



Photovoltaic

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- photovoltaic represents available a natural way of obtaining energy from sunlight
- solar radiation is clean, quiet and maintenance-free renewable resource
- it is the main energy source of the planet since its inception 4 billion years ago and another 4 billion years it will be

It is the world greater certainty than the fact that tomorrow the sun will rise again?

Sunlight

From the sun reaching the earth each year several thousand times more energy than the global annual consumption. Potential solar radiation is a huge cost to sunlight as fuel is zero. In many countries, would be enough to cover less than 1% of the area (eg roofs of buildings, unused area) of solar technologies in order to ensure enough power for the whole country

. The most efficient conversion of solar radiation is converted into heat energy. Electricity as universal and noblest form of energy obtained directly using photovoltaic panels, indirectly through wind and hydroelectric power plants and combustion of biomass and biogas

Type of solar radiation

Solar radiation passing through the atmosphere, the intensity of solar radiation scattering on particles of the atmosphere decreases. On the surface, therefore register the three basic types of solar radiation:

- direct sunlight
- scattered (diffuse) radiation
- radiation reflected either from the ground or other objects.

Photovoltaic

Photovoltaic is the technical field concerned with the conversion of sunlight into electricity. Photovoltaic is currently one of the most dynamically developing industries. Its expansion contributes promoting renewable and declining prices of photovoltaic panels.

The photovoltaic effect

Light incident on the interface of two semiconductor materials creates a voltage. Light flux of photons at the impact on the solar cell releases electrons to the n-side to move to the p-layer silicon semiconductor. Their movement generates direct current.

Photovoltaic cell

Photovoltaic cell is a thin (less than 1mm thick) plate composed of silicon and other materials with dimensions of approximately 10 x 10 cm. Voltage of this article is at optimum light conditions of about 0.5 V. Combining photovoltaic cells arises panel, PV system basis.

Photovoltaic panel

Photovoltaic panel is composed of a series or parallel interconnected photovoltaic cells. The panel is hermetically encapsulated and stored in an aluminium frame. The upper part is tempered solar glass, bottom tedlar (Unique properties of DuPont™ Tedlar® polyvinyl fluoride (PVF) biaxially oriented film include excellent resistance to weathering, outstanding mechanical properties, and inertness towards a wide variety of chemicals, solvents, and staining agents) pad which is placed connecting box. A construction and non-silicon thin-film panel is different, what is the different production technology. Photovoltaic is most often comes in the form of panels, which are mounted in suitable structures of roofing, or are directly integrated into the roof.



Types of PV panels

Photovoltaic panels are divided according to the material used for silicon and non-silicon - thin. The most widely used silicon panels divided into monocrystalline, polycrystalline and amorphous. The non-silicon is especially thin panels CdTe, GaAs, CIS, and CIGS.

Effect of solar panels to power

Direct solar radiation and ambient temperature 25°C are ideal conditions for the production of electricity from photovoltaic panels. Increasing the temperature of the panels 1°C , decrease of its performance by about 0.4%. Photovoltaic panels also utilize diffuse radiation in cloudy sky, their performance will be reduced by 30-50%. Proportion of diffuse radiation in our latitudes is about 50% of the total solar radiation..

Optimum slope and orientation panels

The ideal orientation of the panels is directly south orientation in SE or SW, the losses in performance to 5%. The slope of the panels depends on the type of installation and its method of use. Maximum profit was when tilted panels 30° - 35° , a year of operation alone systems it is advantageous to place the panels more "straight" about 49° .

Unit power 1 Wp

Maximum peak performance in standardized tests STC (Standard Test Conditions), energy falls on the solar panel vertically and has a value of $E = 1000 \text{ W/m}^2$, the density of the atmosphere $A_m = 1.5$ cell temperature $T = 25 \text{ }^\circ \text{C}$. The performance of the panel in real terms over denouncing test NOCT (Normal Operating Cell Temperature), panel inclination 45 ° , the intensity of radiation 800 W/m^2 , temperature $20 \text{ }^\circ \text{C}$, wind speed 1 m/s

The yield of 1 kWp installed

To calculate the yield affects the orientation and inclination of the panels, panel type, and habitat. Ideal oriented photovoltaic array panels.

Lifetime warranty

Life Span is stated by the manufacturer to 30 a more years. The warranty for mechanical construction panel - product warranty of 10 years. Power panel mainly due to moisture decreases over time. Výrobca garantuje hranicu maximálneho poklesu výkonu.

The manufacturer guarantees their maximum performance degradation. Warranty that guarantees the performance for 10 years running performance falls below 90%, and after 25 years of power falls below 80% of rated output panel.

Photovoltaic power plant

Photovoltaic power station is a device consisting of a photovoltaic array - serially interconnected photovoltaic panels, voltage inverter for converting direct current into alternating, breakers, wiring and meter to measure production. Production primarily used to cover consumption on the premises, the excess electricity produced is sent to the distribution network.

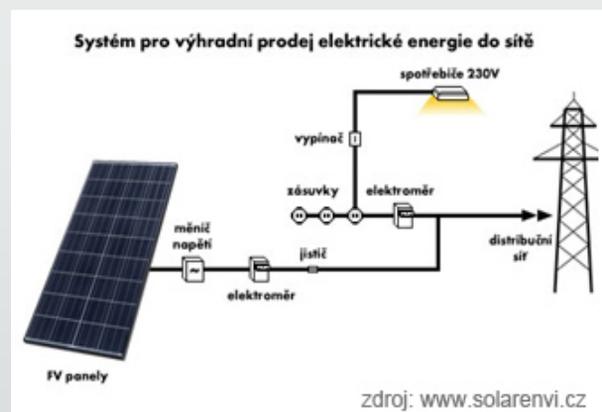
The system is connected to the distribution network.

According to the utilization of electricity distinguished photovoltaic system:

- For direct sales of electricity - photovoltaic power plant (PVP)
- For their own consumption and sale of surplus electricity produced - photovoltaic device (FPH)

Direct sales of electricity

The system produces energy exclusively for sale to the distribution network. The entire output power. Energy in terms of the distribution network is connected at the main meter.



This method is implemented mainly in places without captive / installation on the fields /, the house or the factory with private consumption is not economical.