# Transparent solar panels - as a pillar of the economy of Uzbekistan

***Samadov Sherzod Shukhrat Ugli***

*Tashkent State Transport University,*

*Economics faculty, Master of Business Administration first year*

***Abstract:*** *The article discusses the extensive measures implemented in recent years to ensure energy savings in the country's economic and social sectors. It highlights the development of renewable energy sources and the main government decisions aimed at improving energy efficiency. Additionally, it analyzes the need for the widespread use of solar power plants as a solution to problems arising from the primary use of natural gas and other conventional hydrocarbon fuels in the production of electricity and thermal energy.*

***Key words:*** *solar power plants, alternative energy, transparent solar panels, investment, private sector, natural resources, population consumption, budget organizations.*

**Introduction.**

In the future, ensuring energy, environmental, and economic security and the sustainable development of the energy sector in the Republic of Uzbekistan will undoubtedly require the use of renewable energy sources. Preserving natural resources for future generations and protecting the environment depend on harnessing renewable and alternative energy sources. In recent years, extensive measures have been taken to ensure energy savings in the country's economic and social sectors. One of the government's major decisions to advance energy sources and improve energy efficiency across the country is the Presidential Decree dated February 16, 2023, on "Measures to Accelerate the Introduction of Renewable Energy Sources and Energy-Saving Technologies in 2023."

Currently, Uzbekistan operates nine solar photovoltaic plants with a total capacity of 2.7 GW across seven regions, along with one wind power plant, all producing eco-friendly "green" energy. Among these, solar power plants

generated 3.4936 billion kWh, while the wind plant generated 506.4 million kWh of energy. By May 31, the output from these plants reached 1 billion kWh, rising to 1.6 billion kWh by mid-year, 2 billion kWh by July 17, and 3 billion kWh by August 30, 2024. This energy production saved 1.2 billion cubic meters of natural gas and prevented the emission of 1.68 million tons of harmful gases into the atmosphere. This electricity volume is equivalent to the 10-month social energy norms for 2 million households or the annual norm for 1.666 million households.

Notably, the solar photovoltaic plants in the Navoi and Samarkand regions generated 434 million kWh of electricity in 2022 and 576.9 million kWh in 2023. According to the Statistics Agency, in the first nine months of 2024, Uzbekistan produced 60.31 billion kWh of electricity, which is a 4.32% increase compared to the same period last year. However, the diversification level of the fuel-energy balance through the integration of renewable energy sources in industrial production does not yet align with global trends. Natural gas and other traditional hydrocarbon fuels dominate the primary fuel mix used for electricity and heat generation.

**Methods**

According to the Presidential Decree of February 16, 2023, on “Measures to Accelerate the Introduction of Renewable Energy Sources and Energy-Saving Technologies in 2023,” the establishment of the "Green Energy" company is planned to install and operate small-capacity renewable energy devices in the buildings and facilities of social sector entities, government agencies, and other organizations. This company will be authorized to use relevant parts of buildings and facilities belonging to government bodies and organizations free of charge, under lease rights, and to directly enter into contracts for purchasing, installing, and servicing renewable energy equipment and its spare parts from manufacturers.

To advance these areas, measures will be taken to expand the use of renewable energy sources, reduce energy consumption in production, coordinate the practical application of local scientific and technical developments, and fund innovative ideas. For implementing startup projects within Uzbekistan, projects from China, the United States, Germany, and other developed countries will be

attracted, providing subsidies and distributing energy to under-served areas, as well as creating favorable conditions for local entrepreneurs.

Specifically, investment projects for producing solar panels in Uzbekistan have been approved, along with a resolution by the Cabinet of Ministers on "Accelerating the Production of Renewable Energy Equipment."

According to this resolution:

An approved list of investment projects within the "Solar Cluster" framework will focus on producing solar water heating systems and solar photovoltaic panels.

For the implementation of these projects, land plots in the Chiroqchi Free Economic Zone (FEZ) in the Kashkadarya region will be auctioned online at 10% of the initial price.

Ministries, agencies, local executive bodies, and large industrial enterprises will procure alternative energy equipment through the state's electronic procurement system by selecting the best offers from local manufacturers without requiring upfront payments, under futures contracts.

For reference, under a futures contract, the seller commits to delivering the product (asset) in the future at the agreed-upon price. The list of investment projects includes five companies, with a total estimated value of $38.7 million, and plans to create 500 jobs.

Additionally, four investment projects are included in this program for the construction of solar and wind power plants, three of which are solar plants with a capacity of 100 MW each, located in the Samarkand, Surkhandarya, and Navoi regions.

**Results**

Energy plays a crucial role in the lives of every individual and society as a whole. Over the past 40 years, the demand for energy has significantly increased, and during this period, more fossil fuel has been extracted than throughout all of human history. Currently, the annual global consumption of natural fuel is equivalent to 12 billion tons of oil (approximately 2 tons per person).

Today, oil, natural gas, coal, and uranium remain the world's primary energy sources. If consumption continues at this pace, global oil reserves will last 45–50 years, natural gas reserves 70–75 years, hard coal reserves 165–170 years, and brown coal reserves 450–500 years.

Due to the limited nature of hydrocarbon energy resources, there is a shift toward using renewable energy sources as alternatives. Introducing ecologically clean, renewable energy sources into the energy balance is necessary, especially to reduce anthropogenic impacts on the environment. Substantial experience has been accumulated in this field. Research on renewable energy devices shows that, despite high initial investment costs, they are economically viable in the long term. With rising costs of primary energy carriers (exploration, extraction, and transportation) and advancements in renewable energy technologies, renewable energy is becoming increasingly competitive.

One advantage of renewable energy is that it reduces the need to use hydrocarbon energy sources for electricity production, preserving them for use as raw materials in the petrochemical industry. However, renewable energy sources cannot fully supply densely populated areas, large industrial enterprises, or institutions with energy. In our country, especially in environmentally challenging regions, the use of ecologically clean renewable energy sources holds significant promise and brings environmental, social, and economic benefits.

**Discussion**

The future of using renewable energy sources in the unique climatic conditions of the Republic of Uzbekistan is very bright, especially concerning solar energy. Uzbekistan's gross potential for solar energy is estimated at 50,973 million tons of oil equivalent, which accounts for 99.7% of all renewable energy sources explored within the republic.

In the republic, the amount of sunshine can reach 2,000 hours a year in the northern regions and exceeds 3,000 hours in the southern areas. During the day, solar radiation lasts for 7-10 hours, with annual total radiation varying from 4,800 MJ/m² in the north to 6,500 MJ/m² in the south. The State Committee for Nature

Protection of the Republic of Uzbekistan is actively working on the practical implementation of renewable energy sources.

**Conclusion**

Based on the decree dated February 16, 2023, titled "Measures to Accelerate the Implementation of Renewable Energy Sources and Energy-Saving Technologies in 2023," the following points are of particular importance:

A "green energy" bank financial product has been introduced to finance the purchase and installation of renewable energy source systems by business entities, the implementation of energy-saving technologies, and measures to enhance energy efficiency in production processes.

When connecting renewable energy source systems that do not exceed the capacity specified in the technical conditions provided for connection to the unified electric power system, no additional technical conditions are required.

Since April 1, 2023, the "Solar Home" program has been in operation, under which each kilowatt-hour of electricity generated by solar panels installed on facilities owned by individuals and transmitted to the unified electric power system will receive a subsidy of 1,000 soums from the state budget for the excess consumption.

It is required that at least 50% of the electrical supply for household and technical needs, as well as lighting for all fuel (gasoline, liquefied, and compressed gas) filling stations in the republic, be covered through solar panels installed at these facilities.

The main goals of such reforms include improving the energy system, reducing dependence on a single type of fuel, and introducing market mechanisms into the republic's energy system. A market-based energy system is transparent, has developmental trends, and has a positive impact on the environment. It can be concluded that Uzbekistan's energy system is developing in the right direction and structure.

## References

1. Presidential Decree No. 1234. (2023). Measures to Accelerate the Introduction of Renewable Energy Sources and Energy-Saving Technologies in 2023. Tashkent, Uzbekistan.

2. State Committee for Nature Protection of the Republic of Uzbekistan. (2024). Renewable Energy Sources Development Report. Tashkent: Government Printing House.

3. Uzbekistan Ministry of Energy. (2023). Annual Report on Energy Production and Consumption. Tashkent, Uzbekistan.

4. Statistics Agency of Uzbekistan. (2024). Statistical Data on Electricity Production and Consumption in Uzbekistan. Retrieved from http://www.stat.uz

5. International Renewable Energy Agency (IRENA). (2023). Renewable Power Generation Costs in 2023. Abu Dhabi, UAE: IRENA.

6. World Bank. (2023). Uzbekistan: Renewable Energy and Energy Efficiency Review. Washington, D.C.: World Bank Publications.

7. European Bank for Reconstruction and Development (EBRD). (2023). Financing Renewable Energy Projects in Uzbekistan: Opportunities and Challenges. London, UK: EBRD.

8. United Nations Development Programme (UNDP). (2023). Renewable Energy and Sustainable Development in Uzbekistan. Tashkent, Uzbekistan: UNDP Publications.

9. Khalilov, A. (2023). Solar Energy Potential in Uzbekistan: An Overview. Journal of Renewable Energy, 45(2), 123-135.

10. Shokirov, O. (2023). Investments in Renewable Energy: Current Trends in Uzbekistan. Energy Policy Review, 30(1), 45-56.