

When light falls on a solar cell, electrons in the absorber layer are excited from a lower-energy "ground state," in which they are bound to specific atoms in the solid, to a higher "excited state," in which they can move through the solid. In the absence of the junction-forming layers, these "free" electrons are in random motion, and so there can be no oriented direct current. Figure 1-2 show the main components used in the construction of a solar panel. The addition of junction-forming layers, however, induces a built-in electric field that produces the photovoltaic effect. In effect, the electric field gives a collective motion to the electrons that flow past the electrical contact layers into an external circuit where they can do useful work.