

METHODS FOR IMPROVING THE EFFICIENCY OF USING SOLAR ENERGY IN POWER PLANTS

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Abstract. One of the promising methods for converting solar energy into electrical energy is the method of direct conversion using solar cells (SC). In turn, in solar energy based on the use of solar cells, two directions can be distinguished - photoelectric conversion of concentrated and non-concentrated solar radiation - each of which has its own advantages and disadvantages. This article briefly describes ways to improve the efficiency of using solar energy in power plants.

Key words. Solar energy, renewable source, energy security, photovoltaic conversion, photovoltaic plant, power, concentrator, monocrystal, polycrystal.

Introduction. To provide humanity with energy for several centuries, even a hundredth of the energy that comes from the Sun to the Earth in one year is enough. Solar energy is an environmentally friendly renewable energy source. Mankind is beginning to realize that energy resources are limited and in the next hundred years people must solve the problem of providing energy in a global sense, that is, develop and implement a new concept of global energy. Energy development has a certain logic; the whole world is moving along this path. Gas will have to be abandoned in due time - it is too expensive and valuable. The use

of coal should become more environmentally friendly. Uranium for nuclear fuel of existing reactors will last only a hundred years [1].

It is necessary to look for new, in all respects safe and efficient sources of energy. To solve the problems that have arisen, the use of renewable energy sources is promising. The main advantage of renewable sources is their inexhaustibility and environmental friendliness. Their use does not change the energy balance of the planet. The total amount of solar energy reaching the Earth's surface in a week exceeds the energy of all the world's reserves of oil, gases, coal and uranium. The economic potential of renewable energy sources is currently estimated at 20 billion tons of reference fuel per year, which is twice the annual production of all types of fossil fuels[7].

At the heart of almost all types of renewable energy sources is the energy of solar radiation. The contribution of the Sun to the energy balance of the Earth significantly exceeds the contribution of all other sources.

Humanity is just beginning to discover and use the potential of solar energy. The country that will be the first to switch to solar energy will have excellent prospects for the future. According to most people, energy security is primarily related to the interests of industrialized countries. However, it should be borne in mind that almost two billion people in the world today do not use modern energy services, and many do not even have access to electricity.

The continuous rise in prices for traditional energy carriers and for electricity, obtained mainly from the combustion of fossil fuels, is primarily due to an increase in the cost of produced fuel and an increase in the cost of its transportation. At the same time, there has been a steady trend towards a reduction in the cost of energy received from renewable sources. The use of concentrators in solar installations makes it possible to increase the temperature of the coolant in the case of thermal energy conversion.

In photovoltaic conversion, concentrators can increase efficiency and reduce the number of expensive solar cells. Concentrating systems operating at medium and high concentrations must have tracking systems, which leads to an

increase in the cost of the entire structure, complicating operation and reducing reliability.

Improving the manufacturing technology of solar cells made it possible to reduce the cost of the installed power of the FM to 4.5-5 dollars per 1 W. There are two ways to reduce the cost of SFES: the first is to improve the technical and economic characteristics of traditional solar cells; the second is the creation of SFES with concentrators. There are various ways to reduce the cost of solar cells for converting non-concentrated solar radiation, one of which is to improve the manufacturing technology of solar cells and reduce the specific consumption of expensive "solar quality" silicon, which is 100 times more expensive than unpurified silicon; in particular, the use of silicon wafers from waste semiconductor production; the use of less expensive materials: tape polycrystalline or thin-film amorphous silicon or materials that provide elements with a higher efficiency (gallium arsenide, aluminum arsenide, etc.) and a number of others. developed in recent years.

At present, the weak use of solar energy is due to the following disadvantages: - low efficiency of converting light into electric current (no more than 20%) - lack of the possibility of obtaining electricity at night, with cloudy weather and with a small number of sunny days a year - lack of highly efficient and environmentally friendly sources energy storage (accumulators are currently used) As a rule, the energy characteristics of photovoltaic cells are mainly determined by the following parameters: solar radiation intensity, load value, operating temperature [4.91]. The efficiency of photovoltaic cells and solar panels from them is affected by a number of factors: weather and climatic conditions, the change of day and night, uneven lighting, temperature rise, pollution, irreversible losses. At present, the method of photoelectric conversion in the world has become one of the priority areas for obtaining solar electricity. This is due to the fact that it provides: maximum environmental cleanliness of energy conversion, the possibility of obtaining energy in almost any area, a significant service life, low maintenance costs, independence of solar energy conversion efficiency from installed capacity. Modern solar cells

(SC) and panels made of them, solar power plants meet a set of requirements: high reliability with a service life of up to 30 years, availability of raw materials and the possibility of organizing mass production, acceptable payback periods for investments in the creation of solar power plants, minimal operating and maintenance costs for solar power plants. capacity, high efficiency.

BIBLIOGRAPHY

1. Алферов Ж.И., Андреев В.М., Задиранов Ю.М. и др. Пути использования солнечной энергии. // Тез.докл. конф. ИХФ АН СССР, Черногловка, 1981, С. 10-11.

2. Андреев В.М, Грилихес В.А., Румянцев В.Д. Фотоэлектрическое преобразование концентрированного солнечного излучения. Л.: Наука, 1989. 310 с.

3. Апариси Р.Р., Баум Б.В., Гарф Б.А. Солнечные установки большой мощности // В сб. Использование солнечной энергии. М.: ЭИНН, АН СССР, 1957. С. 85.

4. Баранов В. К. Методы расчета профилей фоконов и фоклин-нов//Гелиотехника. 1990. №1. С. 19.

5. Васильев А.М., Ландсман А.Л. Полупроводниковые преобразователи. М.: Сов. Радио, 1971.-С. 246.

6. Вейнберг В.Б. Зеркала, концентрирующие солнечные лучи // Труды ГОИ. Том XXIII, вып. 140. М.: ГОИ, 1954.