



# Photovoltaic power station wikipedia

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Photovoltaics (PV) is the conversion of light into electricity using semiconducting materials that exhibit the photovoltaic effect, a phenomenon studied in physics, photochemistry, and electrochemistry. The photovoltaic effect is commercially used for electricity generation and as photosensors.

A photovoltaic system employs solar modules, each comprising a number of solar cells, which generate electrical power. PV installations may be ground-mounted, rooftop-mounted, wall-mounted or floating. The mount may be fixed or use a solar tracker to follow the sun across the sky.

The term "photovoltaic" comes from the Greek *phōs* (*phōs*) meaning "light", and from "volt", the unit of electromotive force, the volt, which in turn comes from the last name of the Italian physicist Alessandro Volta, inventor of the battery (electrochemical cell). The term "photovoltaic" has been in use in English since 1849.

In 1989, the German Research Ministry initiated the first ever program to finance PV roofs (2200 roofs). A program led by Walter Sandtner in Bonn, Germany.

In 1994, Japan followed in their footsteps and conducted a similar program with 539 residential PV systems installed. Since, many countries have continued to produce and finance PV systems in an exponential speed.

Photovoltaics are best known as a method for generating electric power by using solar cells to convert energy from the sun into a flow of electrons by the photovoltaic effect.

For optimum performance, a solar panel needs to be made of similar modules oriented in the same direction perpendicular to direct sunlight. Bypass diodes are used to circumvent broken or shaded panels and optimize output. These bypass diodes are usually placed along groups of solar cells to create a continuous flow.

Electrical characteristics include nominal power ( $P_{MAX}$ , measured in W), open-circuit voltage (VOC), short-circuit current (ISC, measured in amperes), maximum power voltage (VMPP), maximum power current (IMPP), peak power (watt-peak,  $W_p$ ), and module efficiency (%).

Open-circuit voltage or VOC is the maximum voltage the module can produce when not connected to an electrical circuit or system. VOC can be measured with a voltmeter directly on an illuminated module's terminals or on its disconnected cable.

Temperature sensitivity is usually described by temperature coefficients, each of which expresses the

derivative of the parameter to which it refers with respect to the junction temperature. The values of these parameters, which can be found in any data sheet of the photovoltaic module, are the following:

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