

## Grid-connected EPC System

### 并网EPC系统



### Engineering Procurement Construction Mode

Photovoltaic power station refers to a photovoltaic power generation system that uses solar energy and special materials such as crystalline silicon plate, inverter and other electronic components to connect with the power grid and transmit power to the power grid. Photovoltaic power station is a green power development energy project with the greatest encouragement from the state.

EPC Mode is also known as the integration mode of engineering, procurement and construction. It refers to that after the decision-making stage of the photovoltaic power station project, an engineering company is entrusted to carry out the general contracting of design procurement construction from the beginning of design through bidding. In this mode, according to the total price or adjustable total price specified in the contract, the engineering company is responsible for managing and controlling the progress, cost, quality and safety of the project, and completing the project according to the contract.

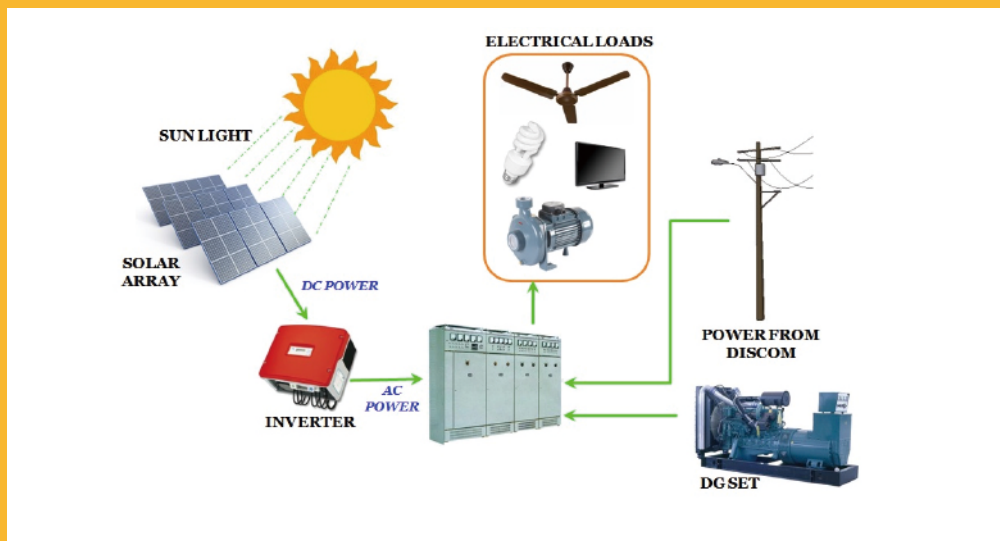
### 光伏电站EPC模式

光伏电站是指一种利用太阳光能、采用特殊材料诸如晶硅板、逆变器等电子元件组成的发电体系，与电网相连并向电网输送电力的光伏发电系统。光伏电站是属于国家鼓励力度最大的绿色电力开发能源项目。

EPC模式又称设计、采购、施工一体化模式。是指在光伏电站项目决策阶段以后，从设计开始，经招标，委托一家工程公司对设计-采购-建造进行总承包。在这种模式下，按照承包合同规定的总价或可调总价方式，由工程公司负责对工程项目的进度、费用、质量、安全进行管理和控制，并按合同约定完成工程。

## Grid-connected solar photovoltaic power generation system

### 并网太阳能光伏发电系统



### What is grid-connected solar photovoltaic generation system

The grid-connected solar photovoltaic power generation system is composed of photovoltaic cell array grid connected inverter, which directly inputs the electric energy into the public grid through the grid connected inverter without energy storage by the battery. Compared with the grid-connected solar photovoltaic power generation system, the off-grid solar photovoltaic power generation system saves the process of battery energy storage and release, reduces the energy consumption, saves the floor space and reduces the configuration cost.

### 什么是并网太阳能光伏发电系统

并网型太阳能光伏发电系统是由光伏电池方阵并网逆变器组成，不经过蓄电池储能，通过并网逆变器直接将电能输入公共电网。并网太阳能光伏发电系统相比离网太阳能光伏发电系统省掉了蓄电池储能和释放的过程，减少了其中的能量消耗，节约了占地空间，还降低了配置成本。





## The classification of grid-connected solar photovoltaic generation system

### 1. Grid-connected photovoltaic power generation system with countercurrent

#### 有逆流并网光伏发电系统

When the electric energy generated by the solar photovoltaic system is sufficient, the remaining electric energy can be fed into the public power grid to supply power to the power grid (sell electricity); When the power provided by the solar photovoltaic system is insufficient, the electric energy will supply power to the load (buy electricity). Because the direction of power supply to the power grid is opposite to that of the power grid, it is called countercurrent photovoltaic power generation system.

当太阳能光伏系统发出的电能充裕时，可将剩余电能馈入公共电网，向电网供电（卖电）；当太阳能光伏系统提供的电力不足时，由电能向负载供电（买电）。由于向电网供电时与电网供电的方向相反，所以称为有逆流光伏发电系统。

### 2. Non countercurrent grid-connected photovoltaic power generation system

#### 无逆流并网光伏发电系统

The solar photovoltaic power generation system will not supply power to the public grid even if the power generation is sufficient. However, when the power supply of the solar photovoltaic system is insufficient, the public grid will supply power to the load.

太阳能光伏发电系统即使发电充裕也不向公共电网供电，但当太阳能光伏系统供电不足时，则由公共电网向负载供电。

### 3. Switching grid-connected photovoltaic power generation system

#### 切换型并网光伏发电系统

The so-called switched grid-connected photovoltaic power generation system actually has the function of automatic operation and two-way switching. First, when the photovoltaic power generation system is insufficient due to cloudy, rainy days and its own failure, the switcher can automatically switch to the power supply side of the power grid and supply power to the load from the power grid; Second, when the power grid is actually powered off for some reason, the photovoltaic system can automatically switch to separate the power grid from the photovoltaic system and become the working state of the independent photovoltaic power generation system. Some switching photovoltaic power generation systems can also disconnect the power supply for general loads and connect the power supply for emergency loads when necessary. Generally, switched grid-connected power generation systems are equipped with energy storage devices.

所谓切换型并网光伏发电系统，实际上是具有自动运行双向切换的功能。一是当光伏发电系统因多云、阴雨天及自身故障等导致发电量不足时，切换器能自动切换到电网供电一侧，由电网向负载供电；二是当电网因为某种原因突然停电时，光伏系统可以自动切换使电网与光伏系统分离，成为独立光伏发电系统工作状态。有些切换型光伏发电系统，还可以在需要时断开为一般负载的供电，接通对应急负载的供电。一般切换型并网发电系统都带有储能装置。

#### 4. Grid-connected photovoltaic power generation system with energy storage device

##### 有储能装置的并网光伏发电系统

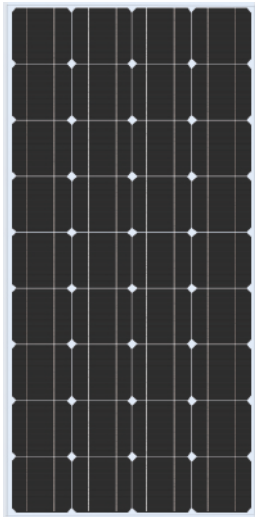
It is to configure energy storage device according to needs in the above types of photovoltaic power generation systems. The photovoltaic system with energy storage device has strong initiative. In case of power failure, power restriction and fault in the power grid, it can operate independently and supply power to the load normally. Therefore, the grid connected photovoltaic power generation system with energy storage device can be used as the power supply system for important or emergency loads such as emergency communication power supply, medical equipment, gas station, refuge indication and lighting.

就是在上述几类光伏发电系统中根据需要配置储能装置。带有储能装置的光伏系统主动性较强，当电网出现停电、限电及故障时，可独立运行，正常向负载供电。因此带有储能装置的并网光伏发电系统可以作为紧急通信电源、医疗设备、加油站、避难场所指示及照明等重要或应急负载的供电系统。

#### The components of grid-connected solar photovoltaic generation system

##### 1. Solar panel

##### 太阳能板



Solar panel is the core part of solar power generation system. The function of solar panel is to convert the light energy of the sun into electric energy, output DC and store it in the battery. Solar panel is one of the most important components in solar power generation system. Its conversion rate and service life are important factors to determine whether the solar cell has service value.

太阳能电池板是太阳能发电系统中的核心部分，太阳能电池板的作用是将太阳的光能转化为电能后，输出直流电存入蓄电池中。太阳能电池板是太阳能发电系统中最重要部件之一，其转换率和使用寿命是决定太阳电池是否具有使用价值的重要因素。



## 2. Inverter

逆变器



The direct output of solar energy is generally DC 36V to DC 48V. In order to provide electric energy to 220VAC electrical appliances, it is necessary to convert the DC energy generated by the solar power generation system into AC energy, so DC-AC inverter is required.

太阳能的直接输出一般都是DC 36V - DC 48V。为能向220VAC的电器提供电能，需要将太阳能发电系统所发出的直流电能转换成交流电能，因此需要使用DC-AC逆变器。

## 3. AC distribution cabinet

交流配电柜



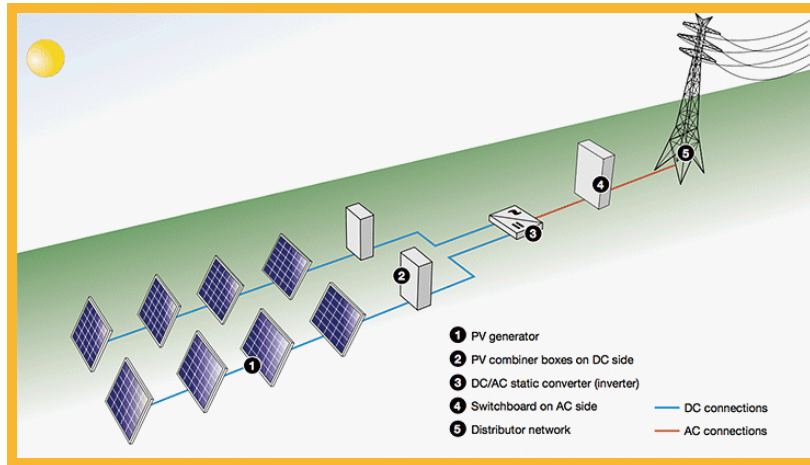
Its main function in the power station system is to switch the standby inverter, ensure the normal power supply of the system, and measure the electric energy of the line.

其在电站系统的主要作用是对备用逆变器的切换功能，保证系统的正常供电，同时还有对线路电能的计量。

## The forms of grid-connected solar photovoltaic generation system

### 1. Centralized grid connection

#### 集中式并网

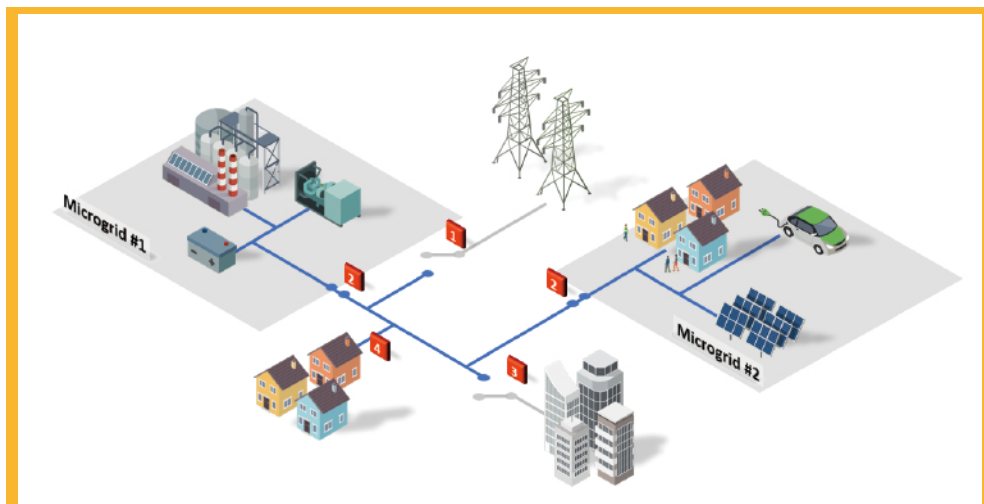


The utility model is characterized in that the generated energy is directly transmitted to the large power grid, which is uniformly allocated by the large power grid to supply power to users, and the power exchange with the large power grid is one-way. It is suitable for grid connection of large-scale photovoltaic power stations, which are usually far from the load point. Desert photovoltaic power stations are connected to the grid in this way.

特点是所发电能被直接输送到大电网，由大电网统一调配向用户供电，与大电网之间的电力交换是单向的。适于大型光伏电站并网，通常离负荷点比较远，荒漠光伏电站采用这种方式并网。

### 2: Decentralized grid connection

#### 分散式并网



Also known as distributed photovoltaic power generation and grid connection, it is characterized in that the electric energy generated is directly distributed to the power load. The excess or insufficient power is regulated by connecting the large power grid, and the power exchange with the large power grid may be two-way. It is suitable for small-scale photovoltaic power generation system. Generally, this method is adopted for urban photovoltaic power generation system, especially for building combined photovoltaic system.

又称为分布式光伏发电并网，特点是所发出的电能直接分配到用电负载上，多余或者不足的电力通过联结大电网来调节，与大电网之间的电力交换可能是双向的。适于小规模光伏发电系统，通常城区光伏发电系统采用这种方式，特别是于建筑结合的光伏系统。



## Application Scenarios

It is widely used in remote mountainous areas, power-free areas, islands, communication base stations and street lamps. The system is generally composed of photovoltaic array composed of solar cell modules, solar charge and discharge controller, grid connected inverter, DC load and AC load. The photovoltaic array converts solar energy into electric energy when there is light, and supplies power to the load through the solar charge and discharge controller.

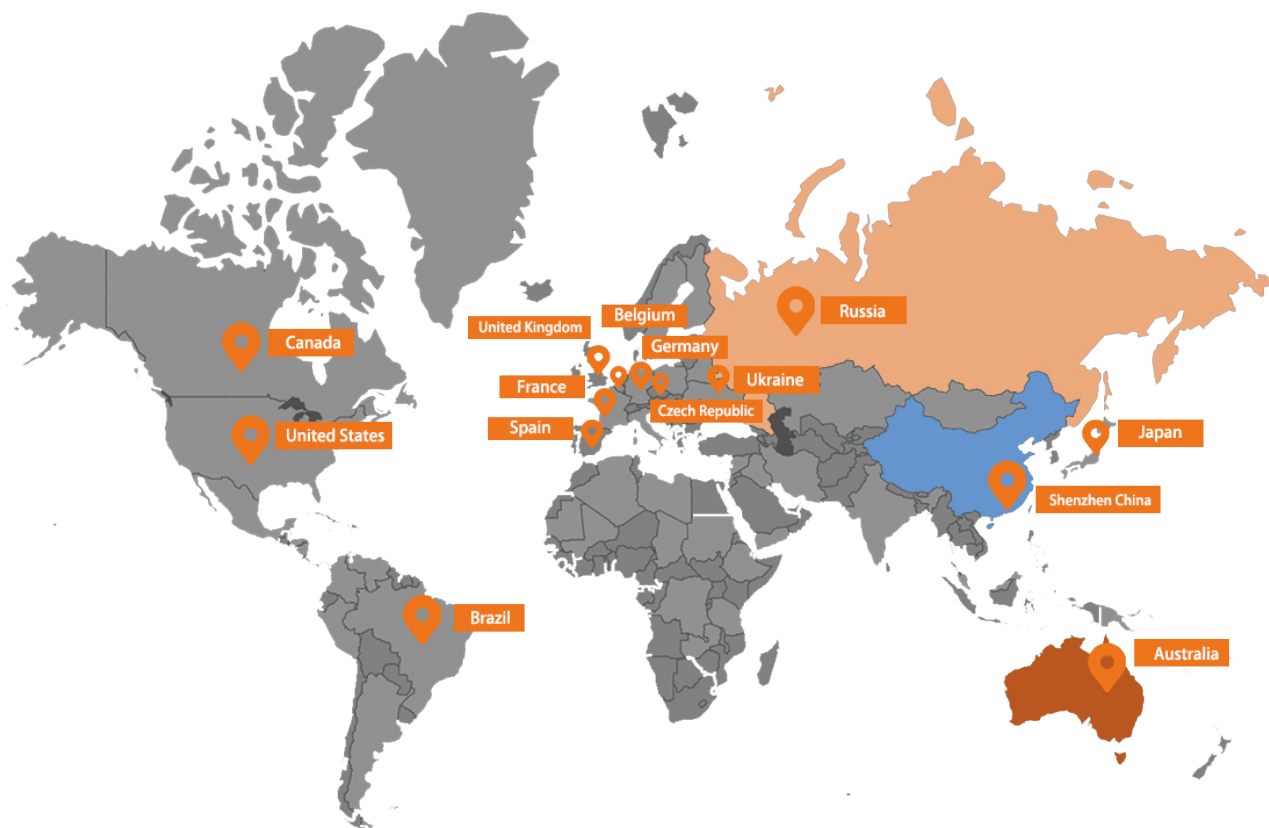
### 应用场景

广泛应用于偏僻山区、无电区、海岛、通讯基站和路灯等应用场所。系统一般由太阳能电池组件组成的光伏方阵、太阳能充放电控制器、并网型逆变器、直流负载和交流负载等构成。光伏方阵在有光照的情况下将太阳能转换为电能，通过太阳能充放电控制器给负载供电。





## Global Markets Distribution



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