

Solar power by country 2022

Worldwide usage of solar energy varies greatly by country, with the top 10 countries representing approximately 74% of the photovoltaic market. As of 2022, China has the largest solar energy capacity in the world at 393,032 megawatts (MW), which produces roughly 4.7%-5% of the country's total energy consumption.

The renewable power capacity data represents the maximum net generating capacity of power plants and other installations that use renewable energy sources to produce electricity. For most countries and technologies, the data reflects the capacity installed and connected at the end of the calendar year. The data is presented in megawatts (MW ...

Solar PV dominated investment in 2022, accounting for 64% of the renewable energy investment. The overall snapshot of the investment trends across Asia-Pacific, Africa, Europe & others and Latin America & Caribbean regions are captured in the solar PV investment trends section of this report.

Solar power is clean, green, inexpensive, and renewable power that is produced when sunlight strikes human-made solar cells and is subsequently converted into electrical energy. Solar power is effectively infinite in supply and can be generated at any point at which sunlight reaches the ground in every country on Earth. Solar energy also prevents the negative impacts of fossil fuels, such as greenhouse gas emissions from coal consumption.

With 113,015 MW of solar power online and more on the way, the U.S. currently has enough solar power capacity to power 21 million households. A report from the National Renewable Energy Laboratory determined that solar panels covering a collective area of 22,000 square miles--roughly the area of Lake Michigan, or just over six tenths of a percent (.6%) of the country's total land area, could provide enough electricity to power the entire United States.

Solar energy is typically harnessed using either photovoltaic (PV) or concentrated solar power (CSP) systems. Photovoltaic systems are by far the more common and versatile of the two. Photovoltaic systems generate electricity directly from sunlight via solar cells: When solar radiation (sunlight) strikes a photovoltaic solar cell, the light's photons ionize semiconductor material (usually silicon) in the solar cell, which causes electrons to break free of their atomic bonds and creates an electrical current that can then be either directed or stored in a battery.

Solar cells absorb specific wavelengths of light. Other wavelengths are either reflected, too weak to be efficiently converted (infrared), or create heat instead of electricity (ultraviolet). However, solar cell technology continues to improve, increasing the efficiency of the conversion process.

The second-most-common method of harnessing solar energy is the concentrated solar power (CSP) installation. CSP plants produce electricity indirectly using devices known as solar thermal collectors, which focus solar energy to heat water, which then becomes steam and moves a turbine whose motion generates electricity. Globally, current CSP installations generate only a fraction as much energy (6,387 MW) as photovoltaic systems (843,086 MW).

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However, total capacity is only one way to view solar production. Another method is to examine solar penetration--that is, the percentage of each country's total energy consumption that comes from its solar installations.

All data and visualizations on Our World in Data rely on data sourced from one or several original data providers. Preparing this original data involves several processing steps. Depending on the data, this can include standardizing country names and world region definitions, converting units, calculating derived indicators such as per capita measures, as well as adding or adapting metadata such as the name or the description given to an indicator.

At the link below you can find a detailed description of the structure of our data pipeline, including links to all the code used to prepare data across Our World in Data.

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