KS3 Lesson Plan

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Lesson 1	Why Renewable Energy?		
Level	Key Stage 3	**Time required**	1 hour or two 1/2 hour sessions

National Curriculum Links

Geography, Science, PSHE, ICT, D&T, Maths (view scheme of work for full details of links)

Aims

- The students will learn how electricity is generated and the potential problems this may cause
- They will learn about two renewable sources of energy (wind and solar), and why this type of energy is important
- They will collect data about the amount of energy used in school

Resources required

Pen and paper, PC with internet access

Web search keywords

Renewable energy, sustainability, wind power, solar power, hydroelectricity, tidal power, wave power, ground source heat pump, geothermal, oil and gas supplies, North Sea gas, security of fuel supply, energy saving

What is Renewable Energy?

Ask the students to discuss renewable energy. What is renewable energy? What types of energy are considered 'renewable'?

(Renewable energy is energy which is generated from sustainable sources. Examples: wind, solar, hydroelectric, tidal, wave, ground source heat pump, geothermal)

Why is renewable energy important?

There are two main reasons why renewable energy will become increasingly important:

1 - Security of Supply

There are several reasons (economic, political, and environmental) why our energy supply is not totally secure. Most electricity is currently generated at power stations by burning fossil fuels such as coal, gas and oil.

We are consuming our natural fossil fuel resources very rapidly, and they will eventually run out. Even traditional nuclear energy generation is not renewable.

For example, supplies of natural gas in the North Sea are expected to run out this century (ask the students to investigate). When a country's fuel supply is exhausted, it may become dependent on other countries. Political and economical differences may dictate the cost and availability of this energy.

Renewable energy allows independent energy generation (discuss this with the students)

2 - Climate Change

Global warming will lead to unpredictable and potentially dangerous changes in the Earth's climate.

Scientists predict that even if we were to cease all CO2 output today, global warming would continue beyond the year 2100.

Climate change will almost certainly have a severe impact on us and the world we live in.

We need to use less energy to make our remaining fossil fuel supplies last longer, since they are also essential for the manufacture of many plastics, chemicals and medicines.

We need to look at alternative ways of producing energy using renewable sources which do not produce CO2.

We need to change our behaviour and attitudes towards our energy usage.

Task 1 - Meter Readings

Find out where the school electricity meter is and regularly measure output.

By reading the meter at appropriate times, work out how much energy is used over the course of 5 days, the weekend, and half term.

Is any of this energy being wasted? What could the students do to stop this?

Why are there variations in the amount energy being used at different times?

Plot this information on a graph either on paper or using a PC.

Task 2 – LogiCity Climate Change Game

Open the LogiCity game in Internet Explorer: http://www.logicity.co.uk

Registration is required. From the LogiCity web site:

'LogiCity is designed to be both fun and educational. Although it's aimed at older children (KS3+ and young adults), the gameplay and the concepts are suitable for most children from 10 or 11 years upwards. The game itself is split into 5 activities ranging from a family role-play about what forms of transport to use to a decision oriented game where players have to maximise carbon savings from a limited cash budget to a race against the clock round a fictitious office switching off electrical equipment.

'The game can help pupils at Key Stages 3 & 4 Citizenship investigate issues surrounding sustainable development, using IT to experiment with alternative lifestyles, as well as assisting with their knowledge and understanding of environmental change and sustainable development (attainment target 4) in the geography curriculum. The geography component is particularly relevant to the targets

at level 5, where pupils are expected to suggest explanations for the ways in which human activities cause changes to the environment and the different views people hold about them'

Play the game. Discuss with the students what they have learnt.

Extension Activity 1 – Security of Supply

Ask the students to perform a web search of oil and gas pipelines throughout the world. Which countries produce the most oil and gas? What problems could there be with oil and gas pipelines crossing international borders?

Extension 2 – Climate Change

Ask the students to perform a web search to find images of the following types of renewable energy:

- Wind
- Solar
- Hydroelectric
- Tidal
- Wave
- Ground source heat pump
- Geothermal

Optional: print off, label and include in the students' portfolios.