

Unit 2 People and the Planet topic 10

Consuming resources

1. Resource is a naturally occurring substance (e.g. Water, minerals) which can be used in its own right, or made into something else
2. Renewable resources will never run out and can be used over and over again
3. Sustainable resources meet the needs of people now, without preventing future generations from meeting their own needs.
4. Non renewable/Finite resources are being used up and cannot be replaced.
5. Food Security is the ability to obtain sufficient food on a day -to -day basis. People are considered to be 'food secure' when they do not live in fear of hunger.
6. Food insecurity is when it is difficult to obtain sufficient food. This can range from hunger through to full-scale famine.
7. Black Gold is another name for oil, because it is such a valuable commodity.
8. Peak Oil is the point at which oil production reaches its maximum level and then declines.
9. Energy security means access to reliable and affordable sources of energy. Countries with enough or surplus are **energy secure**, those without enough are **energy insecure**.
10. Ecological footprint is the area of land and sea that supplies the products that you need to live.

1970	2020	Increase	Resource
100	225	125	Oil
40	160	120	Natural Gas
60	125	75	Coal
20	40	20	Renewables
1	20	19	Nuclear

Resource consumption 1970–2020 (p166)

2. Sort the resources below into the correct category. Use page 166 to help you.

Resources

Wind
 Bio—fuels
 Hydrogen (e.g. To power cars)
 Coal
 Solar energy
 Hydro electric power (Water)
 Oil

Renewable resources

Wind
 Solar energy
 Hydro electric power (Water)

Sustainable Resources

Hydrogen (e.g. To power cars)
 Bio—fuels

Non—Renewable Resources

Coal
 Oil

4. Complete these sentences.

1. The most commonly used resource is oil
2. The resource with the largest increase in consumption is oil.
3. 2 reasons that this is a problem are that it is a finite resource and we are at peak oil.

1. List 2 ways oil is used by people.

A. Energy

B. Transport

Oil is a finite resource. What does this mean?

One that is limited or restricted

World reserves of oil (top 4 with %)

1. Saudi Arabia with 22.3% of world reserve

2. Iran with 11.2% of world reserve

3. Iraq with 9.7% of world reserve

4. Kuwait with 8.4% of world reserve

Main consumers (by country type/region)

1. USA

2. China

3. India

Major problems the world faces if there isn't enough oil are that industries, transport and domestic use will need to be changed as they all rely heavily on oil. Unemployment, travel and heating will become a huge problem. Disputes between nations will become worse. At present Sudan and South Sudan are in dispute over payments for oil transportation. Tensions between UK and Argentina over the Falkland Islands since large oil reserves discovered under the seabed.

Supply vs Demand

1. Number of barrels of oil produced 2011 - 87 million barrels

2. 2. Predicted demand for 2030 - 116 million barrels

3. Max number of barrels that can be produced in a day— 100 million barrels
Potential scenarios once peak oil is reached

Optimistic = That renewable energy or a different technological fix will be invented to overcome our reliance on fossil fuels.

Pessimistic = That wars will break out and countries face blackouts, recession, unemployment, travel chaos and people dying from the cold.

Describe the relationship between economic growth and oil consumption. (Use China as an example)

China's economy doubled in size between 2005 and 2012. It is now the second largest energy consumer behind the USA.

The demand for energy has risen by 86% since 2000. It needs this energy to continue its economic growth. There are also huge demands from its more affluent population for cars. China is expected to account for 40% of the world's energy consumption by 2030.

Energy Tensions, USA

The USA is not energy secure. There are 2 options for it to become energy secure.

1. Explore new territories in the Arctic and Canada, where there are thought to be huge reserves.

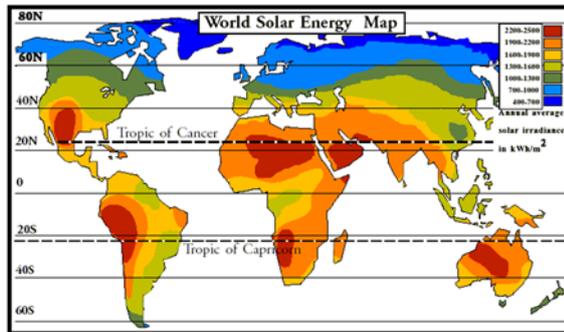
2. Stabilise areas of human conflict where oil supplies could be cut off.

Energy Tensions. Russia

Between 2006 and 2010, Gazprom (Russia's oil company) cut winter supplies to the Ukraine, Poland, Hungary, Bulgaria and Romania over various disputes. It is now once again in dispute with many countries after its military went into Crimea.

Solar Energy as a renewable resource.

Solar Energy can be used to heat water, and to heat and cool living spaces. It can also be used to create electricity. Use the map below to describe which areas have the greatest potential for solar energy.



The areas that have the greatest potential for solar energy are developing countries in the tropical areas such as Ghana (Africa's largest solar power plant to be built in this country). In tropical areas the high angle of the sun makes solar energy more intense- and the cost of developing solar power could be less than extending conventional electricity grids and power lines into rural areas.

Photovoltaic cell (PV Cell) (explain how they work) directly converts solar energy into electricity using PV cells grouped into panels.

Why will renewable energy resources become more important in the future?

Renewable resources will become more important in the future as the finite fossil fuels run out. People are also aware that pollution levels through the burning of fossil fuels are unsustainable and so cleaner fuels will be sought.

Use the graph on page 178 to describe the growth in solar power between 2002 and 2011. There is a steady increase in the growth of solar power between 2002 and 2011. Germany is leading the way almost tripling the amount of the second country Spain. Japan and the USA are making smaller strides toward using solar power for their economy.

Give 3 reasons why the use of solar power has increased

1. Falling costs (e.g. of producing PV panels)
2. The rising price of fossil fuels
3. Government subsidies to support renewable energy projects.

Describe how use of solar energy could support economic growth in Ghana
Ghana's economy is growing fast with GDP growing over 14% in 2011. It needs more energy to drive its economy even further. So, it is planning to use the sun's energy to produce electricity. Blue Energy is the company behind the \$400 million project. 155 MW solar photovoltaic plant will be operational by 2015. 4th biggest in the world. 10% of Ghana's energy will come from renewable energy, it currently stands at 1%.

Give 4 advantages for countries of producing their own energy from renewable resources

1. To be energy secure
2. Protection against changes in international relations.
3. 'Future-proofing' their energy supplies (in a world with declining fossil fuels), by making use of energy sources that will not run out.
4. Producing the energy needed for industrial growth.

Use page 168

Describe the locations where most of the protests took place

Most of the protests took place in developing countries with the exception of the USA and Italy.

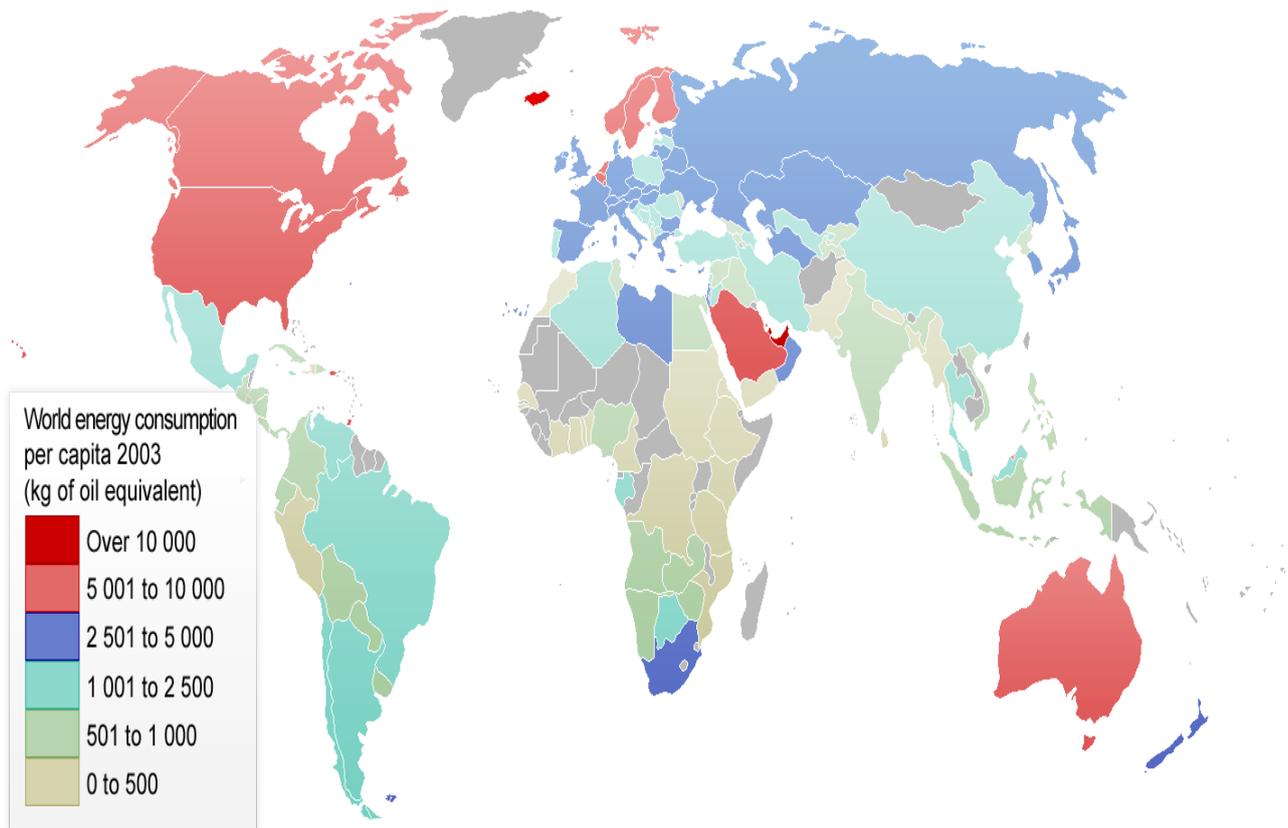
Outline two possible reasons why these countries might be most affected by resource shortages

1. Water shortages

These developing countries already lack access to safe water.

2. Population growth

There is a greater demand for food.



The Middle East and Asia Pacific are the main net exporting regions for coal and gas. The territories in these regions export up to 60% of all gas and coal exports in the world (US\$ net). Of the 53 net exporting territories, 15 are in Asia Pacific, and 13 are in the Middle East. In some regions there is only one net exporting territory: in Southern Asia this is Bhutan; in Eastern Europe this is Poland; and in North America this is Canada. Japan has no net gas and coal exports and hence relies on imports. Gas and coal exports are 2% of all world exports.

"Coal is Australia's major mineral export and accounts for nearly 25% of Australia's export earnings."

2. China (1.3 billion people) and India's (1.21 billion people) economies are very strong at the moment - as they develop even further they will need more energy and oil. List 4 users you can think of.

1. Car owners

2. Domestic use

3. Other transportation

4. Industrial use

'USA shale gas supplies'

i) what it is?

Shale Gas is methane (natural gas).

ii) where it is found?

In impermeable shale rock deep underground, unlike conventional natural gas which is in permeable rocks, such as sandstone. The gas cannot flow through the shale, so simply drilling a well, as you would for conventional natural gas, is not enough.

iii) why it causes concern for some people?

Leaking methane, water contamination, air pollution, massive industrialisation of the landscape, worsening climate change and earthquakes are concerns people have. Shale gas extraction also leaks large amounts of methane (a very strong greenhouse gas) and makes available fossil fuels that would not otherwise be burnt, both significantly worsening climate change.

What are the disputes in

Africa: In 2012 South Sudan, and the new country of South Sudan, were involved in dispute over payment for oil transportation.

South Atlantic: Ownership of the Falkland Islands. Tensions have risen since large oil reserves were discovered under the sea-bed.

South Caucasus: Area suffers from numerous disputes and political tensions e.g. Between Azerbaijan and Turkmenistan.

East Asia: In 2012, Japan and China were in dispute over the ownership of a group of islands in the east China Sea - an area rich in oil and gas reserves.

Russia: Between 2006 and 2010, Gazprom (Russia's oil company) cut winter supplies to the Ukraine, Poland, Hungary, Bulgaria and Romania over various disputes. The flow of Russian gas to Western Europe (including the UK) through these countries fell by up to 40%. It is now once again in dispute with many countries after its military went into Crimea.

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Abu Dhabi

Abu Dhabi is the largest of the seven emirates that make up the United Arab Emirates.

Food supply

are they food secure?

They are food insecure.

What are the problems?

It is a desert country with little rainfall and it does not have land that is suitable for growing crops.

Solutions:

The emirate has huge profits from selling its oil and can therefore afford to import food resources. However, in 2008 there was a food shortage and the price of wheat and grain rose. The solution to this was to develop 3000 Hectares of farmland in Sudan. The government agreed to lease the land for free in exchange for technological expertise in improving farming techniques.

Will the solutions work?

Sudan has a plentiful supply of water from the River Nile. It also has large areas of land suitable for agricultural development. Crops such as wheat and potatoes are grown and exported to Abu Dhabi. This solution suits Sudan, which needed new ways of earning money after it lost its oil reserves to South Sudan when it gained its independence. The Abu Dhabi Fund for Development is concerned about global warming and continued population growth. In the future having the finances to buy resources such as food may not be that easy. Abu Dhabi is committed to developing food supplies, with similar projects in Uzbekistan and Senegal.

What does the future look like?

Education/Schools

Ealing in West London (Local government– council) offers:

- 240 litre wheelie bins for paper recycling, which are emptied for free each week.
- 240 litre wheelie bins for recycling drink or food cans.
- Free compost bins for fruit and vegetable peelings, and a garden waste collection service.

Conservation/Green Deals

- 100% grants - available to low income households, or those who live in an area with high fuel poverty.
- Loans—repaid in instalments that are added to the electricity bill over

Recycling UK (National government)

-The UK produced 7 million tonnes of food waste in 2009, which—if used as bio-fuel—could produce the same amount of electricity as a new power station. That would save oil.

- Recycling plastic bottles (made from crude oil) would also save oil.

What does the future look like? - 2

How can we 'fix' our way out of trouble?

Since 2000, car manufacturers have achieved reductions in fuel consumption by improving engine technology. Lower consumption means lower emissions. Developing cars that use electric power as well as diesel or petrol known as hybrids.

Hydrogen fuel is a sustainable fuel when compared to fossil fuels as it is the most abundant element in the Universe with no harmful emissions. Fossil fuels on the other hand are finite and produce harmful emissions.

What is 'the hydrogen economy'?

If the whole economy used hydrogen instead of oil it would then be known as the hydrogen economy .

What are the advantages and disadvantages of encouraging the use of hydrogen

Advantages as a fuel for heating or transport, where it's used in a fuel cell that converts hydrogen into electricity. The emissions could be zero if the hydrogen is separated using renewable electricity sources.

It is cheap to produce.

It has many uses, e.g. Power generation, transport and other industries.

It is safe.

Its only by-product is water.

Refuelling is quick, and a full tank of hydrogen gives a range of several hundred kilometres.

Disadvantages comes from the fact that natural gas is used as a heat source in the separation process, this does produce emissions.

USA named example

In the USA, new hydrogen cars such as the Ford's Edge produce one emission - water pure enough to drink. In 2005, to encourage consumers to buy these cars, California developed the worlds first hydrogen highway. By 2013 there were 36 filling stations in the state. This infrastructure may encourage Californians to adopt hydrogen-fuel-cell vehicles as they become more affordable.