International Journal of Civil Engineering and Machinery Manufacture

Volume 4, Issue 2, June, 2019

Publisher: HongKong New Century Cultural Publishing House
Address: Unit A1, 7/F, Cheuk Nang Plaza, 250 Hennessy Road, Wanchai, Hong Kong
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Photovoltaic Power Generation

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Abstract: This essay mainly introduces structural composition of photovoltaic power generation. And list its advantages and disadvantages. It also points to the classification of photovoltaic systems.

Keywords: Renewable energy; Photovoltaic power.

1. Introduction

With the advancement and development of science and technology, energy and the environment are very important to human beings. Humans also realize that it is necessary to use renewable energy like geothermal energy, tidal energy, wind energy, etc. This article introduces solar energy in main.

Photovoltaic power generation is a technology which make solar energy into electrical energy in direct. It is made up by four components: solar panels (use semiconductor interface's photovoltaic effect), DC to DC parts and inverter. The important part are made up of electronic components. The solar cells are put and used in series which means to make a cell module. The module is connected to a DC to DC part and can supply DC voltage to DC load and battery.

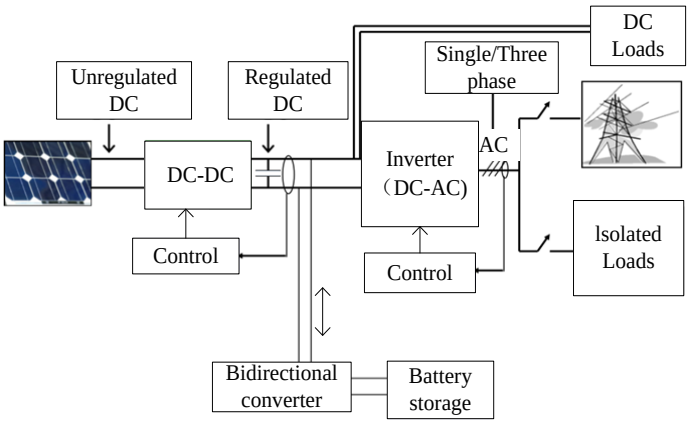

Figure 1. Photovoltaic power systems

2. Advantage

In addition to China, other countries' energy is also very tight. China is a country with energy shortages which energy reserves are less than the world average. It can be used for a long time and costs a little money to maintain and clean it. It is clean energy which is relative safety and mostly used. It's also high efficient and would save much money in future. It is also very important when it talk to long-term energy strategy. The advantages of photovoltaic power generation could be reflected in many aspects when it compared with the traditional generations:

Will not run out.
No contaminants, high reliability and safety.
Can be installed in any location without geographical restrictions.
It can generate electricity on site without consuming fuel and erecting transmission lines.
Better quality of electricity.
People are willing to accept.
Short construction time.

3. Disadvantages

Although solar energy is a clean energy source, certain pollutants are produced when solar panels are produced. Under the existing conditions, the level of solar panels produced in China is not very high, and mass production

will bring some pollution to the earth. According to calculations, a lot of energy is consumed when producing a common-size solar panel. This energy is enough to make a led lamp work for a long time, and the more solar panels produced, the more energy is consumed and the more pollution is produced.
The energy produced per unit area is not very large and requires a large area of solar panels.
affected by weather conditions, such as rain, cloudy days, etc.
The construction cost in the early stage is much larger than the traditional generator.
Solar panels will produce some pollution during production which is not very environmentally friendly.

4. Photovoltaic System Classification

4.1. Independent photovoltaic power generation

Another name for independent photovoltaic power generation is off grid photovoltaic power generation. It is usually consists of three parts, a solar cell module, a controller, and a battery. It necessary to owned a AC inverter which means to supply power to an AC load. Independent photovoltaic power generation usually can be established at any places, include city power supply, rural power supply, street light power supply, emergency protection power supply, etc.

4.2. Grid connected photovoltaic power generation

Grid connected photovoltaic power generation have certain requirements for electrical energy. Only after the voltage after photovoltaic power generation is processed accordingly, after the grid connection conditions are met, the power can be fed back to the grid. If the system has a DC battery, some of the power is directly fed back to the DC power supply.
The grid connected power generation system which is connected with batteries is very flexible. It can be put into operation or launched according to the needs of the power grid, and thus has a good effect on the adjustment of the grid voltage, so that the grid voltage is maintained within a certain range. Photovoltaic power generation systems installed in buildings such as residential shopping malls are generally equipped with batteries, while photovoltaic power generation systems without batteries are less flexible and generally installed in larger networks.
Usually large-scale photovoltaic power plants are owned by the state, and there are many power plants connected to the grid, which can provide a lot of power. The electricity generated by these power plants can be directly put into the power grid, and managed by the dispatch center to control the power flow. But this large power plant often requires high costs. Common photovoltaic power generation equipment is small equipment and is widely used. Because of its relatively low cost, fast construction, and considerable power generation, it has been welcomed by many people. This is also the mainstream of photovoltaic power generation.

4.3. Distributed photovoltaic power generation

Distributed photovoltaic power generation system has other names called distributed power supply, sometimes people call it decentralized power generation. It is often installed in the vicinity of places where electrical energy is required to meet the needs of specific users, with better flexibility and better economy. run, or both.
The distributed photovoltaic power generation system are basicly made up of five parts which includes battery part, bracket part, DC combination box, DC power distribution unit, inverter unit, AC power distribution unit, etc.

5. Conclusion

The use of renewable energy is of great importance to human beings. It not only protects the environment, but also saves existing fossil energy. Photovoltaic power generation systems are suitable for almost all locations like factories, homes, shopping malls, etc. Solar energy has been valued by various countries as a clean energy source, especially in countries with sparsely populated and high grid costs. Overall, the use of photovoltaic power generation is worth promoting

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