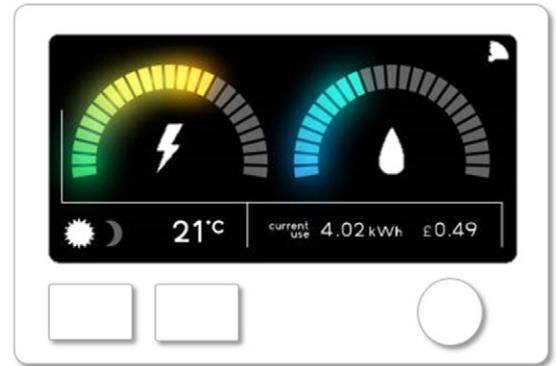




# Renewable Energy

CGI and [Smart DCC](#) are delighted to deliver the second STEM from Home pack of the series – **Renewable Energy.**

The Data Communications Company, often called [Smart DCC](#), is working with CGI to help digitise the energy system across Britain through the use of smart meters. Check out the [first pack](#) of the series for more info on smart meters.



This is an important step to help us all on our journey as we try to reduce the amount of carbon emissions that's making our planet suffer with climate change! CGI help Smart DCC to design, build and manage the technology behind smart meters for homes across the UK.

In this pack, children can research how renewable energy works, code energy challenges, discover it's benefits, attempt a word search and design their own renewable energy magazine.

## Researching renewable energy



### What is renewable energy?

Renewable energy uses sources that cannot run out, for example solar panels using the sun and wind turbines using wind. Energy sources such as coal and oil are not only damaging to the environment, but will one day run out.

### Why is renewable energy important?

Once non-renewable energy sources do run out, we will no longer be able to power our homes, businesses and cars. This is why we must develop sustainable energy methods that not only produce less pollution and are better for the environment, but can run forever, providing us with cleaner air and water.



### Wind energy

Wind energy is usually sourced from wind turbines, tall structures with large blades that move with the wind. Wind turbines work the opposite way to a fan, instead of using electricity to make wind, the turbines use wind to make electricity.

The wind rotates the blades of the turbine, this then spins a shaft, which is connected to a generator, making electricity. The electricity is then sent through distribution lines to a substation, then into our homes to help power them.



What are the advantages of wind energy?

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What are the disadvantages of wind energy?

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### Solar energy

Solar energy harnesses the power of the sun. This can be done in two different ways – as a heat source and as an energy source. Solar energy can heat the water and air in our homes and can be used to make electricity through a process called **photovoltaics**.

Solar panels convert sunlight directly into an electric current. This starts with sunlight in the form of photons hitting the solar cells, knocking loose tiny particles called electrons. All the movement in the electrons bouncing around makes electricity. The panel then collects all of the electricity, sends it through cables to be used in the home.



What are the advantages of solar energy?

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What are the disadvantages of solar energy?

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## Hydro energy

As strange as it sounds, we can actually use water to make electricity. Though these are a dangerous combination, the two never actually come into contact.

Hydro energy systems called hydroelectric plants exist all over the world, with some systems in the US generating power for more than two million homes! Hydro energy starts with water flowing down a river, this is known as a **current**, the current spins the turbines of a generator that is in the water, harnessing electricity.



What are the advantages of hydro energy?

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What are the disadvantages of hydro energy?

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## Your task:

What are the following types of energy and how do they work?

Biomass energy?

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Geothermal energy?

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## Renewable energy coding

### [Electricity generation](#)

Use Scratch to input real data on the type and amount of natural resources used by countries across the world to generate electricity. Then, compare the results using an animated data visualisation. Electricity is important. After all, it powers the computer you are using!



### [Water use calculator](#)

In this project you will make an interactive water usage calculator to make people think about how much water they use. You'll also write code that draws a chart to compare the amount of water used in various different activities.



## Renewable energy cost savings

### Can you solve these renewable energy maths questions?

Tony is considering getting solar panels installed on his home. Using a government scheme, this will cost him £3000. He is told that this will save him an average of £240 off of his energy bills each year. How long will it take for the solar panels to pay for themselves?

**Answer:**

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Mary has 6 wind turbines on her farm, four small and two large. Last year, each small turbine saved her £280 and each large turbine saved her £312 in energy costs. How much did she save in total over the year?

**Answer:**

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Rahima has recently moved into a new home that has an air source heat pump. The pump saves her £30 a month off of her bills. If she lives in the home for five years, how much money will she save?

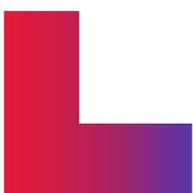
**Answer:**

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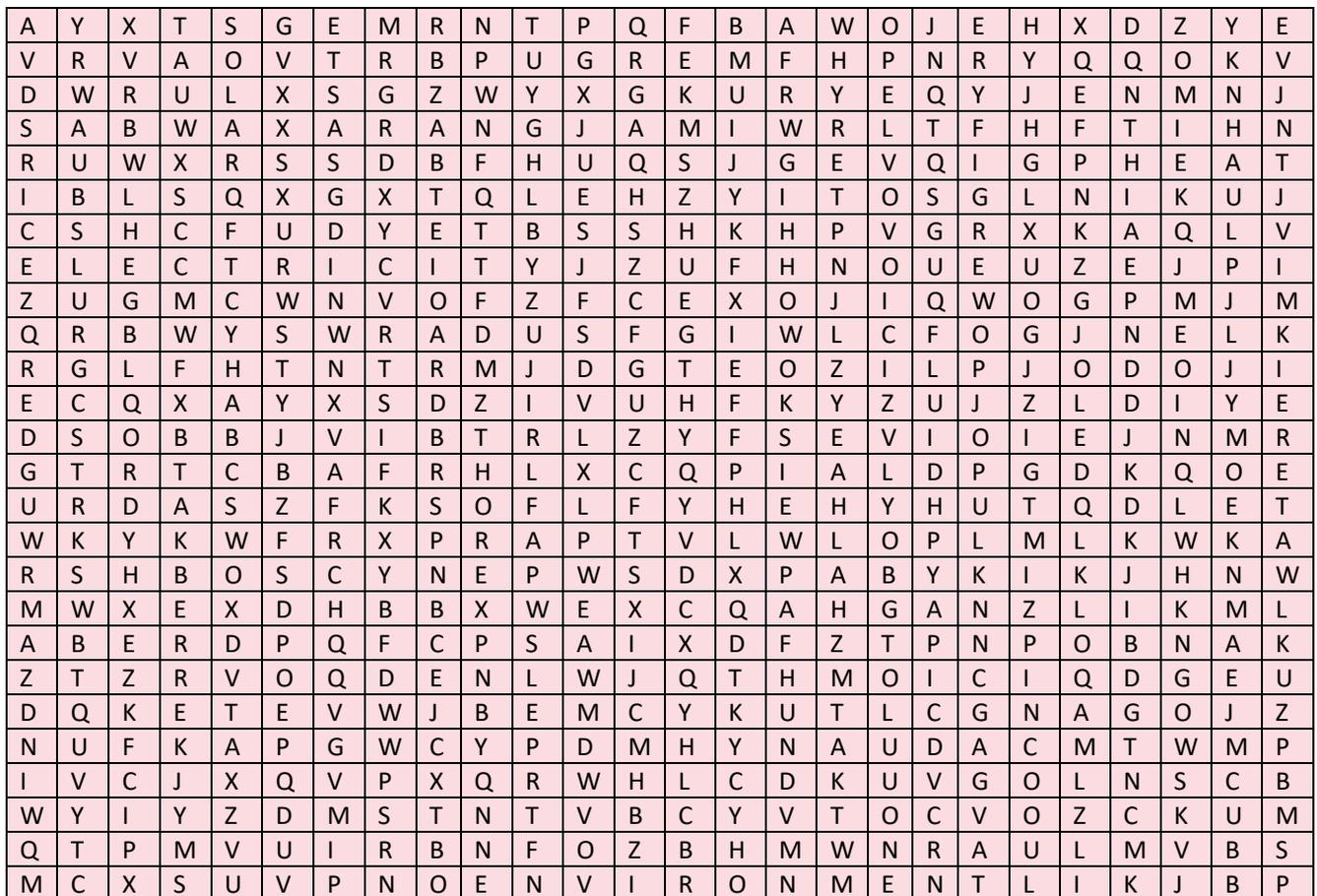
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## Renewable energy word search

How quickly can you find all 12 renewable energy related words in the word search? Time yourself and compete against your family!



|                       |             |       |             |
|-----------------------|-------------|-------|-------------|
| Wind                  | Environment | Water | Pollution   |
| EV (Electric vehicle) | Solar       | Power | Electricity |
| Energy                | Sustainable | hydro | Heat        |

## Design your own renewable energy magazine

Now that you know how renewable energy works and its benefits, your task is to create a virtual magazine to encourage people to use energy from renewable sources.

Using Raspberry Pi's [Magazine](#) activity, persuade people to use renewable energy in their homes and businesses. Some things to consider:

- What are the different types of renewable energy that people can use?
- What are the benefits of using renewable energy?
- How do renewable energy sources work?

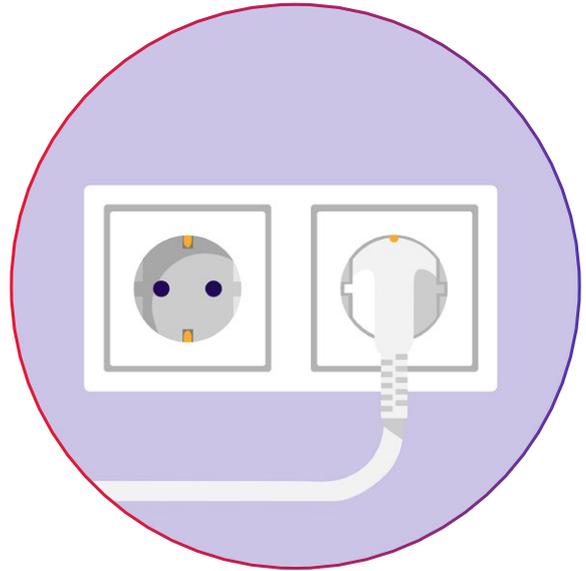
Use bright colours and images to really make your magazine stand out!



## Coming up in the next pack...

The next STEM pack of the series will look at **electric vehicles!**

Find out how electric vehicles work, why families are making the switch from petrol and diesel cars and the benefits to the environment.



Ask your parent/guardian to upload pictures of your STEM creations to [Twitter](#), [LinkedIn](#) or [Facebook](#) using **#STEMfromHome** and **#ExperienceCGI**

For more information or additional support with STEM activities when working remotely, contact [enquiry.uk@cgi.com](mailto:enquiry.uk@cgi.com)