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RENEWABLE ENERGY GUIDE

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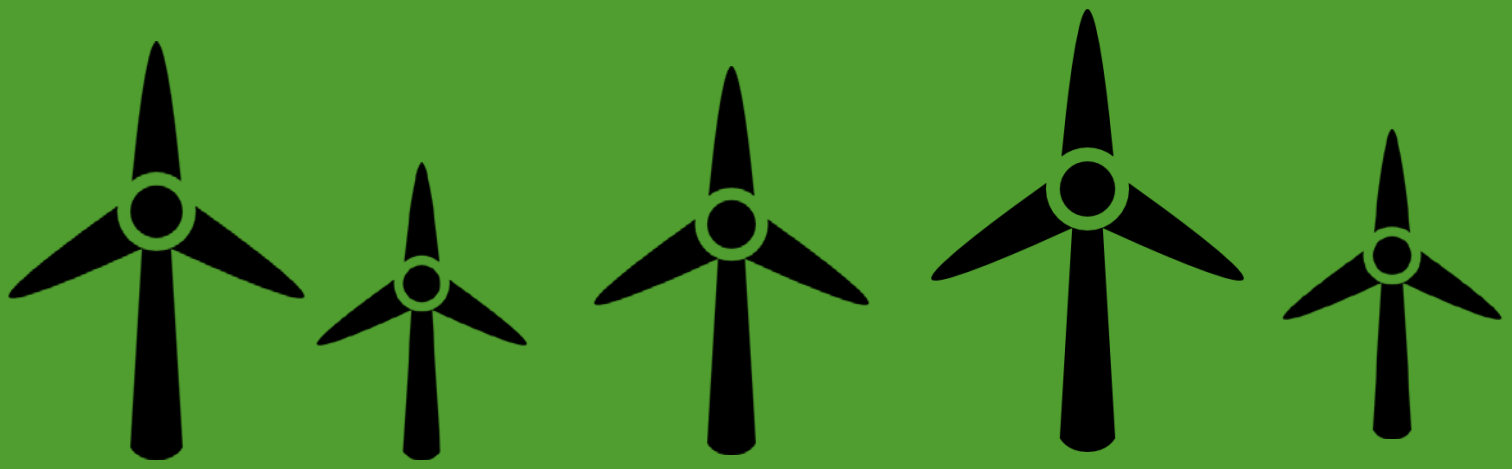
Why use renewable energy?

Most of the energy we currently use in the UK - alongside the vast majority of our energy sources in previous years - is non-renewable. We tend to use fossil fuels, also known as coal, oil and natural gas. These sources are limited and once they're gone, they're really gone. In recent years, we've become more aware of this issue and have come to the realisation that we can't go on living the way we are - it's simply not sustainable.

Because of this, there's been a bigger push for greener energy sources which not only are renewable, but which have zero carbon emissions. This benefits the environment on two counts, and can also be a cheaper energy source, helping your finances at the same time!



How much renewable energy does the UK generate?

We need to embrace zero carbon energy generation as soon as possible, and the solutions are available to us now. The UK already effectively utilises solar and wind power, so it's mainly a case of making these sources more widely available and extending the low carbon generation to heat production too.

Currently, low carbon energy sources, including renewables, total just over half of electricity produced here, with the UK ranked third for EU Wind Energy Capacity (14,572 MW compared to Germany's 50,019 MW in first place). On 7th June 2017, renewables provided over 50% of the UK's total electricity for the first time and on 30th June 2018, solar was the UK's top power source - 27.8% of overall energy generation!

Quick renewable facts

- 1 wind turbine makes electricity for 1,400 homes
- Solar may be the world's main power source by 2050
- Renewables generate about half of the UK's electricity
- 1 hour of sunlight = 1 year of power - if harnessed properly!
- 4 million UK homes have solar panels

Renewable heat sources

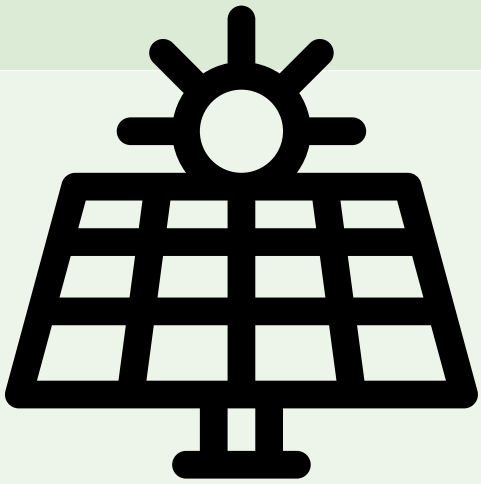
Renewable heat sources reduce carbon emissions and are an energy efficient way to heat or cool a property. They also lower the end user's energy bill, as well as benefiting the environment, providing multiple advantages.

Air source heat: These heat pumps extract heat from the air outside and harness it to deliver efficient heating and hot water. There are two types of pumps: air-to-water systems, and air-to-air systems. Air-to-water systems use hot water for heat transfer. Air-to-air systems heat the air extracted from outside and use fans to circulate it around the building.

Combined heat & power (CHP): These units generate electricity and heat at the same time. CHP units utilise gas, as it is considerably cheaper, and use it to produce electricity. Any waste heat created in this process is harnessed and used to heat the buildings, providing an all-round low carbon heat solution.

Water source heat: This system is based on an underground pipe network where water is extracted from sources like rivers, streams or lakes, and then circulated to buildings to reach the end users. The UK's temperate climate and year-round stable water temperatures mean that this is a really sustainable method.

Ground source heat: Ground source heat pumps extract solar energy from the earth's surface via plastic pipes buried in the group. The pipes work in either horizontal or vertical systems, depending on how much space is available on the property. The longer the pipe is, the more heat can be extracted and harnessed for use within the building.



Solar thermal: This method works by harnessing solar radiation and using it to heat water stored in a cylinder. The water is then ready for use by residents at the property. Some estimates suggest that solar thermal systems can provide up to 60% of the UK's hot water usage for a year.

Biomass boilers: Biomass is organic matter, such as wood pellets or logs, and burning it produces the same amount of CO2 as is absorbed by the material when it was growing. This makes it carbon neutral, and when it's burnt by biomass boilers, it creates heating and hot water for a property.

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Demand side response

Demand side response (DSR) focuses on intelligent energy use. Essentially, DSR is about shifting your electricity use from peak to quieter times, in order to reduce pressure placed on the electricity network.

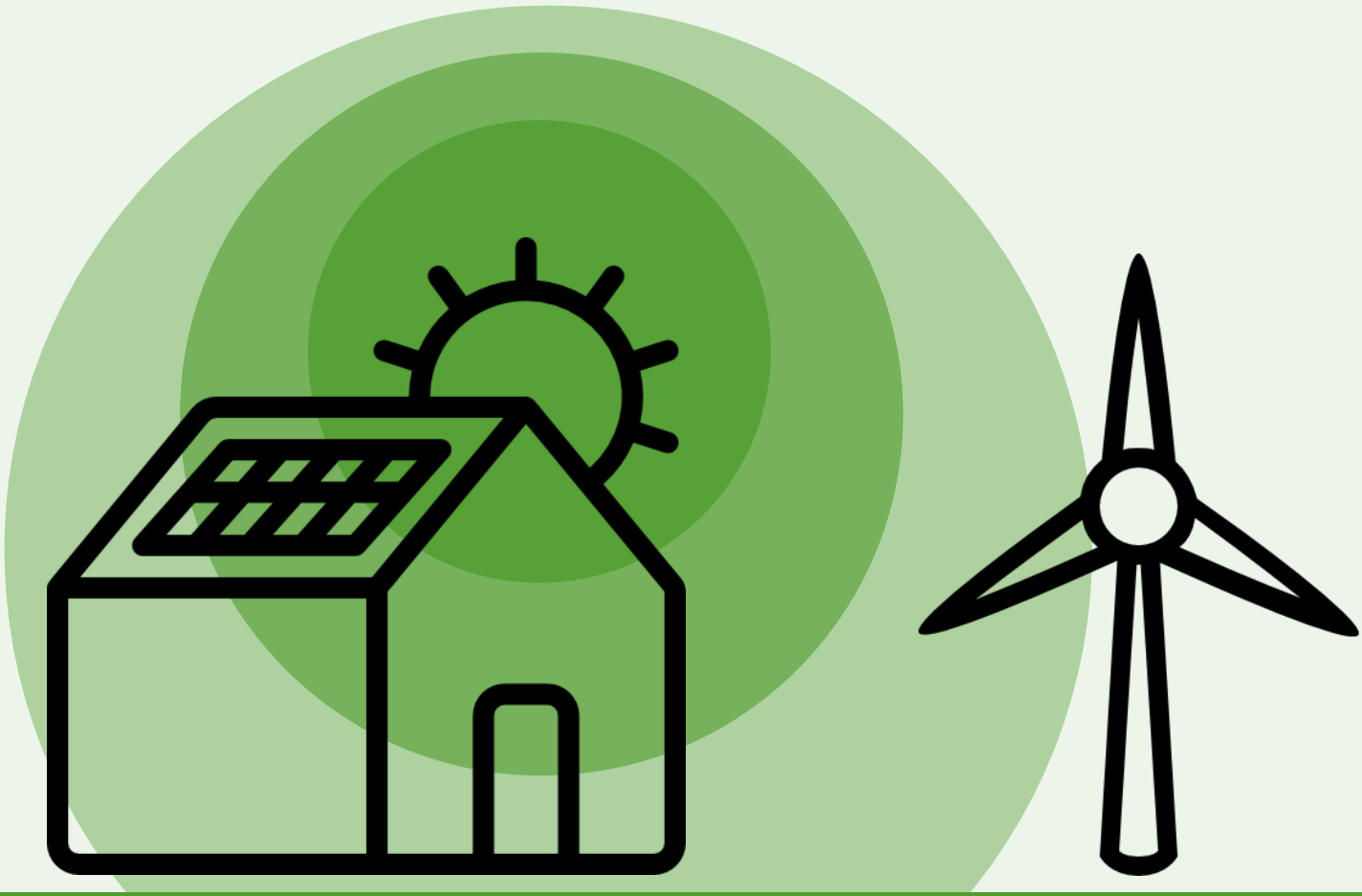
DSR is aimed primarily at industrial and commercial customers, for example factories are encouraged to delay high-energy industrial processes from times when the most energy is consumed across the grid, to quieter times such as overnight. This helps to ensure that no unnecessary energy is being used at times when the grid is already under extra pressure.

Often, due to vast amounts of energy being needed at peak times, surplus energy is generated and stored throughout the day, ready for use when needed. This method, however, is very expensive, so widespread implementation of DSR could save UK bill payers around £1 billion a year.

Although the energy used in the electricity network is not renewable itself, DSR is a really important step towards a renewable future. Reducing consumption plays a vital role in cutting our CO2 emissions when it comes to electricity generation.

Introducing DSR widely will lower consumer bills significantly. This is primarily because it makes more efficient use of existing electricity generators - some of which are several years old - requiring less power from them and at fewer points throughout the day.

A crucial step in facilitating DSR is to push for smart meters in more homes. Smart meters allow the end user to schedule their energy usage for certain times of the day, while also providing them with more options to manage their energy consumption as a whole. Although DSR will not solve the gas supply issues that the UK is facing, it is a reactive solution that will work in the short- to mid-term.



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Hydroelectric power

Hydroelectric power is produced by the movement of water. Essentially, a turbine is installed in a specialised dam, and when the water moves through the turbine, it turns it and generates electricity.

The dam must have a drop in elevation for the water's movement to turn the turbine effectively, so this type of power typically works best when the turbines are installed in rivers, lakes and dams.

Wind turbines

When wind blows, it turns the blades on turbines. This movement is triggered by the kinetic energy carried in the wind's movements, and powers a generator built into the turbine. This energy can then be converted into electrical energy for use by the end user.

Although the initial installation costs of wind turbines can be high, they produce electricity for 70-80% of the year, making them a very efficient renewable source.

Energy from waste

This renewable energy source is also known as EFW and involves burning waste to recover energy. The waste is burnt at temperatures of over 850°C which produces steam. This steam can then be used to power a turbine which in turn creates electricity. Aside from producing energy, EFW methods also prevent waste from going to landfill.

Wave & tidal power

Wave and tidal power both utilise turbines which are driven by the movement of water. However, in the case of wave power, the seawater's movement compresses trapped air to move the turbine. With tidal power, the turbine is moved directly by the water. Critics, however, say that the installation of the turbines negatively impacts wildlife.

Bio energy

Bio energy comes from the burning of organic materials, like forest debris or manure. To produce electricity, the biomass is burned, creating steam. This then moves a turbine which generates electricity. Processing the organic matter in this way, rather than just openly burning it, allows the heat energy released to be harnessed and converted into electric energy.

Solar energy

Solar panels can be installed on land or, most commonly, on rooftops of buildings to capture sunlight and convert it into electricity. It can either be transferred into the national grid or used on a smaller scale, such as in the building on which the panels are placed. Any excess energy created can be sold back to the grid under the Government's Renewable Heat Incentive, providing extra income for the owner.

Hydrogen energy

To produce hydrogen energy, plastic waste must be taken and converted through Distributed Modular Gasification. This process uses extremely high temperatures to turn plastic waste into a synthetic gas which is made mainly of hydrogen.

From this, clean hydrogen can be produced and either used in vehicles or in energy grids. Not only is this a low carbon energy solution, but it also helps to manage to problem of excess plastic waste entering our oceans.

Geothermal energy

Geothermal energy can only be produced in volcanic regions due to the heat of the earth in these areas. Cold water is funnelled underground, creating steam. Similarly to EFW methods of energy generation, this steam then powers turbines to produce electricity.

Although geothermal pumps can be expensive to install initially, there is long term potential for energy supplies in areas of volcanic activity. It's also very sustainable with zero CO_2 emissions.

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