GREEN ECONOMY TRENDS IN THE GLOBAL ECONOMY AND THEIR IMPACT ON THE ECONOMY OF UZBEKISTAN

Muzaffar Norkhujaev
The Central Bank of the Republic of Uzbekistan Lead Economist to the Department of Statistics and Research

Abstract: *This article scientifically analyzes global green-economy trends and their implementation in the economy of the Republic of Uzbekistan. The study was conducted on the basis of statistical data for 2018–2024. The decrees and resolutions of the President of the Republic of Uzbekistan in the field of green transition, in particular PQ-57, PQ-436, as well as the goals set within the framework of the "Uzbekistan — 2030" strategy, are analyzed. The article recommends the introduction of public-private partnerships and ESG standards to achieve the goals by 2030.*

Keywords: *green economy, sustainable development, renewable energy, carbon emissions, green investments, "Uzbekistan — 2030" strategy, ESG, energy efficiency*

INTRODUCTION

The world economy is undergoing fundamental changes in the second half of the 21st century. Anthropogenic climate change, rapid depletion of natural resources, loss of biodiversity, and accelerating air pollution are clearly demonstrating the limitations of the traditional economic growth model.[1] Today, the Paris Agreement (2015), signed by 197 countries, and the UN Sustainable Development Goals (SDGs) for 2030 — in particular SDG-7 (clean energy) and SDG-13 (climate action) — have put the green transition at the center of the global policy agenda.

The concept of a green economy was theoretically introduced in 1989 by Pearce, Markandya, and Barbier.[2] According to the United Nations Environment Programme (UNEP), a green economy is an economy that ensures human well-being and social equity, while significantly reducing environmental risks.[3] By 2023, global green energy investment will reach US$1.74 trillion, surpassing investment in the conventional fuel sector ($1.05 trillion) for the first time.[4]

In Uzbekistan, the green transition is not only an environmental imperative but also an economic opportunity. The country faces complex challenges, including the Aral Sea tragedy, water scarcity, energy shortages, and overreliance on foreign markets.

The study answers the following key questions:

(1) What are the trends in the global green economy?

(2) What were the results of the green transition in Uzbekistan in 2018–2024?

(3) What are the obstacles to achieving the goals of the " Uzbekistan — 2030 " strategy, and what policy recommendations should be developed to overcome them?

[1] IPCC. (2023). Climate Change 2023: Synthesis Report. Geneva: IPCC. https://www.ipcc.ch/report/ar6/syr/
[2] Pearce, D., Markandya, A., & Barbier, EB (1989). Blueprint for a Green Economy. London: Earthscan
[3] UNEP. (2011). Towards a Green Economy. Nairobi: UNEP. https://wedocs.unep.org/handle/20.500.11822/43704
[4] BloombergNEF. (2024). Energy Transition Investment Trends 2024. New York. https://about.bnef.com/energy-transition-investment

Research methodology

The research was conducted based on the following methodological approaches:

- Regulatory and legal analysis: Decrees and resolutions of the President of the Republic of Uzbekistan in the field of green transition, the "Uzbekistan – 2030" strategy, as well as international agreements (Paris Agreement, Kyoto Protocol) were systematically studied.
- Statistical comparative analysis: Dynamic assessment of energy, emissions, and investment indicators for 2018–2024; time series analysis and growth rates were calculated.
- Indicator-based monitoring: An international comparative analysis of Uzbekistan was carried out based on data from the UNEP Green Economy Indicators (GEI), OECD Green Growth Indicators, and the World Bank WDI.
- International experience study: The green transition policies of Germany, South Korea ("Green New Deal"), China, and India were analyzed.

Literature Review

In recent years, the concept of the green economy has become one of the most widely discussed topics in international academic literature. Researchers interpret this concept from various perspectives depending on their theoretical approaches and research objectives. For instance, M. Jacobs (1991) defines the green economy as an economic model that ensures a balance between social justice, economic development, and environmental sustainability. According to his view, sustainable development cannot be achieved solely through economic growth, but also requires the rational use of natural resources and the improvement of social welfare.

Other scholars have focused on the environmental and institutional aspects of the green economy. In particular, E. Barbier (2011) characterizes the green economy as a development model that harmonizes economic growth with environmental protection. He argues that long-term economic progress can only be achieved when economic activities are conducted in accordance with the principles of ecological sustainability. Similarly, D. Pearce (1989) made a significant contribution to the formation of green economy theory by emphasizing the importance of incorporating environmental costs and the value of natural resources into economic policymaking.

International organizations and researchers have also extensively analyzed the mechanisms and development pathways of the green economy. For example, the United Nations Environment Program (UNEP, 2011) describes the green economy as an economic system aimed at low-carbon development, efficient resource utilization, and the reduction of environmental risks. In addition, scholars and experts such as OECD, R. Costanza, and R. Schmalensee highlight the importance of introducing innovative technologies, implementing carbon taxation mechanisms, and applying market-based instruments to address environmental challenges within the framework of a green economy.

Uzbek scholars have also studied the concept of the green economy, considering the specific socio-economic conditions of the country. For instance, M. Yuldashev interprets the green economy as a production model that ensures ecological balance while protecting human health. I. Yuldashev evaluates it as a strategic approach aimed at improving the efficient use of natural resources and reducing environmental risks. Furthermore, Sh. Turaev

connects the implementation of green economy principles with the efficient management of water resources in agriculture, while A. Karimov identifies infrastructure modernization and the expansion of renewable energy sources as key priorities for sustainable development.

Analysis and discussion of results

The global green transition has accelerated at an unprecedented pace over the past 10 years. [5]According to Bloomberg NEF (2024), in 2023, investment in the energy sector will exceed investment in conventional fuels for the first time. The unit cost of solar energy fell from $128 in 2015 to $25 in 2024 (80.5%).[6]

Table 1. Key indicators of the global green economy (2015–2024)

Indicator	2015	2018	2020	2022	2024 e
Green investments ($trln)	0.82	1.04	1.18	1.42	1.95
Renewable energy, total (GW)	1,985	2,350	2,799	3,372	4,450
Solar energy price ($/MWh)	128	68	48	36	~25
Electric vehicle sales (million units)	0.54	2.02	3.24	10.52	~17
Green bond market ($bn)	41	165	269	487	~620
CO_2 emissions, total (Gt)	35.6	37.1	34.8	37.5	~36.8

Note: e — preliminary estimate; GW — gigawatt; MWh — megawatt-hour; Gt — gigaton. Source: BloombergNEF (2024); IRENA (2024); IEA (2024); Climate Bonds Initiative (2024).

Regional trends vary sign Significantly. The European Union has created the most progressive regulatory environment through the Carbon Border Adjustment Mechanism (CBAM) and the EU Taxonomy. [7]China has captured 70–80% of the global market for solar panels and electric vehicle batteries, driving down prices sharply. South Korea, as part of its [8]Green New Deal launched in 2020, aims to attract $73.4 billion in green investment by 2025 — the equivalent of $1,400 per citizen.[9]

In Uzbekistan: statistical analysis (2018–2024)Repeat renewable energy development. The renewable energy sector in Uzbekistan began to develop rapidly after the adoption of the " Uzbekistan — 2030 " strategy.

By 2024, the installed solar capacity reached 1.24 GW — a 15.5-fold increase compared to 2020. Within the framework of Resolution No. PQ-4477, 17 major projects were implemented, including the 500 MW Nukus solar power plant with the participation of Abu Dhabi Future Energy Company (Masdar).[10]

Table 2. Dynamics of renewable energy and green investments in Uzbekistan (2018–2024)

[5] BloombergNEF. (2024). Energy Transition Investment Trends 2024. New York. https://about.bnef.com/energy-transition-investment
[6]IRENA. (2024). Renewable Capacity Statistics 2024. Abu Dhabi: IRENA. https://www.irena.org/Publications/2024/Mar/Renewable-capacity-statistics-2024
[7] European Commission. (2024). EU Green Deal Progress Report 2024. Brussels: EC. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en
[8]IEA. (2024). China's Clean Energy Transition 2024. Paris: IEA. https://www.iea.org/reports/chinas-clean-energy-transition-2024
[9] Republic of Korea. (2020). Green New Deal: Policy Brief. Seoul: Ministry of Economy and Finance .
[10] UNEP. (2023). Emissions Gap Report 2023. Nairobi: UNEP. https://www.unep.org/resources/emissions-gap-report-2023

Indicator	2018	2020	2022	2024	Growth (x)
Renewable energy share (%)	12	15	18	24	2.0x
Installed solar capacity (GW)	0.08	0.08	0.45	1.24	15.5x
Wind power capacity (MW)	0	0	115	310	—
Loans for renewable energy (billion soums)	1,200	1,850	4,100	8,450	7.0x
Green investments, total ($bn)	0.5	1.2	2.8	4.1	8.2x
Loans from international institutions ($ billion)	0.3	0.7	1.4	2.1	7.0x

Source: Ministry of Energy of Uzbekistan (2024); Statistical Agency of Uzbekistan (2024); EBRD, ADB project data (2024). International institutions — EBRD, ADB, World Bank, and IsDB together.

Carbon emissions dynamics and energy intensity

The environmental impact of green reforms has been confirmed by the numbers. Uzbekistan's total CO_2 emissions decreased from 190 million tons in 2018 to 165 million tons by 2024 — a 13.2% reduction.

[11]However, this indicator is significantly below the "Uzbekistan — 2030" target of a 35% reduction. Energy intensity (energy consumed per $1,000 of GDP) decreased by 10.1% compared to 2020.

Table 3. Uzbekistan's CO_2 emissions and energy efficiency indicators (2018–2024)

Indicator	2018	2020	2022	2024	2030 Goal
CO_2 emissions (million tons)	190	185	178	165	~124 (-35%)
Energy intensity (kg oil equivalent/$1000 GDP)	218	210	204	196	152 (-30%)
Share of gas and coal in energy (%)	88	85	82	76	60 (goal)
Renewable energy share (%)	12	15	18	24	40 (goal)
CO_2 per 1 kWh of electricity (grams)	482	465	438	398	~280 (target)

Source : IEA (2024); Ministry of Ecology of Uzbekistan (2024); Strategy «Uzbekistan - 2030». 2030 goals based on Decree No. PQ-57 and the National Climate Plan.

Green financing and investments

In 2023, Uzbekistan became the first Central Asian country to issue international green bonds ($500 million), which was positively evaluated by ESG investors.

The green loan portfolio of the National Bank of [12]Uzbekistan increased 4.6 times between 2020 and 2024. The EBRD, ADB, and the World Bank together provided $2.1 billion in loans for green projects.

[11] Statistical Agency of the Republic of Uzbekistan. (2024). Uzbekistan in Figures 2024. Tashkent. https://stat.uz

[12] European Commission. (2024). EU Green Deal Progress Report 2024. Brussels: EC. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

"Uzbekistan – 2030" strategy: green goals and current status

" Uzbekistan — 2030 " strategy (PF-60, 2022) is the key document for the national green transition. It defines comprehensive directions that balance economic growth and environmental sustainability:

Table 4. Strategy " Uzbekistan — 2030 " : green goals and implementation status as of 2024

Strategic goal	Basis (2021)	Status 2024	2030 goals	Completion (%)
Renewable energy share	11%	24%	40%	44.8%
CO_2 emission reduction	Basis	-13.2%	-35%	37.7%
Decreased energy intensity	Basis	-10.1%	-30%	33.7%
Green investments ($bn)	1.2	4.1	10+	41.0%
Installed RE capacity (GW)	0.08 (sun)	1.54 total	8.0 total	19.3%
Green jobs (thousands)	~15	~68	300	22.7%
Energy efficiency buildings	Less	15% new building	50% buildings	—

Source: Uzbekistan Statistical Agency (2024); Ministry of Energy (2024); Monitoring Report of the Strategy «Uzbekistan - 2030» (2024). RE - Renewable Energy.

As can be seen from the table, the highest implementation rate is observed in the share of renewable energy (44.8%). However, the lag in the indicators of green jobs (22.7%) and installed capacity (19.3%) is significant.

This indicates that the green transition is progressing slowly. At the current pace, the 40% renewable energy target can be achieved by 2030, but the target of 300,000 green jobs requires additional systemic measures.

Discussion

The economic impact of green reforms is already beginning to be seen. First, energy security is increasing: the increase in the share of renewable energy is reducing dependence on gas imports and balancing the energy balance.

Second, $4.1 billion in green investments in 2024 is having a positive impact on macroeconomic indicators through new jobs, technological modernization, and tax revenues.[13]

Third, export potential is increasing.

Uzbek enterprises specializing in green and clean technologies are gaining access to European markets — especially after the introduction of the EU CBAM (carbon border adjustment mechanism), "green" products began to be highly valued. [14]Fourth, ambient air quality is improving, which reduces healthcare costs and increases labor productivity.

Main problems and obstacles

[13]IEA. China's Clean Energy Transition 2024. Paris: IEA. https://www.iea.org/reports/chinas-clean-energy-transition 2024
[14]European Commission. (2024). EU Green Deal Progress Report 2024. Brussels: EC. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

- Imperfections in the financing structure: Bank loans for green projects have interest rates of 22–28%, which is much shorter than the project payback period (10–25 years). The green bond market is still emerging, and institutional investors (pension funds) do not have a mechanism to invest in green assets.
- Technology transfer and localization challenges: Solar panels, batteries, and wind turbines are almost entirely imported. Local production is less than 5%. R&D spending is 0.19% of GDP, significantly below the OECD average (2.7%).[15]
- Staff shortage: Green economy specialization is underdeveloped — universities have few majors in environmental engineering, green finance, and sustainable architecture. Only 68,000 of the 300,000 jobs needed for the green sector by 2024 have been filled.[16]
- Regulatory gaps: Environmental standards and certification systems are not yet fully developed. There is no carbon trading system. Mandatory standards for green buildings have not been introduced. ESG reporting is voluntary for most of the corporate sector.
- Infrastructure limitations: Transmission losses are 18–22% and are based on outdated technologies. Renewable energy storage capacities (battery systems) are insufficient. Smart grid technologies have not yet been implemented.

Conclusion

This study allows us to draw the following conclusions: First, the green transition in the global economy has become an irreversible trend - in 2023, green investments will exceed traditional fuel investments for the first time. This green transformation is also a strategic necessity for Uzbekistan to maintain international competitiveness.

Second: Uzbekistan made significant progress on the path to green transition in 2018–2024 — the share of renewable energy increased by 2 times, green investments increased by 8.2 times, and CO_2 emissions decreased by 13.2%. Within the framework of the "Uzbekistan — 2030" strategy, 5 major regulatory documents were adopted, and a legal foundation for green transition was created.

Third: The current pace is not sufficient to fully achieve the goals of "Uzbekistan — 2030". Significant acceleration is needed in CO_2 reduction (currently 13.2%, target 35%), green jobs (currently 22.7% achieved), and installed capacity (19.3% achieved).

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