

Energy and sustainability

Geography

Oak

Previous Knowledge

What should I already know?

Materials and their uses, natural and manmade materials and the impact people have on their locality.

- Know what globalisation is and the impact of it.
- Know what natural resources are.
- Understand what the world's most important natural resources are.
- Know which countries have the most natural resources.
- Know how the use of natural resources has increased.

Sustainability

Something is sustainable if it can be maintained indefinitely and something is unsustainable if it cannot be maintained indefinitely.

Even renewable resources can become unsustainable. If a resource is used up faster than it can regenerate, it will eventually be entirely depleted despite its renewability. Conversely, a non-renewable resource can be sustainable if it's used in moderation.



Overview

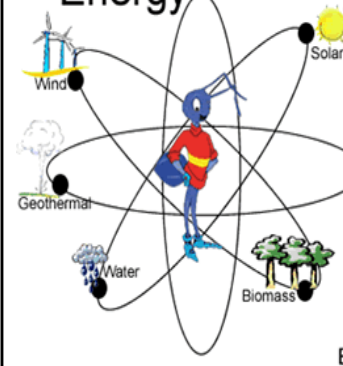
Subject - Geography

In geography, the children will learn about energy use across the world. Children will develop their understanding from the topic 'Natural resources' and discover how natural resources are used to create energy. They will research examples of sustainable and unsustainable practice and use case studies to explore how Curitiba and Freiburg have become more sustainable. They will finally consider the importance of a move towards sustainable energy use and learn about new developments and possibilities in the field.

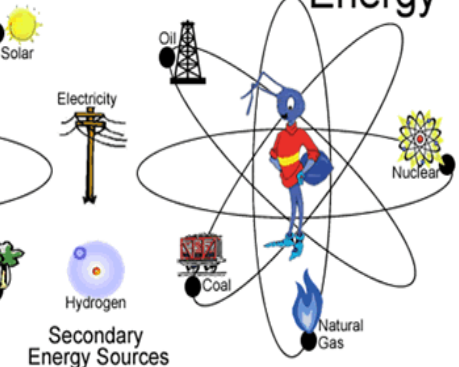
Enquiry question

"Humans are not capable of living sustainably." To what extent do you agree?

Renewable Energy



Non-Renewable Energy



Geographical skills and knowledge

What will I know or be able to do at the end of this unit?

- Know what sustainability is.
- Research examples of sustainable and unsustainable practice.
- Understand how we produce energy.
- Use case studies to investigate how Curitiba and Freiburg have become more sustainable.
- Understand and explain the reasons for a move towards sustainable energy resources.

Text Link



The Boy in the Tower by Polly
Ho-Yen

Tesla technology

Tesla is an electric car company that uses electric energy to power its vehicles rather than using petrol or diesel, which are made from oil.

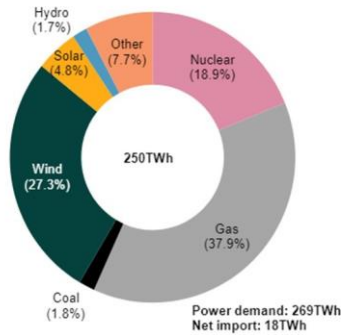
Electric energy can be generated by renewable sources, such as wind power or solar energy. Electric energy is more sustainable than using petrol or diesel because the oil in the earth's surface is difficult to extract and therefore expensive to buy and sell. In addition, oil spills are harmful to the environment because oil slick clings to the land and makes oceans, beaches, marshlands, and wetlands uninhabitable for the living things such as birds, fish, and sea mammals, which can swallow the oil and die.

In 2017, Elon Musk won a bid to create the largest lithium ion battery powered by a wind farm. It generates enough energy to give power to 30,000 homes each year and it's located in Australia. For this reason, electric cars are thought to be more sustainable than petrol or diesel cars, which use oil.



UK Energy production

Generation Mix For Great Britain In 2020



TWh—Terawatt hour. Source: S&P Global Platts.
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On average, energy that is provided by UK suppliers mostly comes from gas (around 38%). Renewable sources, such as wind power are used to produce around 27% of the energy provided while the percentage figures for coal and nuclear power respectively are around 2% and 19%.

Fossil fuels

Advantages

- Oil and gas can be transported safely through pipelines.
- Locating where fossil fuels are is quite easy.
- The technology for extracting fossil fuels already exists.
- They generate large amounts of energy quite cheaply.
- As technology improves, more reserves can be accessed.

Disadvantages

- Fossil fuels release carbon dioxide when they are burnt, creating pollution.
- Carbon dioxide is produced when burning fossil fuels, which contributes to the greenhouse effect and global warming.
- Mining can create ugly scars on the landscape.
- Oil spills can cause environmental damage.
- Oil is mainly produced outside the UK, so prices are set by other countries.
- Supplies are running out and new sources are harder to get to; oil and gas are both predicted to run out within 100 years.
- Underground mining can be dangerous.

Key Vocabulary

Bio gas digester	Processes food and garden waste to produce energy for thousands of homes.
Energy security	When a country provides affordable energy to its poorest citizens.
Fossil fuels	Sources of energy which were formed millions of years ago.
Non-renewable energy	Sources of energy that will run out
Renewable energy	Sources of energy that will not run out. They keep on being generated by the planet because they're part of the planet's natural processes.
Sustainability	Using resources that are good for people, the environment, and the economy, both in the present and in the future.

Curitiba City (Brazil)

Curitiba is the capital of Parana State and is found on the South East of Brazil around 1,000km from Rio de Janeiro. It has been transformed from an agricultural city to a manufacturing one through sustainable planning. The benefits of the systems are as follows:

- Reduced transportation time
- The creation of the CIC has created about 50,000 direct jobs and 150,000 indirect jobs.
- Curitiba's fuel usage is 3% lower than in Brazil's other major cities;
- Improved outdoor air quality and associated health benefits;
- 70% of the city's residents are actively recycling and 13% of solid waste is recycled;
- Property values of neighbouring areas has appreciated, and tax revenues have increased;
- Reduced flood mitigation expenditures by promotion of park development in flood-prone areas (the cost of this strategy is estimated to be 5% lower than building concrete canals).



Significant place—Freiburg (Germany)

In February 1975, thousands of environmental protestors camped out for 9 months on a patch of land 30km north of Freiburg. This action birthed a green movement.

- 1994—Builds Heliotrope: the world's first energy-plus house.
- 2002—Elects Germany's first Green party mayor (Dieter Solomon).
- 2002—Wins Dubai International Best practices award for sustainable development.
- 2010—Wins national award for its climate protection efforts.
- 2012—Names most sustainable city in Germany.
- 2017—New Town Hall becomes World's first public building producing surplus energy.

