ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 6 | Issue: 10 | October 2020 || Journal DOI: 10.36713/epra2013 || SJIF Impact Factor: 7.032 ||ISI Value: 1.188

THE USE OF ALTERNATIVE ENERGY SOURCES IN THE MOUNTAINOUS REGIONS OF THE JIZZAKH REGION OF UZBEKISTAN

Asror Mustafakulov[1]
[1]Associate professor,
Jizzakh Politechnic Institute,
Jizzakh Uzbekistan.

Fazliddin Arzikulov[2]
[2]Jizzakh Politechnic Institute 3rd year student
of the department of engineering,
Jizzakh sity Uzbekistan.

Orif Olimov[3]
[3]Jizzakh Politechnic Institute
Assistant of the department of electric power,
Jizzakh sity,
Uzbekistan

ABSTRACT

The article presents the results of research on alternative energy sources and their application in the mountainous regions of the Jizzakh region of Uzbekistan.

KEY WORDS: ***wind power plant, solar power plant, power, energy, voltage, solar radiation, alternative energy, solar collector.***

INTRODUCTION

The role of countries in the world community is determined by the volume of energy consumption per capita, the rise in the standard of living of the population. Currently, the average energy consumption per capita in the world is 2-4 kWh. But for a comfortable life, this amount is not enough, and it should be equal to 10 kW / h. In the current situation, when the number of fuel sources, such as oil, gas, coal, peat, is decreasing every year, and the cost is increasing, the main problem facing the world community is to fully satisfy the needs of the population for energy. The only way to solve this problem is to use renewable energy sources. These problems are reflected in the Decree of the First President of the Republic of Uzbekistan I. Karimov dated March 1, 2013 No. 4512 "On measures to develop alternative energy sources."

RESULTS AND DISCUSSION

It is known that the potential of renewable energy sources in Uzbekistan is 173.4 million toe. which is three times the annual energy consumption. 98.8% of this energy is solar energy. Since our country is a sunny country, the sun shines 250-270 days a year, and up to 1100 W of energy is transmitted per square meter of land. The use of solar energy is achieved by converting light into electricity using photovoltaic cells - solar cells. Japan, Germany and the USA are leading in this regard [1]. Solar collectors - the production of thermal energy using solar ovens - is measured by the surface area of solar ovens (21 million square meters). Japan, Israel and Greece are leading in this respect. The efficiency of solar cells was very low because the production of pure monocrystalline silicon, which generates electricity from solar energy, was very expensive. Thin-film solar cells have now been created, such as gallium arsenide, polycrystalline silicon, cadmium tellurium, on the basis of which the efficiency of solar cells based on them has significantly increased. Today, solar photovoltaic stations and collectors for heating water with solar energy are successfully used in all regions of the country and in Karakalpakstan. Solar photovoltaic stations are used in the monitoring center "Zaamin", a farm in the village of Narvonsoy of the Forish region, several secondary schools in the Tomdinsky region of the Navoi region, and the Jizzakh Polytechnic Institute. The medical equipment

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 6 | Issue: 10 | October 2020 || Journal DOI: 10.36713/epra2013 || SJIF Impact Factor: 7.032 ||ISI Value: 1.188

of the central hospital of the Nurata region is powered by wind energy (WPP).

Under the influence of the energy of the sun's rays, the hot air that heats up becomes relatively light and rises. Wind is generated by the movement of a stream of cold air tending to take its place. The construction of windmills using such air currents was done in Northern Europe in the early 8th century. Back in 1885, the first wind farms were built in Denmark. In 1918, over 120 wind farms were in use in Denmark. The power of each of them was 10-20 kilowatts. Between 1880 and 1930, more than 6 million wind farms were in use in the United States [2-5]. With increasing altitude, the wind speed will increase. If the wind speed at the ground is 3 m / s, the wind speed will be twice as high at 10 meters. With the help of wind generators installed at a height of 40-80 meters, more than 25-50 kilowatts of electrical energy can be generated. In 2030, it is planned to cover 80% of the energy consumed in the EU countries by wind and solar energy. This will require the construction of 3.8 million wind turbines, 90,000 large and 1.7 billion small solar power plants on the planet over the next 20 years. Germany leads in the amount of electricity (45 GW) generated from the use of wind energy. The use of alternative energy sources such as wind and solar energy contributes to economic growth and environmental friendliness. The cost of 1 Watt of electricity generated by solar power plants decreases with increasing power. This is reflected in the analysis of company price lists. The cost of frame modules is $ 8 of 1 Watt at 3.0-3.5W and $ 5.4 at 45-65W.

Due to annual solar radiation falling directly on existing remote areas of the country, it is possible to obtain 400-600 W of energy in winter and 1800-2500 W in summer from 1 m2 of surface. Table 1 shows the hourly rates of solar radiation falling directly on the foothills [6].

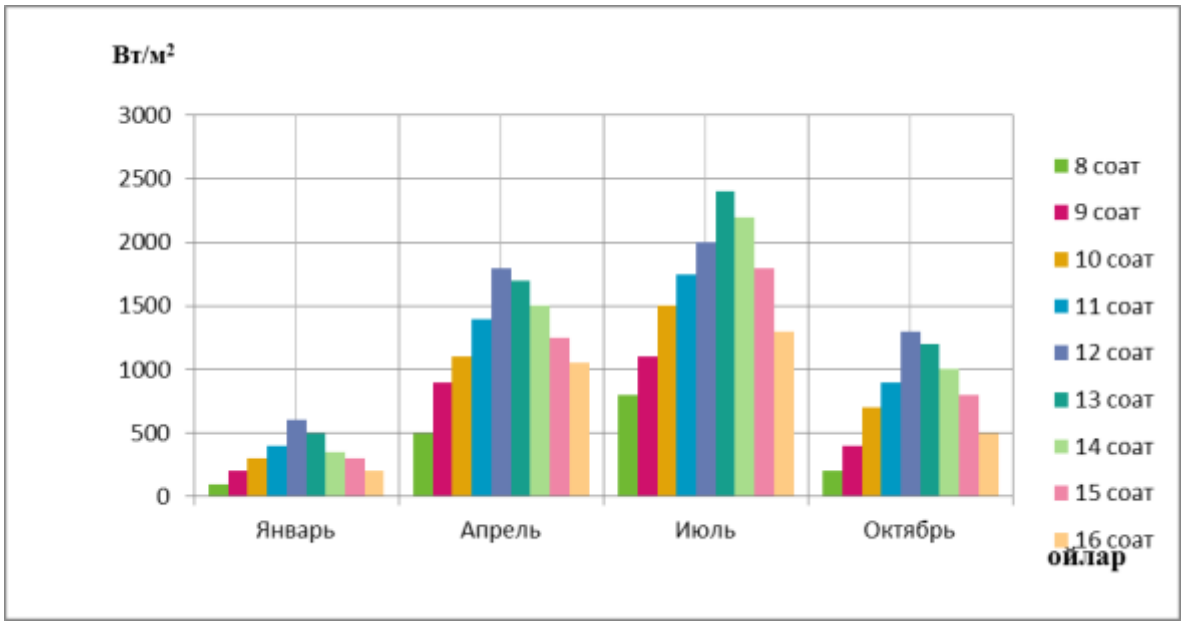


Table 1. Table of capacities that can be obtained by solar radiation on the territory of the republic by the hour.

Solar photovoltaic devices are mainly intended for non-electrified areas and have special requirements for use. This includes:

- a solar photovoltaic installation with a power of 500 W based on monocrystalline silicon is installed at an optimal angle to the sun, depending on the latitude of the place and the season;
- untested alkaline and acid batteries (AKB) with a total capacity of 500-600 A hours are used;
- in various work plans, a controller with a 12/220 W inverter is used to check the battery discharge;
- installation wires and cables of various brands are used;
- fluorescent lamps operating 60 hours / day (10 pieces of 20 W each).

With the help of such devices, you can power a refrigerator (throughout the day), power 70 watts, and you can also power household appliances with a capacity of 20 watts, working 2 hours a day. Scientific and Production Association "Photon" in Tashkent has developed solar photovoltaic installations (SPEU) based on amorphous silicon, which are used to raise water, for energy-saving lighting lamps and black-and-white TVs with a

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 6 | Issue: 10 | October 2020 || Journal DOI: 10.36713/epra2013 || SJIF Impact Factor: 7.032 ||ISI Value: 1.188

capacity of 100 watts, a water pump with a capacity of 175 watts (0.3- 0.45 m³ per hour), meets the requirements of GOST.

№	Part names of SFEU-135	Measurement	Quantities
1	Power of one solar panel	W	135
2	Dimensions of one solar panel	Mm	1060x1380x50
3	Panel voltage in salt box mode	V	14
4	Panel operating voltage	V	9.5
5	Output voltage from panel	V	DC 12V / 4x12V / 4x9V
6	Weight of one panel	Kg	8
7	Total weight of the device without battery	Kg	32
8	Solar panel working range	C°	-40 + 55C°
9	Panel working range	C°	-10 + 42C°
10	Efficiency	%	80-85
11	Warranty period	Year	20

Table 2. Estimated parameters of a solar photovoltaic panel of the type SFEU-135.

When choosing a solar power plant to supply power to remote areas from power grids, i.e. deserts, deserts and foothills, attention is paid to the energy aspect, cost and productivity, as well as operational characteristics. When determining the feasibility of using solar energy devices to supply energy to energy consumers, it is necessary to determine the following parameters:

N- is the required amount of solar energy (pcs.);

Φ- is the area that they occupy ($\Phi = N * \Phi_0$, m^2, where Φ_0 is the area of one module).

As a result of these calculations, the optimal area of the solar installation is determined. When installing a solar installation, it is necessary to be able to easily approach, clean, inspect, and repair each terminal element. In addition, it is necessary to allocate areas for the installation of control and inspection equipment, as well as an electric energy storage system.

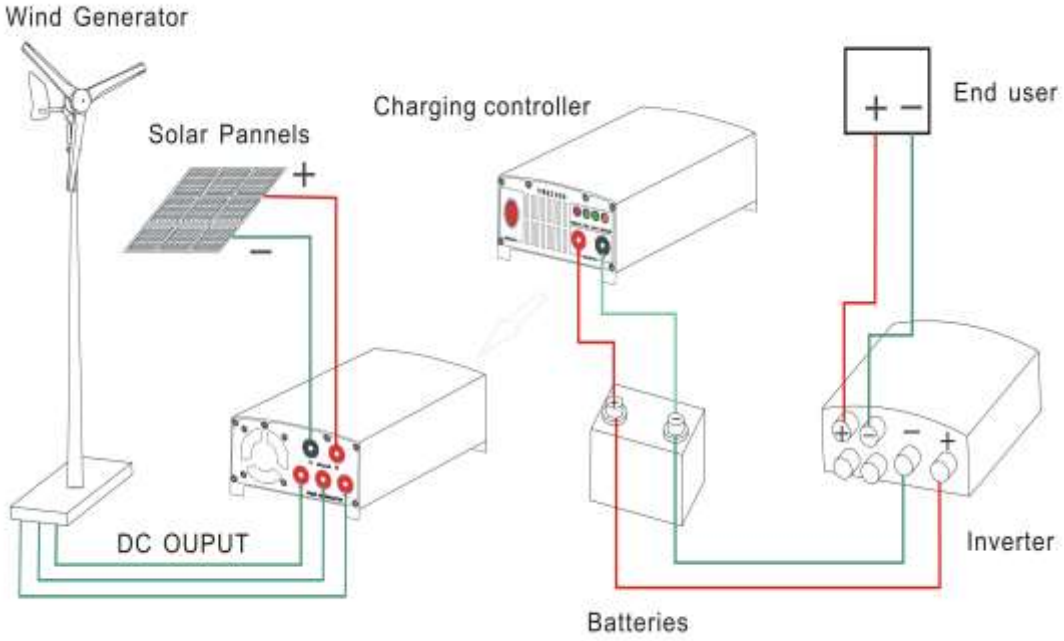
We propose to use 5 solar photovoltaic stations SFEU-135 to supply power to the foothills of the Pakhtaabad rural district of the Jizzakh region, through solar photovoltaic devices that can provide 50% of the electricity demand of energy consumers. Each of these solar photovoltaic stations of the SFEU-135 type covers an area of 4140x12720x50 mm.

In addition, the installation of 2 wind power plants of the type VEU-1500 for power supply of the residential area showed that the demand of consumers in this zone for electricity in autumn, winter and spring will be provided by 60-80%. The villages of the Jizzakh region, which have no power supply, are located on the slopes of the foothills. The air temperature here is (+35) - (+40) °C in summer and -10° C -20° C in winter. In winter, there is a sharp drop in temperature and a quick sunset.

CONCLUSIONS

Based on the aforementioned potential indicators of renewable energy sources in the foothills of the Jizzakh region, i.e. the intensity of solar radiation and the potential for wind speed, it is planned to create a hybrid solar-wind power plant to supply power to these settlements. Figure 1 shows a block diagram of a hybrid solar-wind power plant [6].

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 6 | Issue: 10 | October 2020 || Journal DOI: 10.36713/epra2013 || SJIF Impact Factor: 7.032 ||ISI Value: 1.188



1 Fig. Schematic structure of a low-power wind-solar hybrid photovoltaic device [4].

REFERENCE

1. *Klychev Sh.I., Mukhammadiev M.M., Avezov R.R. and others. Non-traditional renewable energy sources. Tashkent: Publishing House "Science and Technology" - 2010.*
2. *Shefter Ya.I. "Using wind energy" - 1975*
3. *Mustafakulov A.A., Murtazin E.R., Dzhuraev O. "Automated system of commercial accounting of alternative energy and electricity sources. "Creation and efficiency improvement of resource-saving agricultural machinery." Collection of scientific articles. November 20-21, Gulbahor - 2014.S. 398-400.*
4. *Mustafakulov A., Arzikulov F. EPRA International Journal of Multidisciplinary Research (IJMR). V.6, No. 9. September, 2020.pp. 278-290.*
2020 EPRA IJMR | www.eprajournals.com | Journal DOI URL:
https://doi.org/10.36713/epra2013.
5. *Mustafakulov A., Arzikulov F. The American Journal of Engineering And Technology. September 14, 2020 | Pages: 32-36*
6. *Doi: https:*
//doi.org/10.37547/tajet/Volume02Issue09-.
http: //www.gov.uz/ru/helpinfo/energy/239