	Definition
Energy security	The balance between energy supply (production) and demand (consumption) determines the level of energy security.
Energy Surplus	If supply exceeds demand then a country has an energy surplus.
Energy Deficit	If demand exceeds production there is an energy deficit and the country suffers from **energy insecurity**

M7: What strategies can be used to increase energy supply?

Strategy	Problem
Wind- Turbines are turned by the wind to generate power	BUT can look ugly but supply 10% of UKs energy.
Solar – Photovoltaic cells mounted on solar panels convert sunlight into energy.	BUT solar power is seasonal and farms need a lot of space
Geothermal- Damming a river allows water to be stored in a reservoir and controls river flow.	This is a long term solution, but very expensive.
Wave- waves force air into a chamber where it turns a turbine linked to a generator.	BUT costs are high. Portugal built the first wave farm in 2008.
Hydro – large scale dams create enough water to turn turbines to generate electricity	BUT Large dams are expensive they currently supply 85% of the worlds renewables
Tidal – turbines in barrages build across rivers use rising and falling tides to generate electricity.	BUT there are few barrages as high cost.
Biomass- Energy produced from organic matter. -	BUT burning organic matter can create smoky conditions and fuelwood is limited