УДК 620.91, 620.92
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AUTOMATIC BICOSONIC SYSTEM SURVEILLANCE OF THE SUN

Головань М., Костючко С. Автоматична двохосьова система стеження за сонцем. У даній статті проаналізовано основні джерела видобутку електроенергії. Продемонстровано їх переваги та недоліки. Досліджено найперспективніший з них. Наведено перспективи розвитку сонячних електростанцій. Відмічено основні види та методи монтажу досліджуваних станцій.
Ключові слова: електростанція, трекер, сонячна панель, енергоефективність.

Головань Н., Костючко С. Автоматическая двухосевая система слежения за солнцем. В данной статье проанализированы основные источники добычи электроэнергии. Продемонстрировано их преимущества и недостатки. Исследовано самый перспективный из них. Приведены перспективы развития солнечных электростанций. Отмечено основные виды и методы монтажа исследуемых станций.
Ключевые слова: электростанция, трекер, солнечная панель, энергоэффективность.

Holovan M., Kostiuchko S. Automatic bicosonic system surveillance of the sun. This article analyzes the main sources of electricity generation. Their advantages and disadvantages are demonstrated. The most promising of them is investigated. Prospects of solar power stations development are presented. The main types and methods of the studied stations installation are noted.
Keywords: power plant, tracker, solar panel, energy efficiency.

Introduction

A modern person does not imagine himself without the latest technology, the latest gadgets. But all these devices need power and consume not a small amount of electricity for the production of which mankind spends no effort. Ways of extracting this most popular resource are quite different from the most dangerous to the environmentally friendly. After all, with the large use of resources sharply appears the problem of pollution. We will analyze the main types of electricity generation their advantages and disadvantages.

Types of power plants.

Thermal power plant (TPP) is a power plant in which primary energy has a chemical form and is released by combustion of coal, liquid fuels or gas.

The main advantages include the low cost of consumed fuel; small investment; free accommodation; low cost of energy.

Disadvantages: high degree of environmental pollution; significant expenses for the operation of plants; have no binding to a specific area; small placement area.

Nuclear Power Plant (NPP) is a power plant in which nuclear (nuclear) energy is converted into electricity. The power generator at the NPP is a nuclear reactor. Unlike natural gas fired power plants, nuclear power plants operate on nuclear fuel (mainly 233U, 235U, 239Pu).

The advantages of such stations are: the small amount of harmful emissions; small amount of fuel used; high output power; low cost of energy.

The disadvantages include: the danger of exposure; the impossibility of adjusting the output power; low probability of an accident, but very serious consequences of the world scale; significant capital investments.

Hydroelectric Power Plant (HPP) is a power plant that, with the help of a hydro turbine, converts the kinetic energy of water into electricity.

Advantages: do not need extraction and transportation of the resource; environmental friendliness; regulation of water flows; high reliability; easy maintenance; low cost

Disadvantages: alienation of fertile lands; waterlogging; violation of aquatic ecosystems; large areas of accommodation; possible additional use of natural resources.

Solar power plant (SPP) is solar panels consist of a series photocells that are semiconductor devices and instantly receive and convert solar energy into electricity. The transformation process itself is called the photoelectric effect itself.

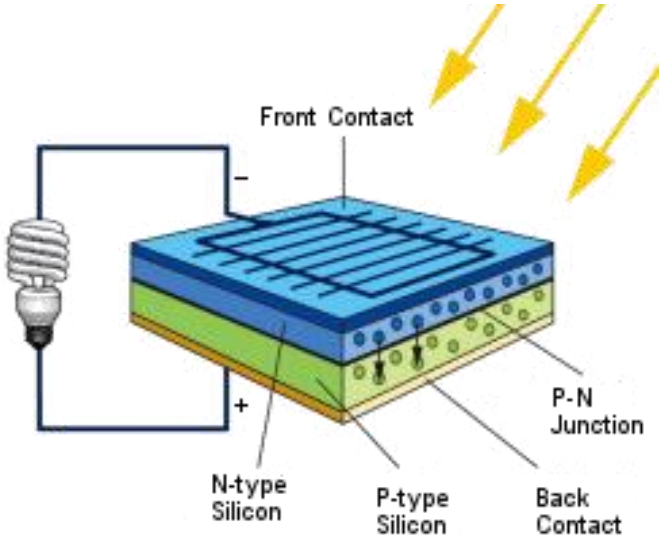


Figure 1 - Scheme of work of solar panels

Advantages: environmentally friendly; energy independence; work from sunrise to its west; do not require maintenance; receiving a profit for the "Green" tariff; durable.

Disadvantages: expensive cost

Wind power plant (WPP) is a power plant that, with a wind turbine help, converts the mechanical energy of the wind to an electric power. Wind power plants are a renewable energy system, because wind is a renewable energy source.

Advantages: environmentally friendly type of energy; ergonomics; renewable energy; better solution for hard-to-reach places.

Disadvantages: instability; relatively low energy output; high cost; danger of wildlife; noise pollution.

Let's stop our attention at solar power stations, as those with the greatest advantages and subjective disadvantages.

Solar panels and their installation. Solar trackers.

The systems f solar panels fixing are a details complex, united in a design, which provides reliable fastening, fixing and control of solar panels. The fastening system can be quite different, because they are divided by function. These designs are made of aluminum and steel, which gives the highest possible reliability and long service life of the system.

By functional purpose, the system of fixing solar panels are divided into types:

• Static mounting systems;

• Dynamic systems (trackers).

The static system is a system of solar panels that receives solar energy in stationary form and generates it in electricity. The static type of fastening is more common in Ukraine due to its reliability and cost. The reliability of this system of fixing the solar panels is very high, because with the correct installation, taking into account all climatic and geographical conditions, it will last more than 20 years. Static mounting systems for photovoltaic modules are divided into ground and roof.

Ground systems are systems that are designed for installation in the ground. Immediately during design, the most effective and optimal angle of inclination of solar panels is calculated. The advantage of this panel mounting system is the ability to install anywhere and on any plane.

Ground-based mounting systems are single-stranded single-row and two-way two-row.

The roof fixing system of solar panels is a design that is placed on the roof of the house.

The roof mounting systems are anchored and ballast.

The dynamic system is a more high-tech and efficient system for installing solar panels. Its uniqueness consists in automatic panels adjustment for placing of the Sun. The solar panel system will monitor the position of the sun and get maximum performance. Also, this system is quite well protected from weather conditions, if necessary, it adapts to poor climatic conditions (snow, wind).

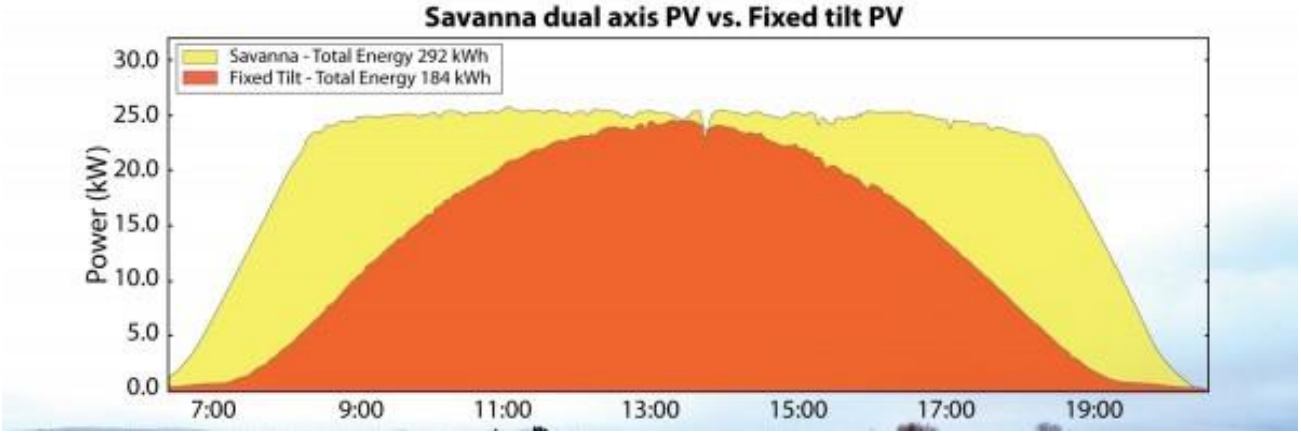
Dynamic mounting systems for photovoltaic modules are divided into:

• One-to-one. These fasteners allow you to rotate the solar panels vertically. This opens up great opportunities to systems that are installed in difficult geographic conditions and inadequate soil equality. Before commissioning, such a system must be adapted to specific operating conditions.

• Two-story. This system of fastening panels gives even better performance than the previous one, because it automatically moves not only vertically but also horizontally, which in general alleviates any losses in electricity generation. This system will receive 40% more power than a static panel mounting system.

Dynamic system is a system with fixing solar panels, which automatically adapts to the position of the sun and weather conditions. Dynamic system is very high-tech, it consists not only of high-quality and reliable materials, but also "smart" software. Data systems are the most effective type of solar panels, because their utility is high. Generation of solar energy into electricity reaches the maximum values precisely with the dynamic system. Before mobile systems there are almost no obstacles related to geographic location.

Compared to static SES systems, this kind receives 40-50% more electricity.



The main advantage of such systems is their complete autonomy. This advantage is in line with the main, because in the work of dynamic systems do not need the human power cost, in general intervention without the need will bring only losses. The mobile system autonomy is a positive and effective advantage over the static system of the solar power plant.

Types of Dynamic Solar Power System: one-axial; biaxial.

One-axial dynamic system of solar panels moves only on one axis – vertical. It adapts to the Sun position, and controls its movement. A one-axial dynamic system moving vertically with a tracker receives approximately 15-20% more power than static.

The biaxial dynamical system moves by the arrangement of the sun in two directions – horizontal and vertical. Such a system can be taken into account as the most effective, since receiving electricity independently of the location takes place as much as possible.

Conclusions.

The most promising, at present, solar power generation method is electric power generation. Eco-friendly, non-volatile, stable in operation, they, like no other, are attracting increasing attention and are used in a wide variety of fields (from conventional calculators to solar panels on satellites). At present there are quite a lot of developments devoted to this area, but it continues its tireless development – the adaptation of the solar monitoring system, the improvement of the electricity accumulation system, solar panels optimization.

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