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Mustafakulov A. A.

Candidate of Physical and Mathematical Sciences, Associate Professor Jizzakh Polytechnic Institute

Jizzakh city,Uzbekistan

ECONOMIC PERFORMANCE OF ALTERNATIVE ENERGY SOURCES

Annotation: *The article provides information on the possibilities of using alternative energy sources in small families and the economic performance of this energy. It has been shown that solar photovoltaic sources have a shorter payback period.*

Keywords*: energy, photoelectric plate, energy, solar, photocell, inverter, battery, efficiency.*

Мустафакулов А. А[1]

к. ф.-м. н, доц. кафедры физики

Джизакский политехнический институт

ЭКОНОМИЧЕСКИЕ ПОКАЗАТЕЛИ АЛЬТЕРНАТИВНЫХ ИСТОЧНИКОВ ЭНЕРГИИ

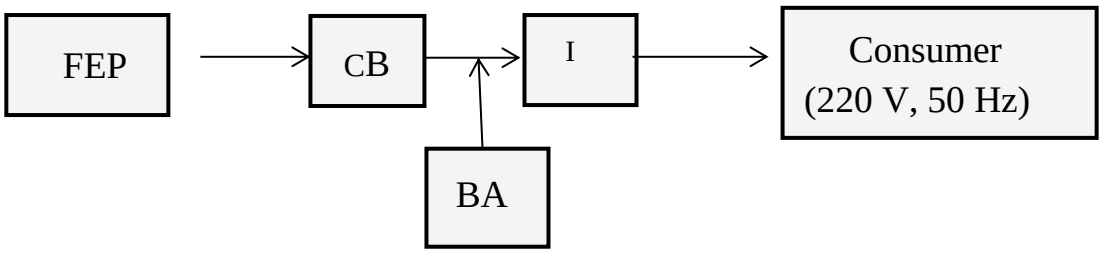
Аннотация*: В статье представлена информация о возможностях использования альтернативных источников энергии в малодетных семьях и экономических показателях этой энергии. Показано, что солнечные фотоэлектрические источники имеют меньший срок окупаемости.*

Ключевые слова*: энергия, фотоэлектрическая пластина, энергия, солнечная энергия, фотоэлемент, инвертор, батарея, КПД.*

Introduction: Worldwide, energy consumption per capita averages 2-4 kWh, which is constantly increasing. Therefore, the demand for alternative energy, especially solar photovoltaic devices, is growing, and now photovoltaic power plants with a capacity of 100 to 12,000 W are being developed and put into practice. There are also some shortcomings in the development of solar

power plants, such as the inability of photovoltaic cells to convert sunlight to electricity, the high cost of photocells, the variability of the angle of solar radiation on the surface of photoelectric plates. In determining the efficiency of photovoltaic sources, it is necessary to calculate these economic indicators. This article analyzes the description of the main components of a photovoltaic source for a particular home and the economic performance of its use.

Solar photovoltaic devices consist of the following main parts :



FEP photoelectric plate; CB-control block; RB-rechargeable battery; I-inverter.

The control unit controls the voltage connected to the load and the battery. FEP is a photoelectric plate that converts light energy into electrical energy, which is now made of silicon crystal and polycrystalline based plates. The inverter amplifies the constant voltage generated at the FEP and converts it to an alternating voltage (220 V, 50 Hz) .

The BA-battery accumulates the voltage generated in the FEP and serves to provide uninterrupted power to the consumer in the absence of light. The service life of photoelectric plates is on average 30 years. During this period, the inverter is replaced 1 time and the batteries 5 timesIf the average power consumption for an apartment of 6 people is assumed to be 2 kW, this power can be provided by photovoltaic panels in sufficient quantities. This loading capacity serves to power everyday electrical appliances such as low-power energy-saving lighting lamps, refrigerators, televisions, and low-power washing machines. The average solar radiation (radiation intensity) in our

country is 1 kW / m^2 . The efficiency of modern photoelectric plates is 15%, and a photoelectric plate with a surface of 1 m^2 can produce 150 watts of electricity. There should be a surface of a photoelectric plate to generate the 2 kW power required for a small family

$$S=2000/150=14\ m^2$$

The combined cost of a 2 kW photovoltaic plate with components is calculated by Mir Solar as follows:

$$K_c = 2 \times 9{,}0 = 18{,}0 \text{ mln. sum.}$$

Electricity generated in a photoelectric plate in a yearis defined as

$$W = K_д P_M T_ы$$

It is defined as the amount of electricity generated in a photoelectric plate within a year. In this case, $K_{lc} = 0{,}5 \div 0{,}7$ the coefficient is the loss correction, which takes into account the change in the angle of incidence of heat and light in the solar cell during the day; P_M – maximum power of the photoelectric plate; T_s – hours of sunny days (1 year) [6].

In our country, the number of hours of sunshine during the year is 850-1000 hours, the total power of the photoelectric plate is W = 0.7 × 2kvt × 1000 hours = 14000 kWh.

Nowadays, 1 kWh of electricity in our country costs 295 soums a year

E = 14000 x295 = 4130000 soums.

The payback period of a photovoltaic device is determined as follows:

18 / 4.13 = 4.3

This means that the payback period has been reduced more than 3 times from 2000 to 2022. In subsequent years, the price of 1 kWh of electricity in separately used photovoltaic panels was 7 euros / kWh in 2004 and 5.5 euros / kWh in 2022. That is, the price of alternative electricity is declining. The price of traditional electricity across the country is rising steadily. In recent years, the price of electricity has increased by 3 ÷ 5 times.

Conclusion: From the above data, it can be seen that the self-coverage costs of solar photovoltaic panels are continuously decreasing and alternative energy sources remain economically competitive with traditional electricity sources**.**

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