Solar panels diagram inside

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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.

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.

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.

What about that last piece of equipment? If you look at the back of a solar panel, you"ll see a small black box near the top. That"s the junction box/bypass diode. You can see it for yourself in the picture below.

Bypass diodes are a bit more complicated. In solar installations, multiple solar panels are typically connected together in a line or "series". This is a cost-effective and simple system, but there is a drawback. If one solar panel suddenly becomes shaded (let"s say a cloud moves over a corner of your installation), that panel stops producing electricity, meaning the electrons aren"t following.

Since all the panels are connected, this panel then blocks all the electricity produced by the other panels from following, seriously hampering how much electricity your entire system is generating.

Like we mentioned at the beginning of this article, solar is actually a pretty simple system. Solar panels create electricity. That electricity is transported to your inverter via wires housed in protective metal pipes (known as ‘electrical conduit’) from the panels on your roof. The inverter changes the electricity from

direct current to alternating current (AC) so your home and grid can use the electricity.

After that, it is then fed directly into your electrical panel, typically via a circuit breaker just like the ones you already have in your electrical box. From there, you can use it in your home. If your installation is producing more than you can use, that excess will go directly into the grid.

In the end, the solar panel, as well as the entire solar installation, is simply about moving electrons from one place to another. It"s a simple concept, but amazingly complex once you really start to dig in. At least you now know that solar"s all about moving electrons - pull that out at your next dinner party!

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