Solar panel diagram with explanation

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Solar energy has many benefits that are attractive to both homeowners and businesses. The primary benefit of solar energy is its cleanliness, as it does not generate any emissions or pollutants that can harm the environment. Additionally, since the sun will shine for free every day, using solar energy provides an inexhaustible source of renewable power that never runs out.

Cost Savings: Another major benefit of using solar energy is cost savings. Homeowners and businesses alike have seen a reduction in their monthly electric bills due to the use of photovoltaic (PV) panels on their roofs or other areas exposed to sunlight. PV panels convert the sun"s rays into electricity, which can be used immediately or stored in batteries for later use. This eliminates the need to purchase expensive utility-supplied electricity from traditional sources like coal-fired power plants and nuclear facilities. In addition, governments around the world offer generous tax credits and rebates when individuals install solar systems.

On first glance, solar panels are pretty simple pieces of technology. Sunlight hits them and they produce electricity, then flows out of a wire to whatever you want to power. Done. There"s no motors and no moving parts (electrons are the only moving object in a solar panel). However, when you take a closer look at a solar panel diagram, you’ll see they are actually incredibly complex.

The solar cells are what actually transform light into electricity. A typical residential solar panel includes 60 solar cells. If you look closely at the image above, you can see each square blue solar cell in the panel.

Solar cells are made up of extremely thin layers of silicon (the 2nd most common element in the universe), silver, aluminum, and a few other elements. Silicon is the workhorse that actually converts sunlight to electricity, while the other materials help to gather and transmit that electricity.

The image above represents a cross section of a solar cell. You can see the aluminum at the bottom of the panel that allows ‘used’ electrons to flow back into the panel (thus completing the circuit) as well as the anti-reflective coating on top to allow the solar panel to absorb as much sunlight as possible.

In between those two layers is the n-layer and the p-layer. What are those? That"s where the magic happens!

The n-layer and p-layer are the powerhouse of solar cells - it is where electricity is made!

Remember how electricity is simply the flow of electrons? Well, the n- and p-layers are both made of silicon, but the n-layer has extra electrons while the p-layer has extra holes that electrons can fill.

Here"s a quick TED video on the process:

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All the solar cells in a solar panel are extremely flat and squashed between a sheet of glass on top and a protective layer underneath. Since the glass is rigid and can crack, most solar panels are protected by an aluminum frame that goes around the solar panel to provide more strength.

Dupont publishes an interactive solar panel diagram - check it out to learn a bit more about each component.

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