STUDY OF WORKING PRINCIPLE OF SMALL SOLAR PHOTOELECTRIC PLANTS

Abduladjanov Azizillo Rasuljon o'g'li
Xojimatov Umidbek Turg'unboy o'g'li

Annotation: The choice of solar panels depends on several factors. The stability of the sunrise in the region also has a positive effect on the efficiency of the panels, but the most important aspect in choosing a panel remains its type.

Key words: small solar power plants, solar panel, monocrystalline panels, polycrystalline panels, amorphous solar panels.

Usually, small solar power plants with a capacity of about 2 kW to 10 kW are recommended to be installed on the roofs of houses or in places with favorable sunlight.

Small SPP consists of several main parts. They are:

- Solar panels
- Accumulator
- Inventor
- Controller

Solar panel. The most basic and important part of these elements is that it generates free energy from the sun by converting sunlight into electricity without any moving parts, zero emissions and maintenance. Solar cells work on the basis of the phenomenon of photoeffect. Today, there are mainly three types of solar panels: monocrystalline, polycrystalline, and amorphous.[1-2]

Monocrystalline panels. Production of solar cells based on monocrystalline silicon, due to the highest purity of the source material (monocrystalline silicon), allows obtaining the highest indicators of photoelectric conversion efficiency among commercial modules. They are obtained by dividing a single silicon crystal into wafers. Monocrystalline elements have rounded corners and a flat surface. Rounded corners are associated with obtaining a cylindrical zagatovka in the production of monocrystalline silicon. [3-4] The uniformity of color and structure of monocrystalline elements depends on the fact that it is a single grown silicon crystal and the crystal structure is homogeneous. The efficiency of these elements is from 20% to 25%.

Polycrystalline panels. Polycrystalline solar cells are made by slowly cooling molten silicon. On the other hand, polycrystalline elements have a square shape due to the fact that a rectangular zagatovka is obtained during the extraction process. The non-uniformity of the color and structure of polycrystalline elements is due to the fact that they are composed of a large number of dissimilar silicon crystals and also contain a small amount of impurities. Polycrystalline silicon elements are distinguished by a bright blue color. These solar panels have the best efficiency: 17-20%, but they are ineffective in scattered light, i.e. on cloudy days.

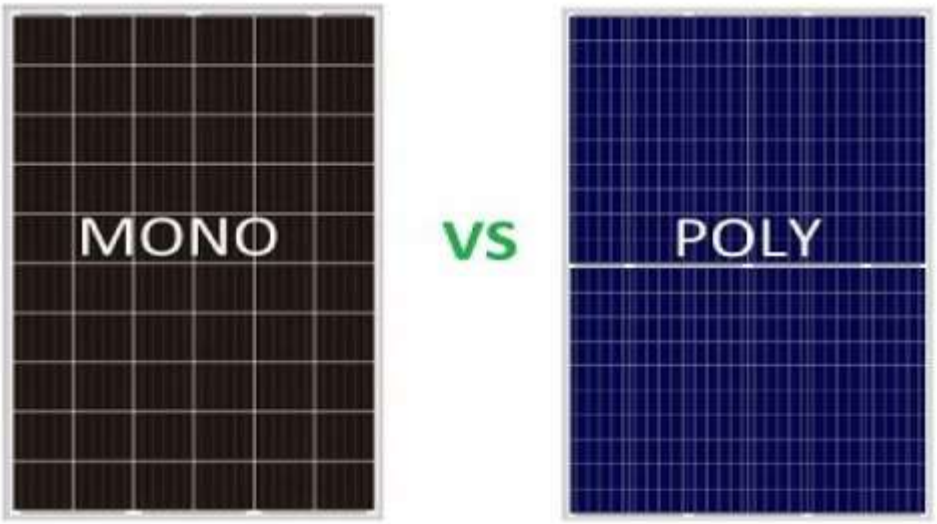

Figure 1. Overview of monocrystalline and polycrystalline panels.

Amorphous solar panels. They are not necessarily crystal, but rather a thin layer of silicon is laid over base materials such as metal or glass to create a solar panel. These Amorphous solar panels are very cheap, but their energy efficiency requires much less square footage to produce the same amount of power as a monocrystalline or polycrystalline solar panel. Amorphous solar panels can also be installed on long sheets of roofing material to cover large areas of the south-facing roof surface. Amorphous film batteries mean a thin silicon coating on the material. The amorphous silicon layer is covered with a protective film. The advantage of these elements is that they work even in diffused light, and therefore they can be installed even on the walls of buildings. The disadvantage is the low efficiency of 7-10%, as well as the gradual deterioration of the amorphous silicon layer despite the protective layer. But even in cloudy weather, it allows to get more electricity.

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