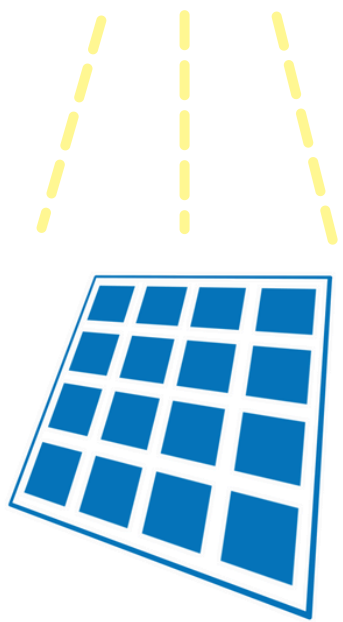


# Solar Energy (PV)

## What Is It?

Solar energy refers to collecting energy from the sun and converting it into electricity. The two primary methods are **photovoltaics (PV)** and concentrated/thermal solar.



## How Clean Is It?

Solar panels produce no emissions while generating electricity. Mining, building, and installing solar technology generates emissions and requires significant land use.



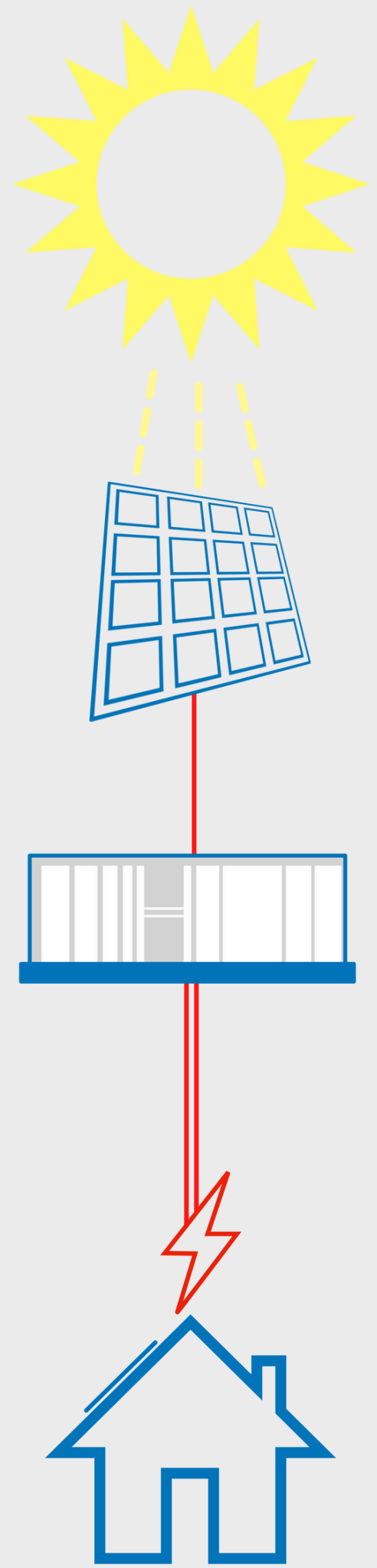
## What Does It Cost?

The cost of solar panels varies by efficiency, with rooftop solar being less efficient and cheaper than utility-scale installations.



## How Does It Work?

1. The sun radiates energy.
2. Photon particles travel 93 million miles in just over 8 minutes.
3. Photons (sunlight) hits the solar panels, where photovoltaic cells absorb light and release electrons.
4. The movement of electrons generates DC electricity, where electrons flow in a single direction.
5. Metal conductive plates on solar cells collect electrons and transfer it to wires.
6. Direct Current (DC) leaves the panel.
7. DC power is converted into usable Alternating Current (AC) electricity by the solar inverter.
8. AC power is either fed directly into the grid from a solar farm or directly into a breaker box for domestic use.



## Space



In the U.S., utility-scale solar power uses half a million acres of land, not accounting for rooftop solar installations. Increasing solar power to the energy grid will require significant additional land use.

## Point

- Solar energy is a renewable form of power.
- Utility-scale installations can generate significant amounts of energy.
- Solar energy produces no emissions.
- Solar energy has the lowest fatality rate of any energy source.
- Greater use of solar power can offset power from hydrocarbons, becoming a greater share of the energy mix.

## Counterpoint

- Solar technology requires mining and produces waste.
- Large solar farms can harm or displace surrounding wildlife.
- The process to build and install solar generates emissions.
- Death and injury can occur at every stage, from mining to installation to maintenance.
- Solar power is largely dependent on the weather and has a low maximum efficiency, while also requiring new infrastructure.

## Did You Know?

The largest solar farms can span thousands of acres, contain over a million separate panels, and power hundreds of thousands of homes. Many of the largest solar farms in the U.S. are located in California.

## What's Next?

Solar PV technology is progressing with more efficient panels, flexible materials, and enhanced energy storage, making solar power more practical and accessible. Additionally, smart grid integration and recycling efforts are supporting long-term sustainability and widespread adoption. Distributed energy solutions, like rooftop solar, will decrease power demand from the grid, even as utility-scale solar power makes up a small portion of the overall energy mix.