



Measures Implemented in Uzbekistan On the Use of Solar Energy

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Abstract: At the beginning of the 21st century, humanity began to face problems related to the imminent depletion of traditional energy sources and the deterioration of the ecological state of the Earth. These problems have become extremely urgent and cause justified concern in the world community on a global scale. This article provides information on the introduction of solar energy in Uzbekistan and the measures taken in this regard.

Keywords: Alternative energy, energy, solar energy, wind energy, photovoltaic stations, roadmap.

Introduction: In our country, attention has been paid to the energy sector as a strategic direction, and new energy capacities have been built in recent years. Nevertheless, the growing population and the expansion of industrial enterprises are leading to an increase in the demand for electricity from year to year. It is estimated that by 2030, the demand for electricity in our country will increase from the current 74 billion kWh to 110 billion kWh. Naturally, in such a situation, the use of renewable energy sources is of great importance in eliminating problems.

According to the legislation of the Republic of Uzbekistan, renewable energy sources include solar, wind, geothermal, natural water flow, and biomass energy, which are naturally renewable in the environment [16].

The fact that the problem of energy resources in the world is getting worse year by year and this process also applies to the energy system of our republic is one of the urgent problems in the field of energy. This problem is urgent in our country, one of its solutions is the necessity of wide use of renewable energy sources, and several decisions and orders have been announced by the government on its implementation [14].

During the years of independence, relations in this area were regulated by the laws "On the rational use of energy", "On electric power industry" [8], and "On the use of renewable energy sources". In this regard, the Decree of the President of the Republic of Uzbekistan dated March 1, 2013 "On measures for the further development of alternative energy sources" [9] is of particular importance. The purpose of the Decree was to further continue research and experimental industrial development at a higher technical and scientific level, taking into account the accumulated experience, to implement some solutions for the use of alternative energy sources in the conditions of our country, taking into account world experience, as well as to take measures to organize the local production of modern equipment and technologies for this sector.

In June 1997, an international conference on solar energy was held in Tashkent under the auspices of UNESCO, UNIDO, the European Commission, and the International Energy Agency at the Solar Physics Scientific and Production Association in order to search for and discuss the most appropriate ways to use solar energy and technologies for its use in Central Asian countries [18].

Scientists and specialists from 20 countries participated in the conference. The participants of the conference were presented with new projects developed in this field by scientists from Uzbekistan and other countries.

In 2000-2001, in order to demonstrate the capabilities of European technologies in the field of solar energy, a heat supply system was installed in a number of entrances to residential buildings. The project was implemented within the technical framework.

In 2002-2006, the UNDP, together with the State Committees for Environmental Protection of Uzbekistan and the Republic of Karakalpakstan, implemented the project "Clean Energy for the Rural Population of Karakalpakstan".

In 2003-2004, the United Nations Development Program, in collaboration with the Tashkent city administration, implemented the project "Technology transfer for mass production of solar panels for water heating." European technology according to sun collectors work release to the Photon factory Photon and Encom enterprises produced more than 300 square meters of new model solar collectors.

In 2004, the Technology Transfer Agency and UNDP developed the project "Clean Energy for Rural Communities of Karakalpakstan" to provide clean energy to rural areas of Karakalpakstan. From 2001 to 2007, "Kurilishgelioservice" LLC installed solar collectors with an area of 942 m² in 17 regions of the

republic. Through these collectors, the population was provided with 1,587,100 kWh of thermal energy per year. In 2005, on the basis of a project funded by UNESCO, the Institute of Physics and Technology of the Academy of Sciences of the Republic of Uzbekistan, together with the Institute of Nuclear Physics of the Academy of Sciences of the Republic of Uzbekistan, launched an autonomous integrated photovoltaic system for energy supply and water purification in the remote tourist area "Ayozkala-Tur" (Karakalpakstan).

As of 2007, the total capacity of photovoltaic power plants installed in Uzbekistan did not exceed 10 kW. These plants were installed in the village of Kostruba and the tourist complex in Karakalpakstan, at the facilities of the Uztransgaz joint-stock company, at some livestock farms in the republic, and at other facilities [12, 61].

Also, within the framework of international projects, a solar-wind facility with a capacity of 15 kW was built to provide electricity to the Charvak station. In 2010, the Mir-Solar enterprise installed a 10 kW solar power plant at the Samarkand cigarette factory [7, 30-31].

The following work has been carried out in the republic to ensure the implementation of the Decree of the President of the Republic of Uzbekistan "On Measures for the Further Development of Alternative Energy Sources" and the Resolution of May 5, 2015 on the Program "On Measures to Reduce Energy Consumption in Economic Sectors and the Social Sphere in 2015-2019 and the Introduction of Energy-Saving Technologies" [5]:

- A Republican Commission on Energy Efficiency and the Development of Renewable Energy Sources was established, and a Department for Increasing Energy Efficiency was established within the Ministry of Economy of the Republic of Uzbekistan as a working body of the Republican Commission;
- A "roadmap" for the development of solar energy in Uzbekistan has been developed with the support of the Asian Development Bank;
- With the support of the Ministry of Trade, Industry and Energy of the Republic of Korea in December 2014, a solar photoelectric station with a capacity of 130 kW was built and put into operation in the Pop district of Namangan region.
- It is planned to prepare projects for the construction of large solar photoelectric stations in Surkhandarya, Namangan and Navoi regions;
- With the participation of the World Bank, a wind atlas of the Republic of Uzbekistan was developed, and an experimental wind power plant with a capacity of 750 kW was built in the Bostanlyk district of the

Tashkent region.

The decree "On measures for the further development of alternative energy sources" and the 6th meeting of the "Asian Solar Energy Forum" held in Tashkent in November 2013 on the topic "Prospects and directions of solar energy technologies"[3], as well as the participation and speech of the President of the Republic at this conference[13], were of great importance in raising work in this area to a new level and saving natural resources.

At this meeting, the President of the Republic of Uzbekistan noted that over the past 5 years, investments in the use of solar energy have amounted to \$520 billion, including \$143 billion in 2012 alone, and that this year, electricity production from solar energy amounted to 113 billion kWh, of which 110 billion kWh was generated by photovoltaic solar stations [3].

In particular, within the framework of the implementation of the Resolution of the President of the Republic of Uzbekistan No. 2183 dated June 4, 2014 "On measures to implement the investment project "Construction of a 100 MW solar photovoltaic power plant in Samarkand region" and in accordance with the decision of the Interdepartmental Tender Council dated October 27, 2016, the main contractor for the design, construction and operation of the world's largest 100 MW solar photovoltaic power plant in Samarkand region with the assistance of the Asian Development Bank was "Zhuhai Singes Green Building Technology Co., Ltd"[19]. A total of 404 hectares of land were allocated for the power plant, of which 254 hectares were constructed in Pstdargam district and 150 hectares in Nurabad district [11]. The plant is particularly significant for its uniqueness not only in Uzbekistan but also in the Central Asian region. The construction of this station, whose annual electricity production capacity is 200 kWh, is not completed.

On March 1, 2013, the President of the Republic of Uzbekistan adopted the Resolution No. PP-1929 "On measures to organize the activities of the International Solar Energy Institute" [9]. In order to implement Resolution No. PP-1929, the Cabinet of Ministers adopted Resolution No. 265 "On measures to organize the activities of the International Solar Energy Institute" on September 25, 2013. The Resolution provided the institute with 3 million US dollars in grant aid and allocated the necessary material and technical base [9].

In accordance with the Resolution of the President of the Republic of Uzbekistan No. PP-1929 dated March 1, 2013 "On the Establishment of the International Institute of Solar Energy", the International Institute of

Solar Energy, established on the basis of the Scientific and Production Association "Physics-Solar" of the Academy of Sciences, became a logical continuation of the development of alternative energy sources in the republic. This scientific institution was entrusted with the implementation of high-tech developments in the field of industrial use of solar energy, the preparation of proposals for the practical use of solar energy potential in various sectors of the economy and the social sphere on the basis of advanced and economically efficient technologies, the conduct of practical research related to the use of solar energy in various sectors of the economy, including the application of technologies for the synthesis and thermal processing of special materials, the coordination of work on the development of documentation for major projects in the field of solar energy, and other similar tasks [2, 6].

No. 3012 of the President of the Republic of Uzbekistan Sh.M. Mirziyoyev of May 26, 2017 " On measures to develop the use of renewable energy sources in economic sectors and the social sphere and increase energy efficiency in 2017–2021", it is planned and is being implemented to increase the capacity of hydropower by 601.9 MW, solar energy by 300 MW, wind energy by 102.0 MW, and in general, the capacity of renewable energy sources by 1003.9 MW.

Currently, small power solar energy installations are used in all regions of our republic.

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