STEM EDUCATION PROGRAMME

Energy

Taking Charge

LO: To evaluate different energy sources

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WHO ARE SSE?

Do now:

How do we consume energy?

KEY WORDS

energy source

renewable

non-renewable

Where does energy come from?

Our lives depend on the ***consumption*** of ***energy*** every day

To access vital resources like ***electricity*** and ***fuel*** we need to ***generate*** energy

There are many ***different ways*** to generate energy

Solar energy

Solar energy comes from the ***sun***

The sun provides ***heat*** energy

Solar ***panels*** convert sunlight into ***electricity***

These can be installed on our ***rooftops*** or in an open space creating a **solar *park***

SSE began its first solar project in ***England*** in January 2022!

Wind energy

Wind energy comes from the ***wind.*** Wind ***turbines*** convert wind energy into ***electricity***

The wind blows the blades around and this ***movement*** is converted into electricity

A group of wind turbines is called a ***wind farm*** – these can be ***onshore*** or ***offshore***

SSE have windfarms across the world including the ***UK & Ireland***

Hydropower energy

Hydropower energy comes from ***moving water***, including dams, rivers and seas. Fast-flowing water spins ***turbines*** to generate ***electricity***

Water wheels are placed in rivers to irrigate farmland

The ***movement*** of big ***waves*** at sea can also be used to spin these turbines

SSE also have ***hydro power stations*** across Scotland!

Coal energy

Coal energy is generated by ***burning coal*** from underground which releases smoke into the air

We burn the coal in ***power stations*** to generate ***electricity***

Coal cannot be replaced and it will eventually ***run out***

Gas energy

Gas energy is generated from ***natural gas*** which has been found deep underground

It is pumped into our homes and used to ***cook*** or burn in a boiler to ***heat*** our water

One day the Earth's natural gas will ***run out***

Oil energy

Oil energy is generated by ***burning oil*** that has been pumped up from underground

We burn oil at ***power stations*** to generate electricity which releases smoke into the air

We also burn oil to make ***fuel*** which powers ***transport*** such as cars and busses.

Oil will eventually ***run out***

Can you remember each energy source?

solar

wind

hydro

coal

gas

oil

Renewable or non-renewable?

Energy sources are either ***renewable*** or ***non-renewable***

Renewable energy comes from resources which keep ***naturally replenishing*** including sunlight, wind and waves

These resources ***never run out***

Renewable or non-renewable?

Non-renewable energy comes from resources which are ***not naturally replenished*** including oil and coal

Most non-renewables are known as ***fossil fuels*** because they are dug up from deep underground

Resources which run out are '***finite***'

Renewable or non-renewable?

solar

wind

hydro

coal

gas

oil

What makes renewable energy so great?

- It will ***not run out*** e.g. wind, sun and waves
- It does ***not*** cause ***air pollution***
- New technologies could produce ***more jobs***
- People can ***make their own*** renewable energy and ***sell*** it
- It can power ***electric vehicles*** which do ***not*** release ***carbon emissions***

A wind turbine saw a solar panel and said ***"Hey, I'm a big fan!"***

How is non-renewable energy harmful?

- It uses up the Earth's natural ***finite resources*** which will run out
- It releases ***carbon emissions*** and other gasses causing ***air pollution*** making it ***harder to breathe***
- Air pollution also makes the planet ***hotter*** than it should be – this is called ***global warming***
- It can leave ***toxic waste*** on land and in the sea
- Working in oil and coal mines is often ***dangerous***

Why might we still need non-renewable energy?

- It is sometimes ***cheaper***
- It is usually ***quicker*** and ***faster*** at producing energy
- It doesn't require specific ***weather***
- It can ***store*** energy which can be used in the future
- Lots of people's ***jobs*** are in non-renewable energy

Renewable energy in the UK & Ireland

We are constantly searching for more ways to generate ***renewable*** energy

There are now ***wind farms*** across the entire world both on land and at sea

SSE are building more ***off-shore*** wind farms than anyone else in the world!

Protecting local wildlife

As we generate more ***clean*** energy, we need to consider the animals that inhabit these areas

SSE have ***windfarms*** across the UK & Ireland and are looking to expand around the world

They are using technology to protect local ***habitats*** and ***wildlife*** including ***puffin*** colonies that usually live on small islands off the coast

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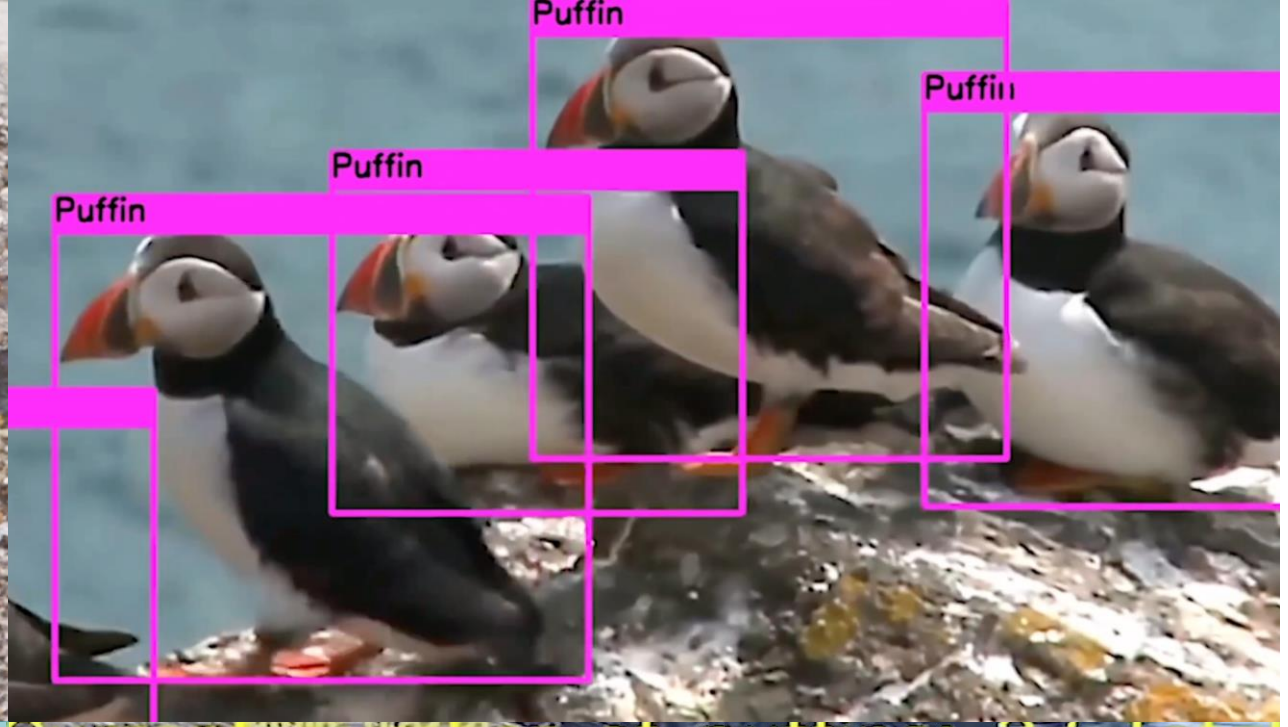
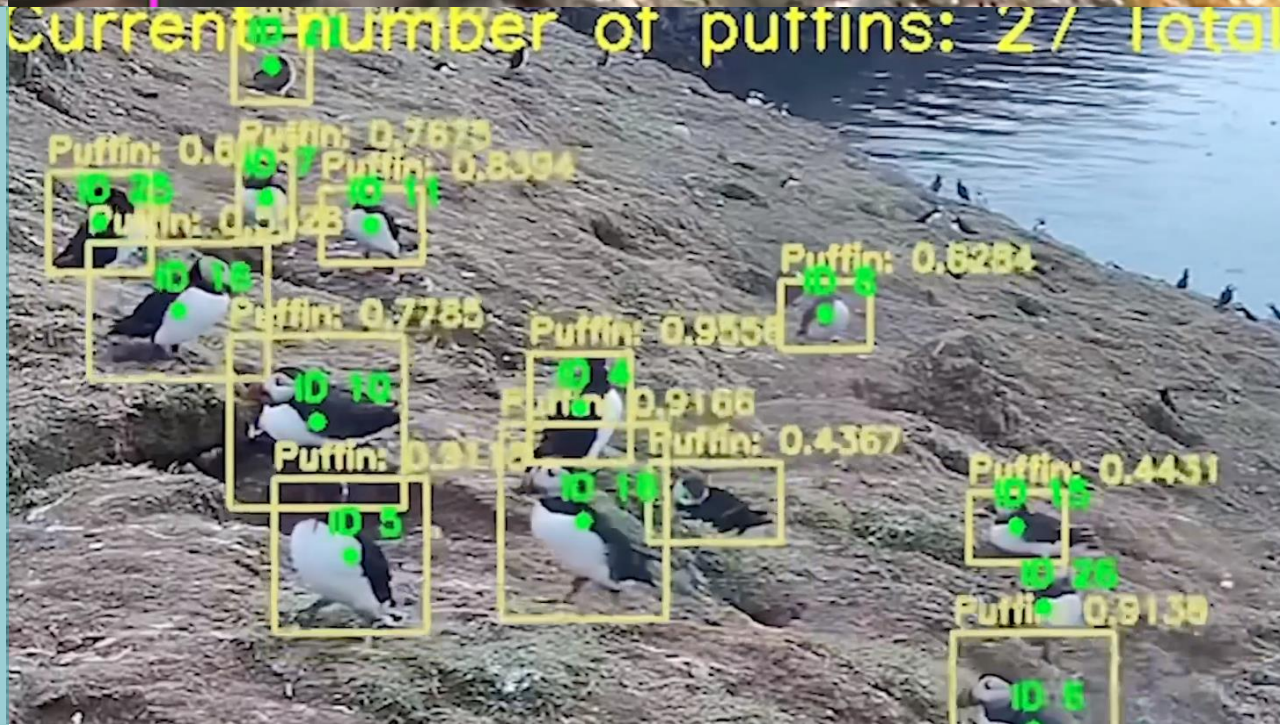
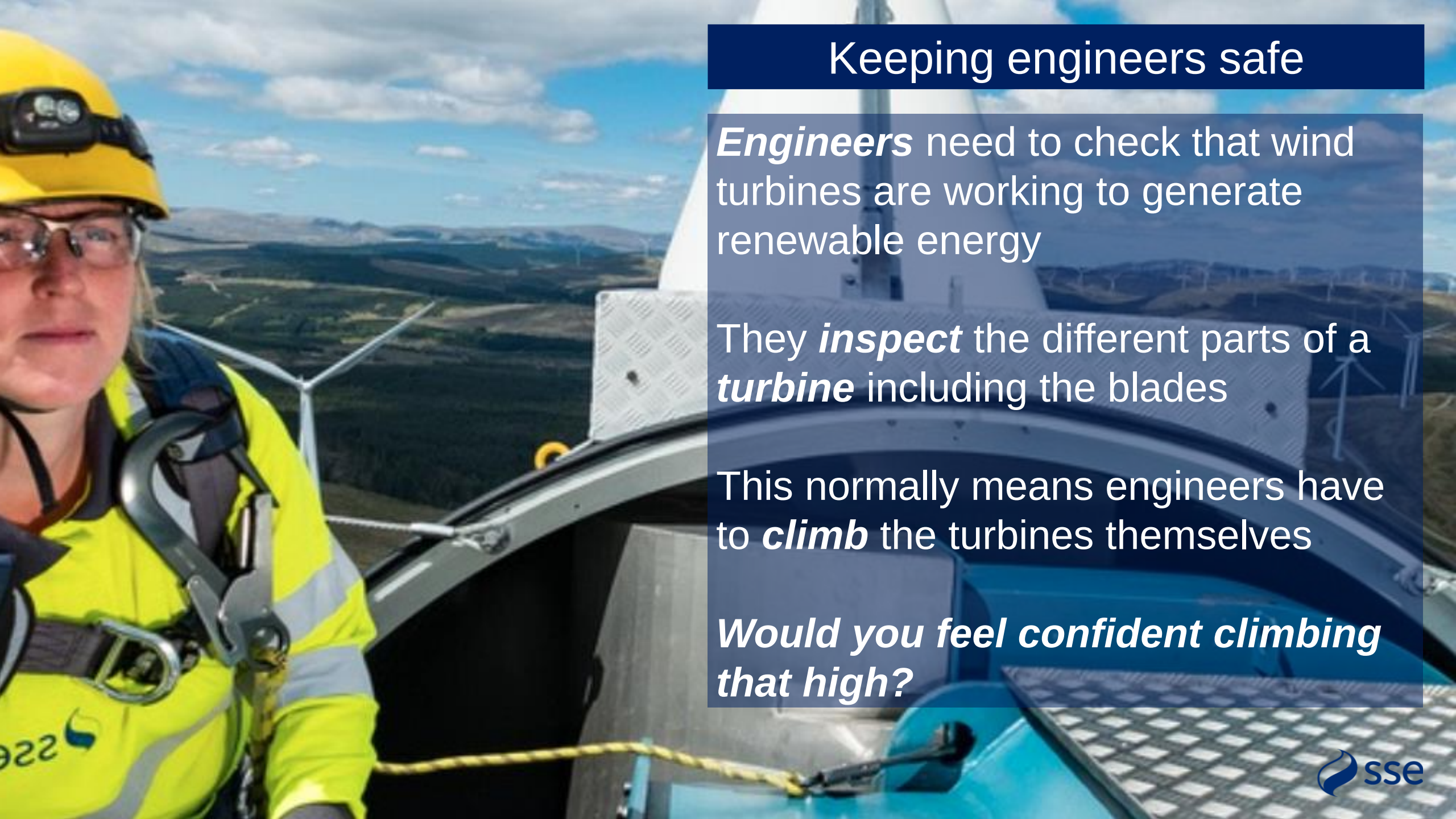


Flying Squad:
SSE have developed ***cameras*** which can ***count*** the number of ***puffins*** to ensure that they are ***safe*** living by the ***wind farms***





Keeping engineers safe

Engineers need to check that wind turbines are working to generate renewable energy

They ***inspect*** the different parts of a ***turbine*** including the blades

This normally means engineers have to ***climb*** the turbines themselves

Would you feel confident climbing that high?

iHawk:

SSE's engineers use ***drones*** which allow them to ***inspect*** the turbines ***virtually***

This is ***safer***, ***quicker*** and ***quieter***!

Local council:

"We plan to build more power stations for non-renewable energy because it doesn't rely on the wind always blowing and the sun always shining!"

How can you persuade your local council to stop building more power stations for non-renewable energy?

Imagine you are about to meet someone from the local council and need to convince them that this is a bad idea and that there are other options!

Which essential skill are we developing?

SPEAKING

The oral transmission of information or ideas

STEP 7

I speak engagingly using facts and examples to support my points

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"We plan to build more power stations for non-renewable energy because it doesn't rely on the wind always blowing and the sun always shining"

SPEAKING

Against

- 'I don’t like non-renewable power stations because...'
- 'I don't think you should build more power stations because...'
- 'We should not be promoting non-renewable energy because...'
- 'I believe that non-renewables are ***harmful*** because...'
- 'In my opinion, building more power stations would...'
- 'Even though non-renewable energy is ***quicker*** and ***cheaper***...'
- 'We need to be careful of the Earth's ***finite*** resources because...'
- 'You should be planning to build more ***windfarms*** because...'
- 'It would be much better to invest in more ***renewables*** because...'
- 'While renewable energy can harm local ***wildlife***, they now have ***cameras*** which can...'
- 'While climbing wind turbines can be risky, they now have ***drones*** which can...'

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Arguing persuasively

- 'I think... '
- 'In my opinion...'
- ‘Linking to...’
- ‘I disagree with...’
- ‘I believe that...'
- 'I ask you to consider that...'
- 'The fact is that...'
- 'Even though _____ ….'
- 'My position is that...'

"We plan to build more power stations for non-renewable energy because it doesn't rely on the wind always blowing and the sun always shining"

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How have we used our Speaking skills?

- What are facts?
- How can they help structure an argument?
- Where did you see this done well today?

Glossary

Air pollution – when harmful gasses are released into the air
Carbon emissions – harmful gasses that are released into the environment mostly from burning fossil fuels
Consumption – using energy to do different things e.g. exercise, cook, travel, use devices e.g. a tablet
Drone - a flying robot
Electric vehicles – vehicles that use electrical energy rather than fuel energy
Energy source – a way of producing energy
Finite resources – natural resources which do not naturally replenish and will run out
Fossil fuels – finite resources that are burnt to generate energy
Generate – using one resource to make another resource e.g. wind energy into electricity
Habitat – where animals live
Non-renewable – when energy is generated from finite resources which run out
Off-shore – out at sea
On-shore – on land
Power station – a place where energy is generated (often from burning finite resources)
Puffin colonies – groups of puffin seabirds that often live on small islands off the coast
Renewable – when energy is generated from resources that do not run out e.g. the Sun
Solar panels – panels which convert light energy form the Sun into electricity
Toxic waste – unwanted material that is often left from burning finite resources
Wildlife – animals that naturally live in an area
Wind farm – a group of wind turbines that use wind energy to generate electricity

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Activity	Time Allocation Guide
Do Now	5 mins
Introduction to sources of energy	15 mins
Provide Model: Guidelines for debate	15 mins
Pupil Practise: Preparing for the debate	15 mins
Review of Learning: Formal debate	10 mins

HOST FEEDBACK

Host Feedback

Please share your work with us on social media using our hashtag **#STEMatSSE**

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Contact us at ***stem@sse.com*** to request a volunteer from SSE to deliver the lesson

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