

PHOTOVOLTAIC

Definition

Photovoltaic technology is the means to convert the sun's radiation directly into electricity by solar cells. These cells are made of semiconducting materials similar to those used in computer chips. When sunlight is absorbed by these materials, the solar energy knocks electrons loose from their atoms, allowing the electrons to flow through the material to produce electricity. This process of converting light (photons) to electricity (voltage) is called the **photovoltaic effect**. Photovoltaic modules are connected in series and in parallels. The modules mostly have a frame, and the supporting structures are usually built out of galvanized steel or aluminium. The structures are attached to the ground via a foundation. Most of the time this type of systems are grid connected. We distinguish between two types of photovoltaics:

- a) On/in building-mounted photovoltaic
- b) On ground-mounted photovoltaic

To a): Photovoltaic modules connected in series and in parallel that are mounted *onto* or *into the building's envelope*, also called *building added on photovoltaics (BAPV)*, or *building attached photovoltaics-BAPV*. Such photovoltaics do not use additional land area not included within the building's footprint neither do they have any building's function. In the case of *in buildings systems* (so-called *building integrated photovoltaics-BIPV*) the photovoltaic modules replace conventional buildings' technological units; therefore photovoltaic components, suited for building integration have to be used to fulfil a number of functions, e.g. mechanical and thermal, standard photovoltaic modules cannot meet.

To b): The majority of the solar power installed today, is ground-mounted. Based on some solar capture optimization rules, the modules have generally a fixed orientation (normally South facing in the Northern hemisphere), and they are tilted to an optimal angle in order to maximize solar utilization. The distance between the rows of modules is designed so as to avoid shading effects while maximising the use of the available land.

There is no consensus on the size of an on ground PV system to be defined "utility scale" or "large". The nominal power of on ground PV systems varies greatly, from a few kWp up to hundreds of MWp.

In some countries, the authorization procedure for on ground PV systems is related to the size. In Italy, for example, a simplified procedure exists for systems smaller than 1MWp, whereas for systems larger than 1MWp, the environmental impact assessment procedure is required.

Related terms

Solar thermal, Solar thermoelectric

Keywords

Building Integrated Photovoltaics, Building Added Photovoltaics, Building Attached Photovoltaics.

... Photovoltaic's definition continues.



Figure 25a Type a) Roof integrated photovoltaics, Tabià in Selva di Cadore (IT), designed by Exit. Special BIPV opaque components (modules + framing system) replace the traditional wooden tiles of the roof. (Photo courtesy of Exit)



Figure 25b Type a) Roof integrated photovoltaics. Glass-glass PV modules can be used in replacement of standard glazed surfaces (facades, roofs, skylights) in building's envelopes, coupled with standard framing systems. (Photo: courtesy of Ertex Solar)



Figure 25c Type b) Waldpolenz solarpark (40MW), Leipzig (DE). This PV system is a typical example of a large scale PV; it is built on a former military area. The modules are arranged in a parallel stripes pattern, are E-W oriented, and face the South with an optimal tilt inclination of about 30°. (Photo : Juwi Solar GmbH)



Figure 25d Type b) Agrinerie® (2.1 MWp), La Reunion (FR). It combines energy generation from PV and lemon grass production. This dual land use design pattern enabled the developers to get the approval for the realization of a system, since in French overseas islands it is not allowed to build on ground PV, because of land and landscape protection rules. (Photo: Akuo Energy)

... Photovoltaic's definition continues.

Source

http33: https://ec.europa.eu/research/energy/index.cfm?pg=area&areaname=renewable_solar

http34: <http://standards.globalspec.com/std/9996054/ds-en-50583-1>

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Translations: Solar PV ground-mounted power

Bosnia and Herzegovina Samostojeći fotonaponski solarni paneli

Bulgarian Соларна централа монтирана на земята

Croatian Ugrađene solarne fotonaponske ćelije

Czech Sluneční fotovoltaická (FV) pozemní energie

Danish Solceller jordmonteret

Dutch Grondgebonden zonnepanelen (*solar parks* = *zonneparken*)

Esperanto Suna surtere muntita elektrejo

Estonian Päikesepaneelid (*PV-paneelid*) maapinnal

Finish Aurinkopaneelit maassa (closest match)

French Energie solaire photovoltaïque terrestre

German Solarpark oder Freiflächen-Photovoltaikanlage

Greek Φωτοβολταϊκά συστήματα στο έδαφος

Hebrew סולארית אנרגיה (PV) הקרקע על

Hungarian földre telepített napelem

Italian Impianto fotovoltaico a terra

Islandic Sólarraflöður á jörðu

Latvian Saules kolektors uz zemes

Lithuanian Antžeminės saulės jėgainės

Montenegrin Solarna FN elektrana montirana na zeljištu

Polish Naziemne panele fotowoltaiczne

Portuguese Energia solar fotovoltaica montada no solo

Romanian Energie solară fotovoltaică terestră

Russian Солнечные фотоэлектрические системы смонтированные наземно

Slovenian Sončna elektrarna na tleh /

fotonapetostna elektrarna na tleh

Serbian Самостојећи фотонапонски соларни панели

Spanish Energía solar fotovoltaica sobre suelo

Swedish Sol PV markmonterad kraft

Translations: Solar PV on-roof power

Bosnia and Herzegovina Krovni fotonaponski solarni paneli

Bulgarian Соларна централа монтирана на покривите

Croatian Krovne solarne fotonaponske ćelije

Czech Sluneční fotovoltaická (FV) střešní energie

Danish Solceller tagmonteret

Dutch Zonne panelen op het dak

Esperanto Suna surtegmente muntita elektrejo

Estonian Päikesepaneelid (*PV-paneelid*) katusel

Finish Aurinkopaneelit katolla (closest match)

French Energie solaire photovoltaïque sur des toits

German Photovoltaikanlage auf dem Dach

Greek Φωτοβολταϊκά συστήματα στις σκεπές

Hebrew סולארית אנרגיה (PV) גגות על

Hungarian Tetőre telepített napelem

Italian Impianto fotovoltaico su edificio

Impianto fotovoltaico in copertura

Islandic Sólarraflöður á þaki

Latvian Saules kolektors uz jumta

Lithuanian Stogų saulės jėgainės

Montenegrin Solarna FN elektrana montirana na krovu

Polish Dachowe panele fotowoltaiczne

Portuguese Energia solar fotovoltaica instalada em telhados

Romanian Energie solară fotovoltaică pe acoperiş

Russian Солнечные фотоэлектрические системы смонтированные на здании

Slovenian sončna elektrarna na strehi /

fotonapetostna elektrarna na strehi

Serbian Кровни фотонапонски соларни панели

Spanish Energía solar fotovoltaica sobre

cubierta/techo

Swedish Sol PV markmonterad kraft