

Here comes the sun

Resources: Teacher Notes; PowerPoint slide; Activity Sheet

[Here comes the sun - Abuja - My City video](#)

[Here comes the sun - The Last Flower video](#)

[Here Comes the Sun - Photovoltaics video](#)

Introduction

These resources consider how electricity can be produced in an isolated location where mains power is not an option. They encourage students to consider the advantages and disadvantages of various options.

Learning Objectives	Learning Outcomes
To evaluate two different ways of producing electricity in an isolated location.	A justified comparison of two different electricity generation methods.

The PowerPoint slide can be used as an introduction to the context and a way of setting the scene, eliciting students' ideas. This could then be followed up by the use of the activity sheet, which looks for a more detailed and considered responses.

These could be supplemented if desired by the 'Here Comes the Sun' materials, both teacher and student facing, which consider the technologies in more detail. They use the context of a young man living in a city in Nigeria, where the power supply was unreliable.

A possible extension activity is to use the short Siemens video which looks at cutting edge developments in solar panels and considering whether in the future they don't need to be rigid but could be flexible:

[Perovskite solar cells](#)

Why this technology is important:

Solar power is an important part of our transition away from fossil fuels and nuclear power. It also represents a move from large centralised power generation facilities and towards a much larger number of stakeholders having the capacity to produce at least some of the power they need themselves. It also means that power can be produced in isolated locations.

However solar cells are dependent upon direct sunlight and even though they still function when the skies are overcast their output is reduced and they obviously don't function at night-time. Therefore they either need to be used in conjunction with storage batteries and/or other methods of power generation.

Answers to support Pupil Activity Sheet**Activity sheet:****Q1:**

Responses to questions on the PowerPoint might include:

- The petrol generator is always available and that is an advantage.
- Connecting the solar panel to a battery would then make electricity available at other times, though of course the battery can run down if used extensively.
- Solar panels don't need fuel transported or paid for.

Q2:

Criteria could include:

- Pollution should be minimised.
- Reliable source of electricity, day and night
- Should be cheap to run
- The device should be portable
- Doesn't need a supply of fuel

Q3:

The table might then look like this:

Criterion	Petrol generator	Solar panel
Pollution should be minimised.	Causes pollution so has to be used in a well ventilated area and will still release fumes that affect the climate.	Although the manufacture causes some pollution the operation doesn't.
Reliable source of electricity, day and night.	Yes.	Not at nighttime unless linked to a storage battery and less effective on an overcast day.
Should be cheap to run.	Depends on cost of fuel.	No running cost.
The device should be portable.	Yes.	Yes, though less so if the panel is large.
Doesn't need a supply of fuel.	Needs fuel.	Doesn't need fuel.

Q4:

The portable petrol generator would really only be used in a location where there was a mains supply if that supply was unreliable. Otherwise it would be too expensive and polluting to consider. The solar panels however could well be used in a situation where there was mains power as they could provide cheaper electricity for some of the time but with the mains supply as a back up.

Q5:

Answers might include: windmill, to produce electricity; solar water heater, to raise the temperature of water; heat pump, or ground source heat pump, to run space heating.

Answers to support PowerPoint Slides:

PowerPoint Slide Answers:

Q1:

The petrol generator can supply electricity at any time and can be easily set up where it is needed. However it needs a supply of fuel and it causes pollution.

Q2:

The solar panel is free to run and causes no pollution in its operation. However it is dependent upon the amount of light it receives in terms of its power output.

Q3:

There are a number of possible solutions, including having both devices but only using the petrol generator when there isn't sufficient light. Another way forward would be to have the solar panel linked to storage batteries to save electricity during the daytime.

Here Comes the Sun
Climate and Sustainability - Sustainable Energy & Infrastructure



The device on the left is a portable petrol powered generator. When the petrol engine is started it drives a generator which produces electricity. It can be moved to where the electricity supply is needed.

The device on the right is a solar panel. It can also be moved to where it is needed but doesn't need any fuel such as petrol. It is positioned to point at the Sun.

1. Suggest advantages and disadvantages for the petrol generator as a way of supplying electricity.
2. Suggest advantages and disadvantages for the solar panel as a way of supplying electricity.
3. Suggest a good way of producing electricity in an isolated location. Your answer could use either or both of these devices or some other technology.

SIEMENS

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Energy Island

Find the balance between cost, pollution and efficiency to keep Energy Island from grinding to a halt!

Infinity STARship

Virtual tour, discover quizzes, hear from Siemens apprentices and young graduates about the path they have followed to their career at the Wonder Wall and experience the SeeMe science and engineering show in the Auditorium.

Decarbonisation Game

Join the STARship crew on their first intergalactic mission to secure a sustainable future and protect Earth's resources.