

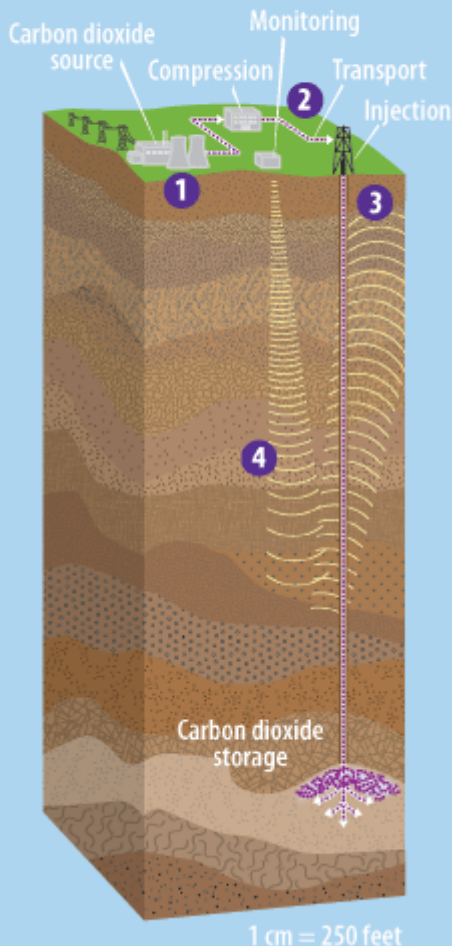
Alternative Energy

Alternative energy will often be referred to as renewable energy sources. These are sources of energy that can quickly replenish themselves and can be used again and again. There are 7 key types of renewable energy and these are; solar, wind, tidal, geothermal, HEP, biomass and nuclear.

Energy Type	Summary
Solar	This comes from sunlight and creates electricity through the use of solar power. It allows individual homes the opportunity to supply their own power, however it is costly and relies on direct sunlight so is weather dependant.
Wind	This comes from wind and creates electricity through the use of wind turbines. They can be used on their own and in groups of wind farms, yet always produce energy. However they are costly and many people feel they destroy the local countryside's, in addition to creating a low lying buzz noise.
Tidal	These are built across an estuary and force water through gaps which turns turbines creating energy. These can help prevent flooding, act as a bridge and are ideal for small islands. They are however costly and interrupt marine wildlife.
Geothermal	This can be produced in volcanic regions. This happens when cold water is pumped underground and comes out as steam. This is then used to power turbines. This provides create amounts of power and is already successfully used in Iceland. However they only work in volcanic areas and rely on an active volcano. In addition to this dangerous elements can be found underground and must be disposed of carefully.
HEP	This can be produced through water passing through a dam. This method allows for a reserve of water to be created which can be used for recreation (tourism). However they are costly and areas of land need to be flooded before this can be build.
Biomass	This is created by the decaying of plant and animal waste. Organic material can be burned to provide energy and if used carefully can be reused. It is cheap and easy to come by. Yet does realise some greenhouse gases when burned and rely on crops being replanted.
Nuclear	This is when nuclear fission is used to break down atoms of uranium which release heat, which is used to create steam which powers turbines. This is safe and reliable if done using correct procedures, and creates jobs. However it is high dangerous if not monitored correctly and leaves radioactive waste which is dangerous to human health.

Carbon Capture

Carbon Capture and Underground Storage



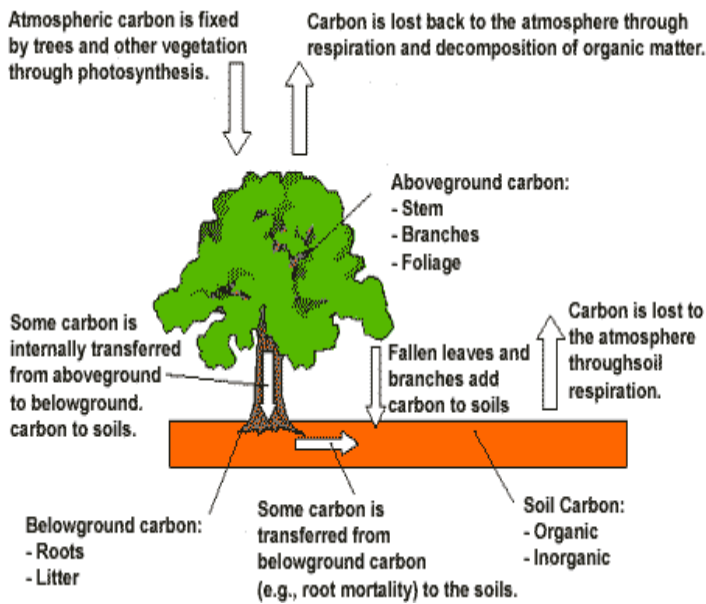
Currently, most of our electricity is generated at large power plants that burn coal and other fossil fuels that add lots of carbon dioxide to the atmosphere. It will likely be many decades before we can get most of our electricity from renewable resources that emit little or no carbon dioxide. In the meantime, scientists are developing ways to capture carbon dioxide from power plants and factories and safely store it underground so that it can't go into the atmosphere.

How it works:

1. Carbon dioxide emissions from a power plant or factory are captured so they are not released into the atmosphere.
2. The captured carbon dioxide is sent through a pipeline to a place where underground rock formations can store the carbon dioxide safely and permanently.
3. The carbon dioxide is pumped deep underground (often more than half a mile down).
4. The site is monitored to make sure the stored carbon dioxide doesn't leak back up to the atmosphere or into underground sources of drinking water.

The United States has enough space to store 1 to 4 *trillion* tons of carbon dioxide. By comparison, the US emits about 6 *billion* tons of carbon dioxide every year. This idea fits in nicely with our current systems, which in turn reduces the cost. In addition to this it allows us time to develop renewable energy sources whilst still keeping our energy output the same. However environmentalists say that it is distracting governments from the need to convert to renewable energy, and the amount of money going into carbon capturing will double the cost of electricity whilst wasting money that could be invested into more sustainable energy. Lastly there is a chance of carbon leaking, this is when the stores of carbon dioxide are leaked out from their underground stores. Although the chances are low this could cause more harm than good.

Replanting Trees



Forests play an important role in climate change. The destruction of forests contributes to the problem through the release of CO_2 . But the planting of new forests can help mitigate against climate change by removing CO_2 from the atmosphere. Combined with the sun's energy, the captured carbon is converted into trunks, branches, roots and leaves via the process of photosynthesis. It is stored in the trees until being returned back into the atmosphere,

through the natural process.

Trees are also planted as part of efforts to restore natural forests as well as to increase tree cover on agricultural land and pastures. In certain conditions plantations can grow relatively fast, therefore absorbing CO_2 at higher rates than natural forest. As long as they are not disturbed, newly planted or regenerating (growing after damaged) forests can continue to absorb carbon for 20-50 years or more. On a local scale, forests play a vital role in regulating water supplies, helping to minimise both water shortages in times of drought and damaging floods in heavy rains. Trees also reduce soil erosion, and provide habitats for a wide variety of plants and animal species. In addition to all this afforestation (replanting of trees) also provides jobs for the local people and allows opportunities for tribes to continue their lives living in the forest.

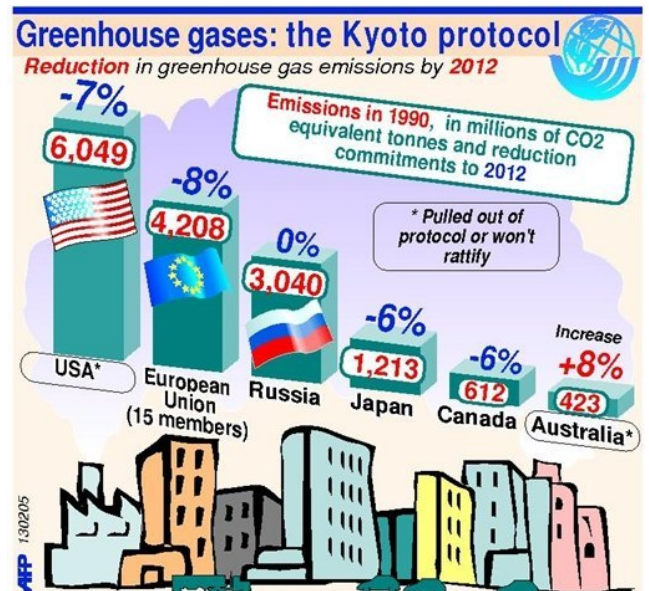


However tree planting only has a limited contribution to reducing CO_2 levels in the atmosphere. It also doesn't address the real issue of preventing emissions at their source. We cannot rely on planting trees to absorb our ever increasing emissions, in addition to this trees take on average 50-100 years to grow to a height that is significant to lower carbon dioxide. Lastly trees are a living organism and therefore will not last forever and therefore will not stop the climate from changing permanently.

International agreements

The main international agreement that helps to mitigate climate change is the Kyoto Protocol, this was created in 1997 and was set up in Japan. However it was not enforced until 2005, where 192 parties (countries) signed up to it. The aim is for countries to reduce their greenhouse gas concentrations in the atmosphere to a level that would prevent dangerous harm to our climate. It puts developed countries in the frame to reduce emissions more on the basis that they are historically responsible for the current levels of greenhouses gases found in our atmosphere. It allows countries a limit on how many emissions they can emit and offers opportunities for countries to buy carbon from countries that are below their target, in a hope of keeping emissions low.

The main positives of the agreement is that it is predicted to have a massive impact on the amount of CO₂ that countries emit, this in theory will help reduce the greenhouses gases found in the atmosphere. It is also allowing countries the opportunity to develop and research more renewable sources of energy that may not have been considered before, whilst having a massive impact on our future generations making it incredibly sustainable (if it works). Another positive is that it encourages international communication to occur, as countries are forced to trade their carbon units with each other, which helps open new trade opportunities in turn, increasing economics and allowing for social development.



However the main issue with the Kyoto Protocol is that it is not compulsory for countries to join and big emission countries such as the USA have not joined in a fear that it would impact their economy. It is also very difficult to implement across all countries as the gathering of information is difficult and at present relies on countries to self-report on how they are doing, which can lead to the possibility of false information being given.