CADASTRING THE RENEWABLE ENERGY SOURCES IN UZBEKISTAN

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ABSTRACT

In this article, we will consider the cadastre of solar energy, which is considered a renewable energy source in Uzbekistan

Key words: alternative energy, solar cadastre, energy object.

INDRODUCTION

It is necessary to train competitive specialists with in-depth knowledge to carry out research, design, construction, operation, repair and reconstruction of energy facilities built on non-traditional and renewable energy sources. Taking this into account, we will consider the solar cadastre of solar energy, which is considered one of the renewable energy sources.

MAIN PART:

Information on the flow of solar radiation and the amount of transported energy is a solar cadastre. Information on the solar cadastre is collected based on the following indicators:

- monthly and annual totals of solar radiation falling on the horizontal plane;
- rays of the sun falling on the horizontal plane in a normal-experimental position;
- the time of the sun's rays.

In general, data on the total amount of solar radiation and incident energy can be obtained in the following ways:

- by calculating data at a specific geographical point - by analytical method;
- in a short period of time at a specific geographical point, with direct information obtained by measuring with tools and equipment;
- by obtaining information from the reference books where the data of the meteorological stations that have carried out long-term measurements with the only accepted method have been collected [1-5].

When calculating the use of solar energy, the amount of energy provided by

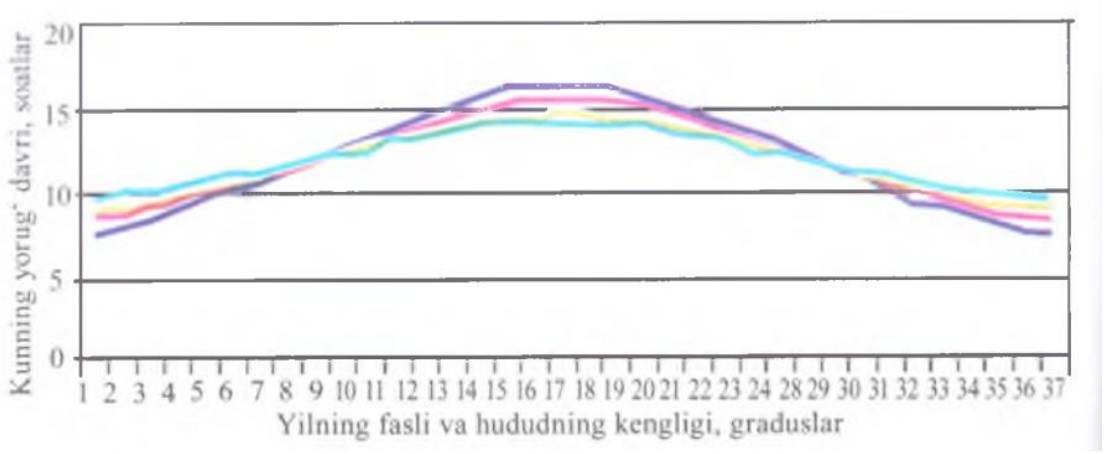
sunlight to 1m2 area is taken into account. The energy of solar radiation reaching the upper part of the atmosphere is 1.395 kW/m2, and this quantity is called the Solar Constant. But before this amount reaches the surface of the earth, it faces various resistances and its amount varies depending on the season of the year and the width of the area under consideration [6-8]. For example, the average intensity of sunlight falling on the Earth's surface:

- in European countries - 2 kW • hour/m2;
- In tropical and Asian countries - 6 kW • h/m2.

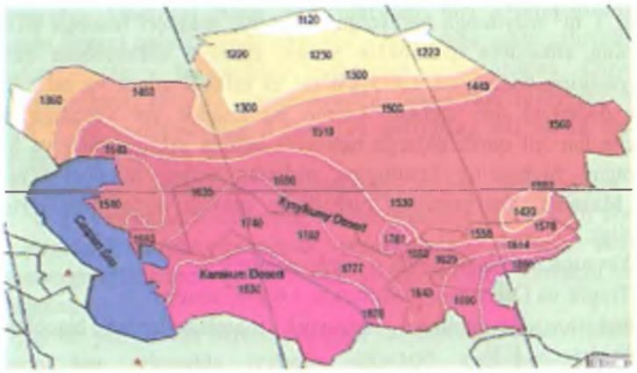
The Republic of Uzbekistan is one of the prosperous countries. Average per year:

- 300 days are considered sunny days;
- 2980 + 3130 hours the average temperature is +42°C, the length of the day is 14-16 hours (Fig. 1);
- the temperature rises to + 70°C in the desert regions;
- up to 1900-2000 kW of solar radiation can be generated in each m2 area in 1 year (Fig. 2).

Figure 1 shows daylight hours in the Republic of Uzbekistan in relation to the width of the territory and the season, and Figure 2 shows the distribution of solar radiation in the countries of Central Asia. Figure 2 shows that the daylight period is 16-17 hours in the 16th and 21st latitudes of the territory of the Republic of Uzbekistan [9-12].



1-Image. The length of daylight in the Republic of Uzbekistan in relation to the width of the territory and the season of the year.



2-Image. Distribution of solar radiation in the countries of Central Asia.

There is a huge potential for the development of renewable energy sources (RES) in Uzbekistan. While the World Bank statistics mention 100 percent access of the population to the electricity,[13-14] according to some estimates for about 1500 rural settlements of 1,5 million people are not properly connected to the central power grids due to their remote locations and inefficiency of outdated electric power transmission lines. Lack of connection to the electric power supply grids and reduced electricity supplies due to excessive electric power loss on the central transmission and distribution lines create a demand and an incentive for the development of RES in those areas. Over 65 percent of the population in Uzbekistan lives in rural areas. So the biomass energy, small photovoltaic panels and small wind turbines can ensure sufficiency and stability of energy supplies for these peoples.[15] Renewable energy potential in Uzbekistan is estimated to be significant, but with the exception of hydro power is not yet exploited on a larger scale.

Technical potential for the renewable electricity capacity is significant:

- Biomass 800 MW;
- Solar PV 593,000 MW;
- Wind 1,600 MW;
- Small Hydro 1,800 MW.

RES is currently extremely underdeveloped:

- Biomass 1.5 MW;
- Solar PV <1 MW;
- Wind <1 MW;
- Small Hydro 394 MW
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The government of Uzbekistan, however, aims to reach 21 percent of RES in the overall energy consumption by 2030.[16] To achieve this goal, Uzbek authorities have developed a normative base promoting and regulating the development of RES in the country, including: Bill "On Alternative Energy Sources," State Programme for the "Development Prospects of Alternative Energy Sources and Fuels for 2013–2020," "Long-term conceptual provisions and development directions for the use of renewable energy sources for the production of electric and heat energy in Uzbekistan," and Draft Concept of the Republic of Uzbekistan for development of alternative fuels and energy for 2012–2020.[5] Currently, however, RES are highly underdeveloped since the share of the alternative energy does not exceed 2 percent (excluding medium and large hydro power) of the overall energy consumption. A very low level of awareness of the population and managers about the opportunities of increasing the use of RES remains a pressing concern.

Solar Energy

Solar energy takes up to 99 percent of the total renewable energy potential in Uzbekistan, which enjoys on average 270–300 sunny days a year. Karakalpakstan enjoys the greatest potential for the production of solar energy of over 19 billion tonnes of oil equivalent (TOE). Andijan region, in the mountainous far Eastern part of the country, has the lowest solar energy potential of 129 million TOE.[17-18] Solar energy research and development in Uzbekistan started in the 1980s, but little progress has been achieved so far. Solar energy potential rich regions of Uzbekistan—Karakalpakstan, Navoi, Bukhara and Surkhandarya—are mostly desert areas with relatively sparsely located population centers and, thus, have prospects for the development of alternative energy. Uzbekenergo and Chinese company Suntech Power have signed an agreement on the establishment of a joint venture for the production of photovoltaic panels for the power of 100 MW. Uzbekenergo, with a loan of US$110 million from the Asian Development Bank, is building a 100 MW capacity photovoltaic power plant in the Samarkand region. The plant is to be constructed by 2019.

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