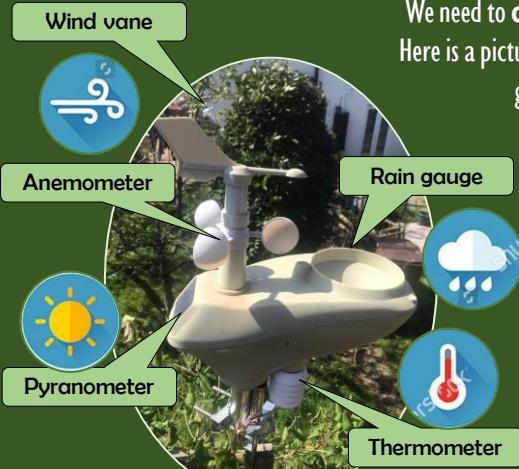


SMART DATA

We have been collecting data about the weather since the late 19th century! All this information has so many uses. The most common way is to use it to help us forecast the weather and show how our climate is changing. But we can also use it to help us make decisions like whether it will be icy and so the roads need gritting, or which parts of the country need extra flood protection as they get more rainfall than other parts. Information about the weather can also help us with our energy supply, making sure we can keep things powered. Energy and weather data science is very complicated, so the pretend events given on this page are very simplified but realistic enough to give you an idea! Do you have what it takes and become data smart?

WEATHER DATA

We need to **collect** data about the weather. We call this **meteorological data**. Here is a picture of a weather station and its instruments. Which instruments would give us useful information for the following types of renewable energy?



A meteorologist works with data from thousands of weather stations to make forecasts and provide information to groups of people who need weather information, like energy companies

ENERGY DATA

Whether it's a massive offshore wind-farm or a small roof-top solar array, every energy source that is connected to the power grid will collect data about how much energy it's producing.



STEP 1 ANSWERS: Anemometers measure wind speed and so are useful for wind energy. Pyranometers measure sunshine, so good for solar. Rain gauges measure rainfall which is helpful for hydro. Wind vanes measure wind direction and thermometers measure temperature.

Now's the time to make decisions! You have three options below. Match each one to A, B and C from step 3. Be careful, though, make the wrong decision and you might struggle to keep the lights on!

STEP 4: MAKE DECISIONS

- Option 1** Send extra water through the hydro dams to empty the reservoirs a little. Speed up checks and repairs to as many wind turbines as possible to make sure they are working well.
- Option 2** Give those solar panels a good clean and put fossil-fuel and nuclear power stations on stand-by ready to produce enough energy, as wind and hydro might not help much.
- Option 3** Shut off the hydro plants — at least it's a chance for some extra maintenance! Hopefully solar and wind will pick up the slack.

STEP 4 ANSWERS: Option 1 = B, Option 2 = A, Option 3 = C.

STEP 3: MAKE PREDICTIONS

With all that meteorological and energy data and patterns spotted, you are ready to make predictions! Here are some 'what if's' for you. What do you think will happen with the amount of energy made by wind, solar or hydro? The answers given below are just some things that might happen. Can you think of anything else?



A It's summer-time and for the next two weeks a heatwave is forecast. This very little cloud and not much wind.

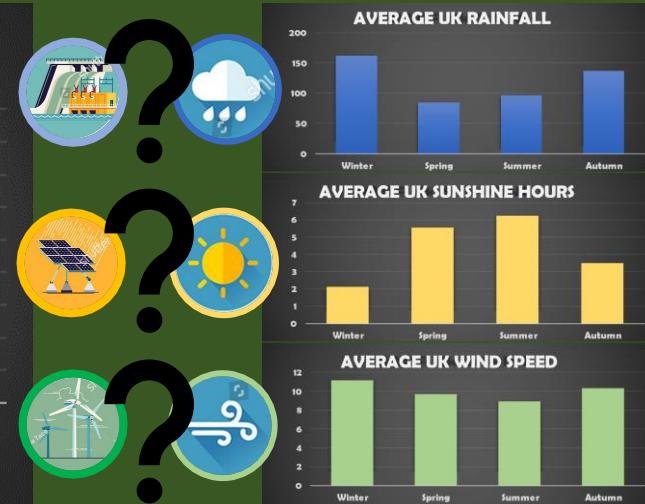
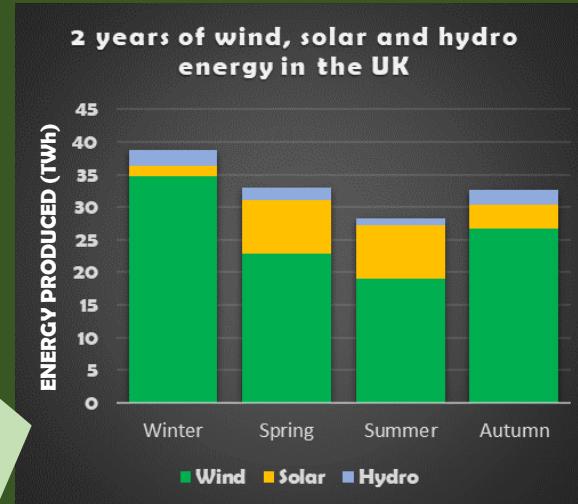
B It's November and a storm is making its way across the Atlantic and will hit the UK bringing lots of rain and wind.

C It has been a very dry spring and many reservoirs are running low due to the lack of rain.

STEP 3 ANSWERS: (A) There will be lots of solar energy being produced but not so much wind. (B) Reservoirs will fill up and so more water can be used for hydro. There will be lots of wind energy for a short time. (C) There will be little water to use for producing hydro energy over the summer.

STEP 2: ARE THERE PATTERNS IN THE DATA?

All this data can be collected and made into charts like these ones. Have a look at them carefully. We can see that most wind energy is produced during winter, when wind speeds are higher. What about solar and hydro? Can you spot a link with rainfall and sunshine?



STEP 2 ANSWERS: More solar energy is produced in the spring and summer when there are more sunshine hours. Hydro is a little trickier, but it is usually the case that more rain in Winter and Autumn means reservoirs have more water and so more of it can be used for hydro energy.

Kit Marie Rackley (geogramblings.com)



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