



ENERGY TRUMPS

Onshore Wind Farms



Britain is the windiest country in Europe. Onshore wind farms generated 8% of Britain's electricity in 2019.

Highest Score Wins		Lowest Score Wins	
Power Output	3	CO ₂ Emissions	0
Speed of start up	7	Cost	1
Reliability	2	Pollution	0
Renewability	9	Risk	1

What are the arguments against offshore wind farms ?



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Offshore Wind Farms



Wind farms at sea benefit from stronger winds. Most offshore turbines are fixed to the seabed, but floating turbines are used in deeper water.

Highest Score Wins		Lowest Score Wins	
Power Output	4	CO ₂ Emissions	0
Speed of start up	7	Cost	2
Reliability	3	Pollution	0
Renewability	9	Risk	2

What is the energy transfer is happening in a wind farm?



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Coal Fired Power Station



The UK used to rely heavily on its large reserves of coal for electricity generation. Now only <5% of UK energy comes from coal.

Highest Score Wins		Lowest Score Wins	
Power Output	8	CO ₂ Emissions	10
Speed of start up	8	Cost	2
Reliability	10	Pollution	10
Renewability	0	Risk	8

Why is coal being phased out of use for electricity generation in the UK?



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Power from Waste Station



In the UK recycling is increasing however there is still a lot of waste produced. This can be incinerated (burnt), generating energy for heating and electricity.

Highest Score Wins		Lowest Score Wins	
Power Output	5	CO ₂ Emissions	9
Speed of start up	5	Cost	2
Reliability	9	Pollution	4
Renewability	2	Risk	2

Is waste a renewable resource?



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Solar PV Farms



Electricity directly from sunlight is called Photovoltaics (PV). PV panels are getting cheaper, but they only work in daylight.

Highest Score Wins		Lowest Score Wins	
Power Output	1	CO ₂ Emissions	0
Speed of start up	1	Cost	3
Reliability	4	Pollution	1
Renewability	10	Risk	1

What are the problems of using solar as an energy source in the UK?



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Biomass Power Station



Biomass, usually from forestry waste, willow, and straw, can be used for heating and electricity. They are carbon neutral*.

Highest Score Wins		Lowest Score Wins	
Power Output	5	CO ₂ Emissions	3*
Speed of start up	7	Cost	6
Reliability	10	Pollution	7
Renewability	10	Risk	3

What does carbon neutral mean?



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Gas Fired Power Station



Gas (methane) is a cleaner fossil than coal and provides about one third of UK total energy supply. It is easy to transport by pipeline.

Highest Score Wins		Lowest Score Wins	
Power Output	8	CO ₂ Emissions	7
Speed of start up	4	Cost	3
Reliability	9	Pollution	8
Renewability	0	Risk	7

What are the advantages of using gas as an energy source?



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Nuclear Power



A controversial method of energy production, providing a low carbon energy supply. Issues with waste and safety cause concerns for many.

Highest Score Wins		Lowest Score Wins	
Power Output	10	CO ₂ Emissions	1
Speed of start up	1	Cost	9
Reliability	10	Pollution	1
Renewability	3	Risk	8

What are the social and environmental issues relating to the disposal of waste from nuclear energy production?



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Tidal Barrage



Water flows through turbines in a dam as the tide comes in and out twice a day, generating electricity. Britain has the best tidal resources in Europe.

Highest Score Wins		Lowest Score Wins	
Power Output	6	CO ₂ Emissions	0
Speed of start up	7	Cost	7
Reliability	6	Pollution	0
Renewability	10	Risk	1

What are the arguments against tidal power?



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Hydroelectric Power (HEP)



Steep valleys are dammed to store water which is then released through turbines to generate electricity. Although high initial cost both financially and to the environment it provides long term reliable and renewable energy.

Highest Score Wins		Lowest Score Wins	
Power Output	8	CO ₂ Emissions	0
Speed of start up	9	Cost	6
Reliability	8	Pollution	1
Renewability	9	Risk	1

What impact on the environment would flooding large areas to store water have?



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Tidal Stream



Tidal stream turbines are anchored underwater, driven by tidal flows to produce electricity. UK has several excellent potential sites.

Highest Score Wins		Lowest Score Wins	
Power Output	8	CO ₂ Emissions	0
Speed of start up	7	Cost	4
Reliability	5	Pollution	0
Renewability	10	Risk	1

Why when you are first developing new technologies for harnessing energy is the cost much higher?



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Geothermal



In some parts of the world the earth's core comes closer to the surface. This can be used for heating and generating electricity. Drilling down to hot rocks and pumping water through them also extracts heat, this is difficult and expensive.

Highest Score Wins		Lowest Score Wins	
Power Output	5	CO ₂ Emissions	9
Speed of start up	5	Cost	8/2
Reliability	9	Pollution	4
Renewability	2	Risk	2

Why does the cost of using geothermal energy vary so much depending on the location?



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Oil Fired Power Station



Oil is a fossil fuel, some is used for heating and electricity production but mostly used as liquid fuels for transport.

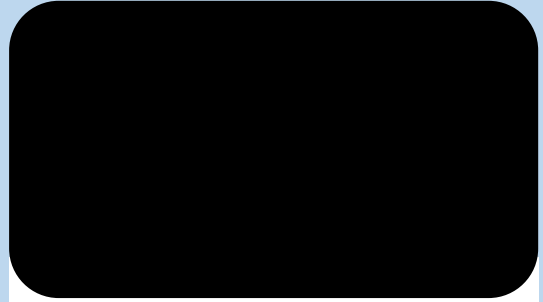
Highest Score Wins		Lowest Score Wins	
Power Output	8	CO ₂ Emissions	8
Speed of start up	5	Cost	4
Reliability	8	Pollution	9
Renewability	0	Risk	8

Why is oil a good fuel for transport?



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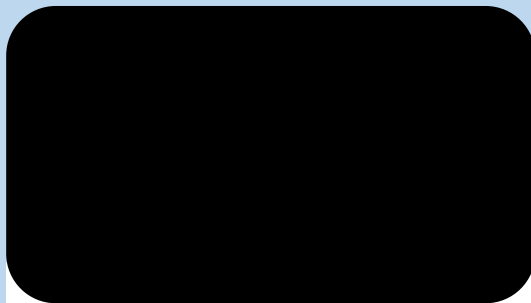
Highest Score Wins		Lowest Score Wins	
Power Output	5	CO ₂ Emissions	5
Speed of start up	5	Cost	5
Reliability	5	Pollution	5
Renewability	5	Risk	5

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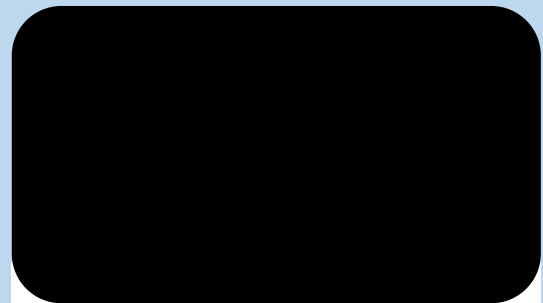
Highest Score Wins		Lowest Score Wins	
Power Output	5	CO ₂ Emissions	5
Speed of start up	5	Cost	5
Reliability	5	Pollution	5
Renewability	5	Risk	5

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Title



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Highest Score Wins		Lowest Score Wins	
Power Output	5	CO ₂ Emissions	5
Speed of start up	5	Cost	5
Reliability	5	Pollution	5
Renewability	5	Risk	5

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