



What is a Solar cell?

A **solar cell**, or Photovoltaic cell, is a semiconductor device consisting of a large area p-n junction diode fused together which, when exposed to sunlight is capable of generating usable electrical energy. This conversion is called the **photovoltaic effect**.

When was a Solar cell, invented or identified?

In 1839, Henri Becquerel a French scientist, discovered that an electric current could be produced by shining a light onto certain chemical solutions and termed it as photovoltaic effect.

In 1877, the Photovoltaic effect was first observed in a solid material (Selenium- a metal).

This material was used for many years for light meters, which only required very small amounts of power.

A deeper understanding of the scientific principles was provided by Sir. Einstein in 1905 and by Schottky in 1930.

The practical solar cells have only been available since the mid 1950's. The first Silicon solar cell was developed by Chapin, Pearson and Fuller in 1954, with an efficiency of 6%. These cells were used in specialized applications such as orbiting space satellites from 1958 onwards.

Today's commercially available Silicon solar cells have efficiencies of about 18–20 %, at a fraction of the price of thirty years ago.

There is now a variety of methods for the practical production of silicon solar cells (amorphous, single crystal, polycrystalline).

How do Solar cells work?

A solar cell consist of two types of material, often p-type Silicon and n-type Silicon. Light of certain wavelengths is able to ionize the atoms in the silicon and the internal field produced by the junction separates some of the positive charges ("holes") from the negative charges (electrons) within the photovoltaic device. The holes are swept into the positive or p-layer and the electrons are swept into the negative or n-layer. Although these opposite charges are attracted to each other, most of them can only recombine by passing through an external circuit outside the material because of the internal potential energy barrier. Therefore if a circuit is made (see figure below) power can be produced from the cells under illumination, since the free electrons have to pass through the load to recombine with the positive holes.