

Learning Hub Guide: The basics of your solar panel system

How do solar panels work?

Solar panels are made up of many solar cells, each of which absorbs the photons from sunlight and the difference of electrical charge between the semiconductors induces electrical current, which is Electricity. This is then transmitted through the tabbing wire that snakes between each cell, they finally meet at the junction box which joins them together to form the whole solar panel. The solar panel then transmits this electricity through a lead wire that can be connected to a charge controller.





How to use the electricity from your solar panel.

Your solar panel produces direct current electricity (DC). DC power flows in one direction around the circuit, while Alternating current (AC) flows both ways around the circuit. Most household appliances use AC power, while vehicles, use DC power.

You will need to choose a load (a pump, lights, heater etc) that is DC powered. Usually in either 12V or 24V. For reference, AC appliances often use 110V or 220V.





Why do you need a battery?

Solar panels don't generate a constant amount of power throughout the day. A 400w max solar panel may produce 400watts per hour on a sunny day at noon. But most of the time it will produce 150-350 watts because most of the time it's not totally sunny. The graphs below show the solar energy hitting a solar panel on a sunny and cloudy day.



If you didn't have a battery, you would not have enough energy to run lights or a refrigerator at night. And during the day likely your solar panel would produce more power than you would need at one given time. Batteries allow you to have a constant supply of energy throughout the day, even if the sun is not shining.

Why do you need a charge controller?

If you connect a battery directly to a solar panel you will damage the battery. The battery needs a constant voltage input to effectively charge. The solar panel doesn't produce a constant voltage, thus the changing voltage will make the battery overheat. The charge controller regulates the voltage going into the battery or into a DC-powered device.





How to set up the system?

Connect the solar panel to the charge converter and the battery to the charge converter using the indicated inputs.



Your battery will now be charging! The charge controller will regulate the voltage entering your batter and will ensure your battery does not overcharge.



The whole system should look like the setup below (if you are only using a DC powered device you won't need the inverter)

