

Consuming energy resources

A resource is anything that is useful

Classification of resources by how long they last

1. FINITE

- Non-renewable resources will run out e.g. coal or oil

2. INFINITE

- Renewable resources renew naturally e.g. solar and wind power
- Recyclable resources can be re-used e.g. uranium for nuclear power

Another way of classifying resources is by **type of resource**

1. **Natural or biological resources** e.g. forests or amount of fertile land
2. **Human resources:** Skills of individuals e.g. Doctors, engineers
3. **Material or capital resources:** money, buildings, machines
4. **Mineral resources** e.g. coal, oil, iron ore

Exploiting (using) energy resources can damage:

1. Pollution e.g. oil spills
2. Landscape scarring e.g. abandoned open-cast mines
3. Deforestation

The **demand for energy resources is growing** because:

1. The World population is increasing
2. There are more rich people (middle class) especially in India and China who want more goods and use more energy

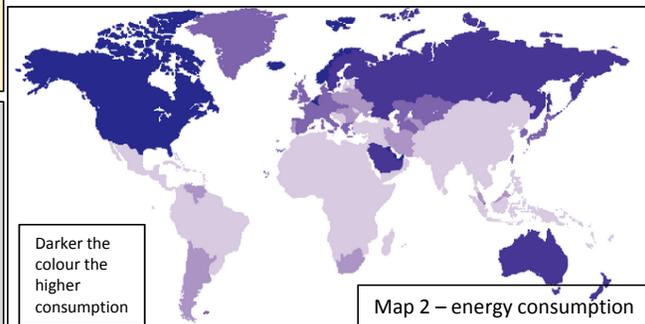
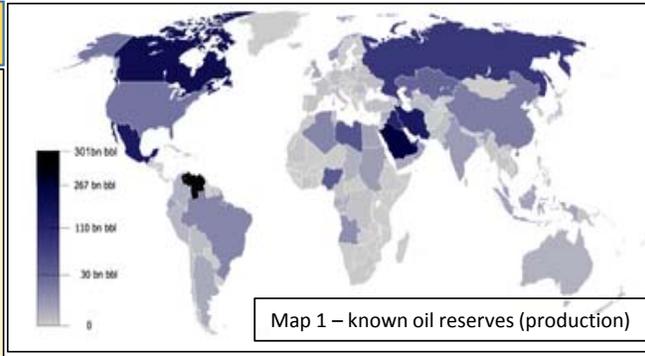
As a result the level of damage caused to the environment is increasing

Production of energy varies around the World (see map 1) and depends on:

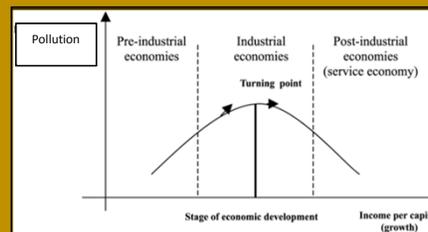
1. Availability (are the resources located in the country)
2. Technological development

Consumption of energy varies around the World and depends on the level of development – more developed countries use more energy as the middle class buy more cars, TVs etc (see map 2). Eg The USA has 5% of the World's population but uses 25% of the World's energy. Africa as the least developed continent still has a high demand for traditional fuels e.g. wood.

The greatest increase in **demand / consumption** is India and China as the number of middle class people in these countries grows



One good thing about the rising middle class is that as people become more educated and less worried about meeting their family's basic needs (shelter, food, water, warmth) they become more concerned about the quality of the environment and put pressure on governments to act. This is shown in the **Kuznet Curve**

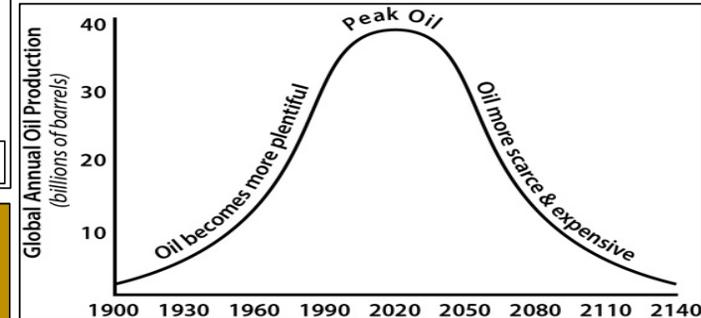


As a result of the rising demand for fossil fuels and changes in technology to allow extraction from non-conventional sources e.g. tar sands oil is being extracted from:

1. More extreme environments e.g. Arctic, deep sea
2. More sensitive environments e.g. Alberta Tar Sands

The extraction of oil from the **Alberta tar sands** has had both positives and negatives

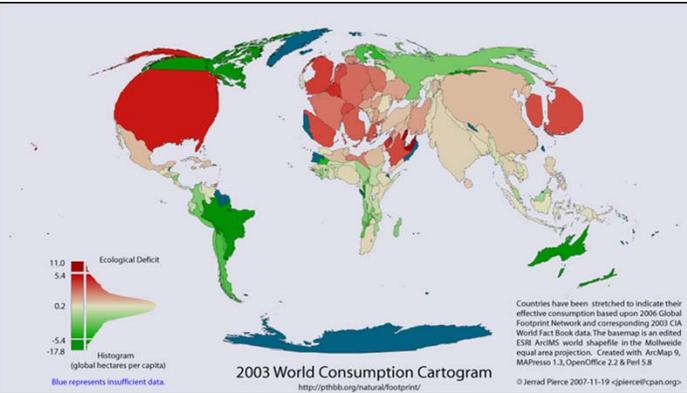
Positives	Negatives
<ul style="list-style-type: none"> • Increased jobs in Canada • Increased wealth for Canada • This wealth can be spent on education, health etc 	<ul style="list-style-type: none"> • Removal of trees from an undamaged environment • Pollution - toxic sludge is discharged into giant "tailing" ponds • Increase in greenhouse gases • Increase water use



Peak Oil is the point when the maximum rate of crude oil extraction is reached, after which the rate of extraction will begin to decline and the price will rise. The approach of **Peak Oil** has encouraged countries to look at ways of reducing the use of fossil fuels. There are environmental reasons e.g. global warming, why countries are also looking for ways to reduce the use of fossil fuels

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A carbon footprint is the amount of CO₂ released into the atmosphere by an individual, business or country. The biggest carbon footprint is from the USA (5 Earths) and the smallest Bangladesh (0.4 Earths).



Ways to reduce the demand for carbon based energy:

Large scale - Alternative (renewable) energy sources:

- **Solar** – more suitable to areas with a high number of sunshine hours eg southern Spain
- **Wind** – need to be located in windy areas eg uplands. Several groups object as these are often beautiful sites. The problem can be solved by locating the wind turbines out at sea
- **Waves & tide** – suitable for countries where most people live in coastal areas
- **HEP** – many people object to the large amount of land that can be flooded as dams are built. May have negative impact on the wildlife in rivers
- **Nuclear** - many people object due to safety fears

All of the above do not use fossil fuels and therefore do not add CO₂ to the atmosphere and contribute to global warming

Medium scale - Energy efficient transport:

- **London's cycle hire scheme** provides 6000 bikes for hire at 400 docking stations around London so people do not have to use cars
- **New London hybrid buses** are 40% more fuel efficient and produce 40% less CO₂ than the older buses
- **The congestion charge** makes vehicles pay to enter into the centre of London between certain times of the day. This reduces the amount of cars on the roads, therefore reducing emissions.
- **Road tax** depends on the pollution it emits. Cars with low CO₂ emissions pay no road tax. The idea is designed to encourage drivers to buy more fuel efficient cars.

Small scale – household energy saving schemes:

- **Solar panels** works best in areas with a lot of sunshine
- **Double or triple glazing** reduces heat loss and therefore less energy is required
- **Reusing** lowers the need for new products to be made and therefore less energy is used
- **Recycling** lowers the need for primary products to be mined so reduces the amount of energy used
- **Shopping locally or growing your own** reduces how far our food travels so less fuel is used

All of the above reduce the amount of fossil fuels used and therefore add less CO₂ to the atmosphere and contribute less to global warming

What will happen in the future?

If CO₂ rises by this amount (*) it will lead to global warming in excess of 2°C which will lead to:

1. Ice caps melting and coastal flooding
2. More extreme weather eg droughts, heat waves and powerful storms
3. Reduction in farm output due to unreliable weather
4. Changes to ecosystems leading to animal extinctions

What will happen in the future?

There are two possible approaches to future energy use:

1. **Business as usual (current policies scenario)** – the world continues to rely on fossil fuels and global warming will get worse.
2. **Sustainable future** – More countries adopt alternative (renewable) energy supplies in order to reduce CO₂ emissions as a way of slowing climate change. These are known as the **New Policies Scenario** and the **450 Scenario**

New Policies scenario – reduces the amount of CO₂ released into the atmosphere keeping the maximum rise in global temperatures to 4°C. Scientists believe this is too high and that if the temperature rises by this amount there will be severe negative impacts on people and the environment

450 scenario – reduces the amount of CO₂ released into the atmosphere keeping the maximum rise in global temperatures to 2°C – the maximum temperature rise scientists believe the Earth can sustain without severe negative on people and the environment

