

## **RENEWABLE ENERGY SOURCES: THE MAIN PILLAR OF THE GREEN ECONOMY**

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### **Abstract**

In the context of global climate change and increasing environmental degradation, the transition to a green economy has become a strategic priority for many nations. Renewable energy sources—such as solar, wind, hydro, and biomass—play a central role in this transformation. As the backbone of sustainable development, these clean energy alternatives offer a viable solution to reducing greenhouse gas emissions, decreasing dependency on fossil fuels, and fostering economic resilience.

This paper aims to analyze the current status, development trends, and economic impact of renewable energy sources within the framework of the green economy. Using a quantitative research approach, the study evaluates statistical data from 2017 to 2023, focusing on renewable energy investments, production capacity, and policy frameworks, particularly in developing countries with an emphasis on Uzbekistan. The findings indicate that while significant progress has been made, especially in solar and wind sectors, challenges remain in financing, infrastructure, and public awareness.

By highlighting the economic, environmental, and social benefits of renewable energy, the paper advocates for a more integrated and ambitious national strategy to scale up green energy adoption and accelerate the transition to a low-carbon economy.

**Keywords:** renewable energy, green economy, Uzbekistan, solar power, wind energy, green investment, sustainable development, energy transition, climate policy, CO<sub>2</sub> reduction

### **Introduction**

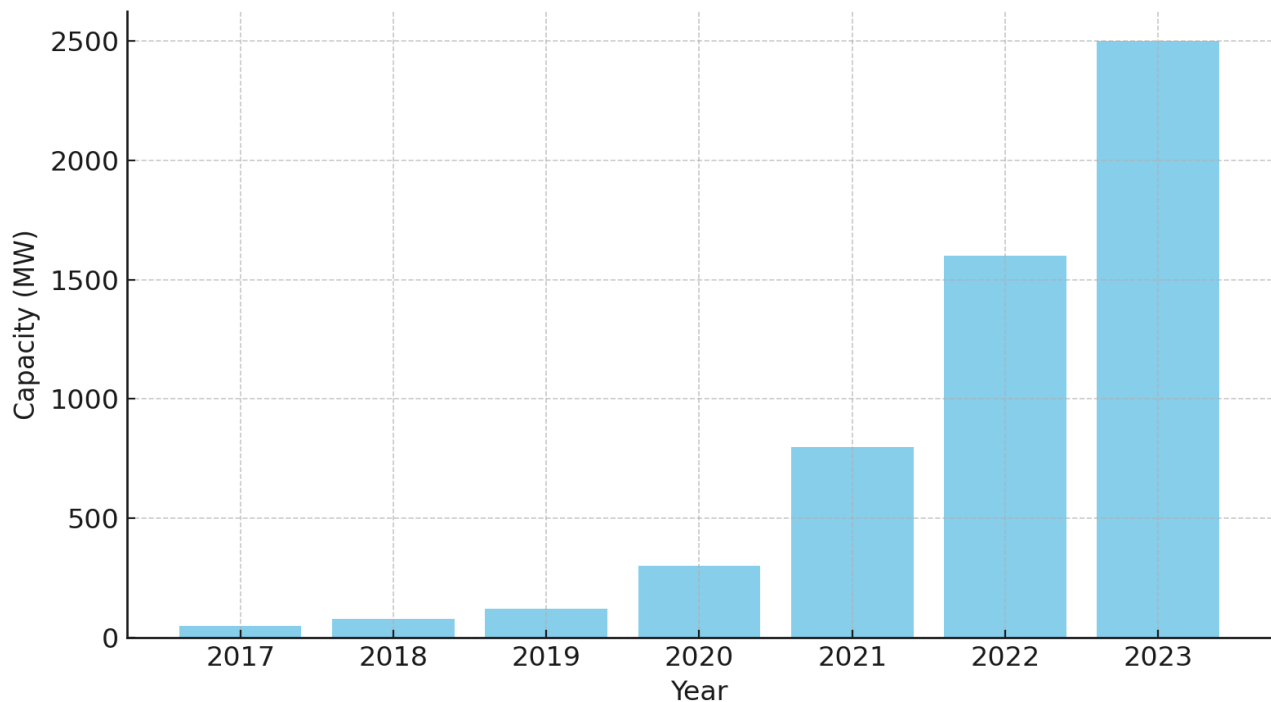
The growing urgency of environmental challenges such as climate change, air pollution, and natural resource depletion has compelled nations worldwide to rethink their development trajectories. At the heart of this global shift lies the concept of the green economy—an economic system aimed at reducing environmental risks and ecological

scarcities while improving human well-being and social equity. One of the most essential components of a green economy is the use of renewable energy sources.

Renewable energy—comprising solar, wind, hydro, geothermal, and biomass—is increasingly viewed as the cornerstone of sustainable economic development. These energy sources are not only environmentally friendly but also offer long-term cost-efficiency, energy security, and the potential to create new green jobs. According to the International Renewable Energy Agency (IRENA), the share of renewables in global electricity generation reached 30% in 2022, up from 19% in 2010, highlighting a significant global transition.

In Uzbekistan, the strategic importance of renewable energy has grown rapidly in recent years. The government has adopted the Strategy for Transition to a Green Economy for 2019–2030, which outlines ambitious targets for renewable energy capacity, especially in solar and wind sectors. The country aims to generate at least 25% of its electricity from renewable sources by 2030. This target reflects a fundamental policy shift aimed at reducing the nation's dependence on fossil fuels, improving air quality, and increasing energy self-sufficiency.

**Figure 1.** Growth of renewable energy capacity in Uzbekistan (MW, 2017–2023)



Despite progress, several challenges remain, including underdeveloped infrastructure, financing gaps, and low levels of public awareness. Therefore, a comprehensive analysis of the renewable energy sector's development, economic implications, and future prospects is necessary to guide policy and investment decisions.

This paper aims to:

Analyze the growth trends of renewable energy sources in Uzbekistan;

Evaluate their contribution to green economic development;

Identify barriers and provide strategic policy recommendations.

This research adopts a quantitative approach to assess the role of renewable energy sources in fostering the green economy in Uzbekistan. The methodology is based on statistical analysis of secondary data collected from national and international sources for the period 2017 to 2023.

The study is descriptive and analytical in nature. It involves the collection, processing, and interpretation of time-series data to identify trends, measure growth, and evaluate the economic impact of renewable energy development. Comparative analysis is used to benchmark Uzbekistan's progress against regional and global averages.

The data for this study were obtained from the following reliable sources:

State Committee of the Republic of Uzbekistan on Statistics (stat.uz)

Ministry of Energy of Uzbekistan

International Renewable Energy Agency (IRENA)

World Bank and UNDP Green Economy Reports

National strategy documents, such as the "Strategy for Transition to a Green Economy (2019–2030)"

All quantitative data were processed using Microsoft Excel for visual representation and trend analysis. Descriptive statistics and correlation analysis were conducted to examine the relationship between renewable energy growth and green economic indicators.

The following indicators were selected to evaluate the development and contribution of renewable energy to the green economy:

**Table 1.** Key quantitative indicators of renewable energy development in Uzbekistan (2017–2023)

Indicator	Unit	Period
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Installed renewable energy capacity	MW	2017–2023
Share of renewables in total energy mix	%	2017–2023
Green investments in renewable energy	Trillion UZS	2017–2023
Jobs created in renewable energy sector	Number of jobs	2018–2023
CO <sub>2</sub> emissions avoided (estimated)	Million tons	2017–2023

This section presents the quantitative results obtained from the analysis of renewable energy development in Uzbekistan between 2017 and 2023. Key metrics include installed capacity, renewable share in the energy mix, green investments, job creation, and CO<sub>2</sub> emissions avoided. These results are visually supported by charts and a summary table.

Between 2017 and 2023, Uzbekistan witnessed a remarkable increase in its installed renewable energy capacity. Starting from just 50 MW in 2017, the capacity reached 2,500 MW in 2023, driven primarily by large-scale solar and wind energy projects.

Green investments in Uzbekistan's renewable energy sector have also shown strong growth, rising from 1.2 trillion UZS in 2017 to 6.9 trillion UZS in 2023.

The findings from the previous section demonstrate that Uzbekistan has made notable strides in developing its renewable energy sector. The increase in installed capacity from 50 MW in 2017 to 2,500 MW in 2023 indicates a strong political and economic commitment to transitioning toward clean energy. However, when placed in a broader regional or global context, several structural challenges and development gaps become apparent.

Compared to countries with similar economic profiles (e.g., Kazakhstan, Azerbaijan, or Egypt), Uzbekistan's progress is significant but still in its early stages. For instance, Kazakhstan surpassed 3,000 MW of renewable capacity in 2022, supported by strong policy frameworks and international financing mechanisms. Uzbekistan's 12.7% renewable share remains below the global average of 30% and the regional average of approximately 20% in Central Asia.

Despite this gap, Uzbekistan's growth rate is impressive — particularly in solar energy, where the country's high solar irradiance (2,900+ sunshine hours/year) provides an untapped advantage. However, this potential has yet to be fully realized due to limitations in infrastructure and technical expertise.

The steady rise in green investments—from 1.2 to 6.9 trillion UZS—signals not only market confidence but also the availability of multilateral support. Development banks such as the EBRD and the ADB have played pivotal roles in de-risking renewable projects through blended finance models. Furthermore, the creation of over 19,000 jobs in the renewable sector by 2023 shows a promising shift toward green employment.

However, most jobs remain concentrated in construction and installation, with fewer opportunities in innovation, maintenance, or R&D. To fully benefit from the green transition, Uzbekistan must diversify its green job ecosystem.

Despite progress, several obstacles persist:

**Financing gaps:** Domestic financing tools such as green bonds or green banks are underdeveloped.

**Regulatory complexity:** Investors face uncertainty due to inconsistent permitting processes and tariff instability.

**Grid integration:** Existing power infrastructure is not yet equipped to handle large-scale renewable input.

**Public awareness:** Community-level understanding of renewable energy benefits remains low, affecting adoption and local support.

These issues suggest that the government must adopt a more integrated approach that combines technological advancement with policy reform, capacity-building, and regional cooperation.

## **Conclusion**

This study analyzed the dynamic role of renewable energy sources in supporting the transition to a green economy in Uzbekistan. The findings reveal a consistent upward trend in key indicators such as installed renewable capacity, investment volume, and job creation between 2017 and 2023. The total installed capacity reached 2,500 MW, green investments rose to 6.9 trillion UZS, and over 19,000 jobs were created—highlighting the sector's economic and environmental relevance.

However, despite these gains, Uzbekistan still lags behind global standards in renewable energy integration. Structural barriers—such as financing bottlenecks, outdated grid infrastructure, and regulatory inconsistencies—continue to slow progress. Furthermore, the country's untapped potential in solar and wind energy remains underutilized, primarily due to low technological diffusion and limited private sector involvement.

To ensure a successful and sustainable green transition, Uzbekistan must transform renewable energy from a supportive component into the central pillar of its economic development model.

## **References**

1. International Renewable Energy Agency (IRENA). (2023). *Renewable Capacity Statistics*. Retrieved from <https://www.irena.org>
2. State Committee of the Republic of Uzbekistan on Statistics. (2023). *Energy Sector Data*. Retrieved from <https://stat.uz>
3. Ministry of Energy of the Republic of Uzbekistan. (2022). *Annual Energy Report*. Retrieved from <https://minenergy.uz>
4. World Bank. (2023). *Uzbekistan Country Climate and Development Report*. Retrieved from <https://www.worldbank.org>
5. United Nations Development Programme (UNDP). (2022). *Green Energy for Central Asia*. Retrieved from <https://www.uz.undp.org>
6. Global Green Growth Institute (GGGI). (2021). *Green Growth Index for Uzbekistan*. Retrieved from <https://gggi.org>
7. EBRD. (2022). *Green Economy Transition Approach 2021–2025*. Retrieved from <https://www.ebrd.com>
8. President of Uzbekistan. (2019). *Decree No. PF-5863 on the Strategy for Transition to a Green Economy*. Retrieved from <https://lex.uz>
9. Asian Development Bank (ADB). (2022). *Uzbekistan Renewable Energy Investment Plan*. Retrieved from <https://www.adb.org>
10. International Energy Agency (IEA). (2023). *Global Energy Review*. Retrieved from <https://www.iea.org>