WHAT IS SOLAR RADIATION?

Solar radiation is the amount of energy the Earth surface receives from the sun. This includes direct sunlight, but also indirect sunlight that reflects off clouds and surroundings. In the northern hemisphere winter, the Earth tilts away from the sun and Europe on average receives less solar radiation. The opposite is true in the summer. This is why solar panels produce a lot more electricity in the summer than in the winter.

HOW IS IT MEASURED?

One piece of equipment used to measure solar radiation is a pyranometer (pictured left). The units used is watts per square meter (W/m²). On a cloudless day when the sun is directly above, roughly 1000W/m² hits the Earth’s surface. Some weather stations also record how long the sun shone for during the day using a sunshine recorder (right), which is a glass globe that focus the sun’s rays into a beam, burning a piece of paper.

DID YOU KNOW?

There are areas of the world that receive 24 hours of daylight for a part of the year! During the middle of the northern hemisphere summer (pictured left), the tilt of the Earth means that everywhere north of the Arctic Circle the sun never sets, at the same time everywhere south of the Antarctic Circle on the other side of the world experience 24 hours of darkness! The opposite is true during the northern hemisphere winter.

GLOSSARY

Latitude: The measure of how far a place is on Earth, north or south from the equator. The equator is given the number 0 (zero) degrees and the further north or south you go, that number goes up. The north pole is 90 degrees north and the south pole is 90 degrees south.

Long-term mean: An average that has been taken over a long period of time, usually 30 years or so. For example, Spain’s June solar radiation long-term mean for the years 1981 to 2010 was 305W/m².

Seasonal: Something that changes as the seasons (Spring, Summer, Autumn & Winter) change. Solar radiation, and so the heat and light a place gets from the sun, can be much less in the winter than in the summer, for example.
THE IMPACT OF LATITUDE ON CLIMATE

Why is it that countries closer to the equator are on average warmer? The map showing the average amount of solar radiation received across Europe between 1981-2010 has a clear pattern. The northern tip of Norway received around two and a half times less solar radiation than the southern tip of Spain, Italy and Greece. This is because the sun’s rays strike southern Europe more directly than northern Europe due to the curve of the Earth. Northern Norway in winter receives almost no solar radiation, as it is close to the Arctic Circle (see overleaf).

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

BE DATA SMART

Solar radiation is very seasonal, especially the further from the equator you go. Countries in Europe can have vastly different amounts of it during certain times of the year. Take Norway for example. Between 1981-2010 Finnmark in northern Norway received 97W/m² on average per year. However, it was 170W/m² during the summer and only 7W/m² during the winter! So, when something changes so much month-to-month or season-to-season, make sure you look at those differences within the year as well as the yearly average!