How solar panels work

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PV cells, or solar cells, generate electricity by absorbing sunlight and using the light ...

Climate change is one of the most devastating problems humanity has ever faced--and the clock is running out.

The energy choices we make today could make or break our ability to fight climate change.

Our transportation system is outdated and broken--and it needs to change.

The US food system should be providing healthy, sustainable food for everyone. Why isn"t it?

Democracy and science can be powerful partners for the public good--and both are under attack.

Solar photovoltaic (PV) panels are based on a high-tech but remarkably simple technology that converts sunlight directly to electricity.

It"s an idea that has been around for well over a century.

In 1839, French scientist Edmond Becquerel discovered that certain materials would give off sparks of electricity when struck with sunlight. Researchers soon discovered that this property, called the photoelectric effect, could be harnessed; the first photovoltaic (PV) cells, made of selenium, were created in the late 1800s. In the 1950s, scientists at Bell Labs revisited the technology and, using silicon, produced PV cells that could convert four percent of the energy in sunlight directly to electricity.

The most important components of a PV cell are two layers of semiconductor material commonly composed of silicon crystals. On its own, crystallized silicon is not a very good conductor of electricity, but when impurities are intentionally added--a process called doping--the stage is set for creating an electric current.

The bottom layer of the PV cell is usually doped with boron, which bonds with the silicon to facilitate a positive charge (P), while the top layer is doped with phosphorus, which bonds with the silicon to facilitate a negative charge (N).

The surface between the resulting "p-type" and "n-type" semiconductors is called the P-N junction (see diagram below). Electron movement at this surface produces an electric field that allows electrons to flow only from the p-type layer to the n-type layer.

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