The Energy Grid: Teacher's Notes

National Curriculum

Geography – environmental change and sustainable development
Science – Energy resources, implications and applications of technology.

Aim

The Energy Grid is designed to encourage your students to think carefully and compare renewable with non-renewable power sources.
The students will begin to think about the way we generate our power in the UK and the advantages/disadvantages of each leading on to a discussion about the energy mix in the UK.

Resources

Copies of the energy grid.

Timing

30-45 mins

Outcomes

Each student will become aware of the advantages and disadvantages of the different energy sources.

Task

Use the Energy Grid as a research activity when starting the topic, or a mind mapping exercise of student perceptions leading to a classroom discussion. It can also be used as an extension activity after the Matching (1) and Sorting (2) Activity.

Differentiation

The grid is designed so that you can delete or include information in the cells to make the exercise easier or more difficult, as appropriate to the level of your students.

Background Information

Renewable sources of energy are: biomass, wind, wave, tide, solar and hydro-electric power

Non-renewable sources are fossil fuels (natural gas, oil and coal) and nuclear.

Useful website : http://www.darvill.clara.net/altenerg/

We cannot just depend on one source of power. Some sources of power are easy to switch on and off e.g. wind turbines, however, others like nuclear or coal power stations may take several days or even weeks to switch off or turn up the amount of power. We do not store power in the UK so as soon as it is generated the power has to be used. If the capacity in the grid drops then it is fairly easy to switch off a wind turbine but a nuclear power station is not so responsive.

Answers

	Fossil Fuels	Nuclear	Solar PV	Solar Thermal	Biomass	Wind	Hydro-electric
What is it?	Laid down 150 million years ago coal, oil and gas are the remains of trees and plants squashed under enormous pressure.	Radioactive uranium is split to generate energy.	Sun shines on solar panels that transfer the energy to electricity.	Sun shines on panels that transfer the heat to water.	Growing a crop which is then harvested and burned either to produce heat or electricity.	Harnessing the kinetic energy in the wind to produce electricity.	Harnessing the kinetic energy in falling water to produce electricity.
Renewable or non-renewable?	Non-renewable – once the gas, coal, oil has been burned it is irreplaceable.	Non-renewable – once the uranium has been used it cannot be used again.	Renewable Sun always rises	Renewable Sun always rises	Renewable As long as the crop is replenished	Renewable. Wind keeps blowing.	Renewable The rain always falls and refills the reservoir
Advantages	They have been used for decades, so we know they are reliable and fairly cheap to process.	It is a reliable source of energy and doesn't produce carbon dioxide.	No moving parts so once installed very reliable	Once the investment has been paid back free hot water	It can be easily available since it is cheap and quick to grow.	The wind blows more in winter and this is when we need more energy. It is clean and the fuel source is free.	It is very efficient – most of the energy is useful.
Disadvantages	Produce copious amounts of carbon dioxide	Radioactive waste is very dangerous and needs careful disposal. Nuclear power stations are very expensive to set up.	It needs a lot of sunshine, so may not be reliable in the UK.	Less sun means less hot water.	Need large storage containers for the fuel.	No wind ,no power. Some people think wind turbines are unsightly.	Some people think dams are unsightly. The reservoirs have flooded the landscape and changed the natural habitat.

3.Energy Grid - WORKSHEET

	Fossil Fuels	Nuclear	Solar PV	Solar Thermal	Biomass	Wind	Hydro-electric
What is it?		Radioactive uranium is split to generate energy. 	Sun shines on solar panels that transfer the energy to electricity.				
Renewable or non-renewable?		Non-renewable – once the uranium has been used it cannot be used again.				Renewable. Wind keeps blowing.	
Advantages	They have been used for decades, so we know they are reliable and fairly cheap to process.	It is a reliable source and doesn't produce carbon. 			It can be easily available since it is cheap and quick to grow.	The wind blows more in winter and this is when we need more energy. It is clean and it is free!	It is very efficient – most of the energy is useful. 
Disadvantages		Radioactive waste is very dangerous and needs careful disposal. Nuclear power stations are very expensive to set up.	It needs a lot of sunshine, so may not be reliable in the UK.				Some people think dams are unsightly. The reservoirs used have flooded the landscape and changed the natural habitat.

Now discuss these questions with your partner:

1. What do you think the energy mix should be in the UK?
2. Why?