



C3S CLIMATE & ENERGY EDUCATION DEMONSTRATOR VARIABLE FACT SHEET

SOLAR (PV) ENERGY

Historical & Projected 1971-2065

WHAT IS SOLAR (PV) ENERGY?

Solar cells or 'photovoltaic' (PV) cells, turn light from the sun into electricity. It is a type of *renewable energy* source meaning it can be used over and over without running out as it is constantly being replaced by nature. One solar panel can be wired with others to make a *solar array*. The bigger the array, the more power produced.



HOW IS IT MEASURED?



The power produced by a solar panel or array is measured in watts (W) and kilowatts (kW - one-thousand watts). When the sun is out, the power produced is higher. The amount of energy that is produced over time is measured in kilowatt hours (kWh). For example, on a bright cloudless day, in 2 hours, a 2kW solar array in direct sunlight will produce 4kWh of energy (2 hours x 2kW).

DID YOU KNOW?



With a wing-span of a 747 jumbo jet, the *Solar Impulse 2* journeyed around the world fuelled purely by solar PV energy. *Solar Impulse 2* used 11,655kWh of solar energy to travel a staggering 43,000km! This historic flight, which broke 19 world records, took place to demonstrate the potential of solar energy.



GLOSSARY

ENERGY STORAGE The capture of energy produced at one time for use at a later time, most commonly by use of batteries. Given the variability and seasonality of renewable energy, energy storage is thought to be an important way to maximise the benefits of it e.g. storing solar energy produced during sunny periods and then using it at night time.

INSTALLED CAPACITY The amount of energy that a power station is able to produce. For example, a solar PV array on the roof of a house might have an installed capacity of 2kW, but may only actually produce this much power in the middle of a bright sunny day.

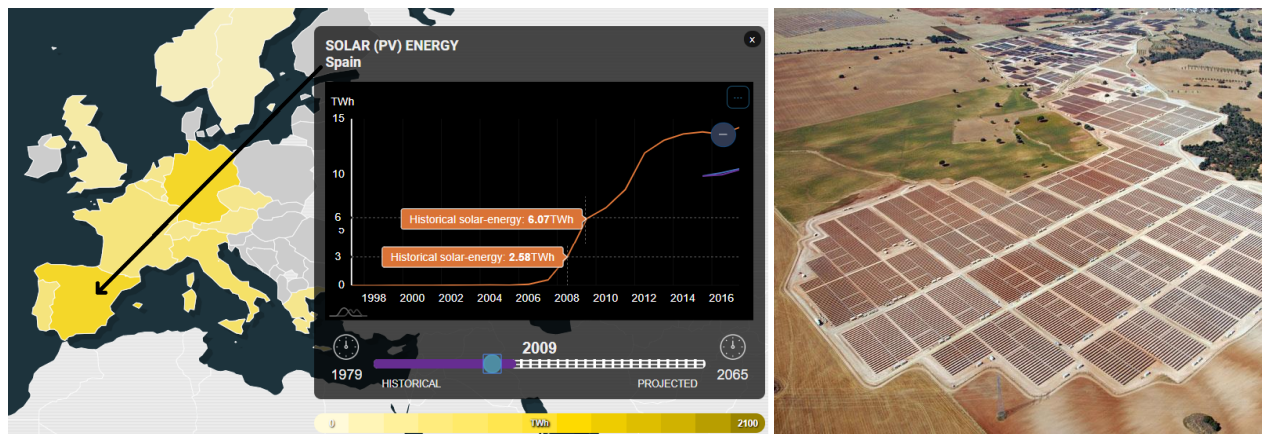
RENEWABLE ENERGY Often referred to as 'clean' or 'green' energy, this comes from natural sources or processes that are constantly replenished on a human time-scale. Examples are sunlight, wind, rain (hydro), tides, waves, and geothermal heat.

KEY MESSAGES FROM THE DATA

- Solar PV energy production has seen a **rapid increase across Europe** particularly **since the mid-2000s**, with **Germany** and **Italy** leading the way as the top two solar energy producing countries.
- However **by 2065**, solar PV energy is **projected to remain a small contributor** to Europe's electricity demand, **around 2%** according to the 'large-scale renewable & storage' energy model.



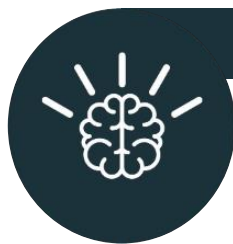
CASE STUDY: SPAIN'S 2008 SOLAR PV BOOM



Spain was one of the first European countries to undergo a solar PV 'boom' in 2008 it increased its 'installed generation capacity' by 2,718MW. This led to the biggest yearly increase in solar PV energy production from 2.58TWh in 2008 to 6.07TWh in 2009. The largest solar farm completed in 2008 was the *Olmedilla Photovoltaic Park* (pictured right), which at the time was the world's largest PV power plant. Olmedilla PV Park consists of 162,000 PV panels, delivering 60MW of electricity on a sunny day. It produces enough electricity to power more than 40,000 homes.

i FOR MORE DETAILS AND ACTIVITIES, AND FOR OTHER CASE STUDIES, SEE THE "RESOURCES" SECTION VIA THE MENU.

BE DATA SMART



There are many ways to measure energy production, and the variable nature of solar energy makes it more important to be mindful of this. For example, it may appear that a country's solar PV energy production went down for a year despite increasing the amount of installed capacity (see glossary). This could be due to that particular year being not as sunny as the previous years, amongst other factors. Solar PV energy is also very seasonal, with much more energy generated in the summer than in the winter.

The [Copernicus Climate Change Service \(C3S\)](#) is one of the European Union's Copernicus Earth Observation Programme services and is operated by the European Centre for Medium-Range Weather Forecast (ECMWF) on behalf of the European Commission.

SEE THE 'REFERENCES & SOURCES' SHEET FOR SOURCES OF INFORMATION. FOR TECHNICAL INFORMATION, LICENSE CONDITIONS, LINEAGE STATEMENT ETC SEE THE EUROPEAN CLIMATIC ENERGY MIXES (ECEM) VARIABLE FACT SHEET E03: http://ecem.wemcouncil.org/pdf/ECEM_VFS_E03_SPG_20180209.pdf

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