



## UZBEKISTAN'S GREEN TRANSITION

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**Abstract:** *This article examines the development of the green economy in Uzbekistan as a strategic direction of economic modernization, energy security and sustainable investment attraction. The study focuses on renewable energy expansion, energy efficiency, green finance, environmental policy and circular economy mechanisms. The analysis shows that Uzbekistan has moved from declarative environmental policy toward large-scale institutional and investment reforms, although the effectiveness of the transition still depends on regulatory consistency, private-sector participation, technological modernization and stronger environmental governance.*

**Keywords:** *Green economy, Uzbekistan, renewable energy, green finance, sustainable development, energy efficiency, circular economy, ecological modernization.*

### **Introduction**

The transition to a green economy has become one of the central directions of Uzbekistan's contemporary development agenda. For a country experiencing rapid demographic growth, industrial modernization and rising energy demand, environmental policy is no longer a narrow ecological issue; it is directly connected with macroeconomic stability, competitiveness, energy security and the quality of future growth. Uzbekistan's economy has historically relied on energy-intensive production, natural gas consumption and resource-heavy patterns of industrial and



agricultural development. Under conditions of climate change, water scarcity and growing pressure on natural ecosystems, such a model creates structural risks for long-term economic sustainability.

The strategic importance of the green economy is reinforced by Uzbekistan's climate vulnerability. The World Bank notes that Uzbekistan is among the most energy- and resource-intensive countries and that climate risks such as water scarcity, drought, extreme heat and the consequences of the Aral Sea ecological disaster may seriously affect welfare and growth prospects. Without adaptation measures, the economy could be around 10 percent smaller by 2050 than under a climate-resilient path.

The research problem of this article is therefore defined as follows: how can Uzbekistan transform green economy policy from a set of strategic objectives into an economically effective, institutionally stable and investment-attractive development model? This question is important because the green transition must not only reduce environmental pressure but also create new productive sectors, stimulate technological renewal, lower energy losses and improve the competitiveness of domestic industries.

## Literature Review

The concept of the green economy emerged at the intersection of environmental economics, sustainable development theory and ecological modernization. In classical environmental economics, natural resources and ecosystem services are treated as forms of capital whose degradation creates long-term economic costs. Pearce, Markandya and Barbier argued that economic growth cannot be considered sustainable if it is achieved by systematically depleting natural capital. This approach remains relevant for Uzbekistan because water resources, land quality, air pollution and energy efficiency are not external issues; they directly affect productivity and social welfare.

Sustainable development theory broadens the discussion by linking economic growth with intergenerational equity, social inclusion and environmental balance. From this perspective, the green economy is not limited to renewable energy. It



includes the restructuring of production, transport, housing, agriculture, public finance and consumption patterns. For Uzbekistan, this means that green development must be integrated into industrial policy, regional development, employment policy and investment regulation.

The literature on renewable energy emphasizes three main economic effects: diversification of energy supply, reduction of fossil fuel dependence and creation of new investment markets. In Uzbekistan, this theoretical argument is especially relevant because electricity demand is increasing, while the traditional gas-based energy model creates both fiscal and energy-security pressures. Renewable energy expansion can therefore function as an environmental measure and as a macroeconomic stabilization instrument.

Green finance literature stresses that environmental transition requires long-term capital, transparent project selection, measurable impact indicators and credible reporting. Uzbekistan's first sovereign green bond issuance in 2023 marked an important step in this direction. UNDP reported that Uzbekistan placed UZS 4.25 trillion in inaugural green sovereign Eurobonds on the London Stock Exchange, with proceeds intended for environmentally focused projects such as water-saving technologies, transport systems, sanitation and protective forests.

The circular economy literature shifts attention from “produce–consume–dispose” models toward resource recovery, recycling, waste-to-energy systems and industrial symbiosis. For Uzbekistan, circular economy mechanisms are still at an early stage, but they are becoming increasingly important in waste management, construction materials, agriculture and urban infrastructure. Recent waste-to-energy projects indicate that circular economy policy is beginning to move from conceptual discussion into practical implementation.

The main research gap is that many studies discuss Uzbekistan's green economy either as a policy goal or as an energy-sector reform. Less attention is given to the economic integration of renewable energy, green finance, institutional reforms, resource-saving technologies and circular economy elements into one coherent modernization model. This article addresses that gap by treating the green economy



as a system of mutually connected economic, technological and institutional transformations.

## **Research Methodology**

The study uses a qualitative-analytical methodology based on comparative analysis, statistical interpretation, logical analysis, system approach and document analysis. Comparative analysis is applied to evaluate Uzbekistan's green transition in relation to international green economy principles and energy-transition practices. Statistical analysis is used to interpret selected indicators of renewable energy capacity, electricity generation, investment and strategic targets. Logical analysis helps identify causal links between energy modernization, investment attraction, resource efficiency and competitiveness.

The system approach is particularly important because the green economy cannot be assessed through isolated indicators. Renewable energy projects, green bonds, waste management reforms, environmental regulation, energy efficiency and institutional modernization interact with one another. Document analysis was applied to official strategic documents, presidential decisions, international organization reports and analytical materials from institutions such as the World Bank, IEA, UNDP and EBRD.

## **Analysis and Results**

Uzbekistan's green economy development is currently shaped by three parallel processes: large-scale energy transition, expansion of green finance and gradual institutional modernization of environmental policy. The most visible progress has occurred in the energy sector. The Strategy for the Transition to a Green Economy for 2019–2030, approved by Presidential Resolution No. PP-4477, sets priorities such as improving energy efficiency, rational use of natural resources, reducing greenhouse gas emissions, expanding green energy access, creating green jobs and strengthening climate resilience. The IEA summary of the strategy notes targets including a reduction in greenhouse gas emissions per unit of GDP and a twofold increase in energy efficiency by 2030.



The energy transition has accelerated noticeably in recent years. According to the President's office, Uzbekistan's total electricity generating capacity reached 25,800 MW by early 2026, of which 8,000 MW, or 31 percent, came from renewable sources including solar, wind and hydropower. Electricity production in 2026 was projected at 90 billion kWh, representing a 40 percent increase compared with 2020. These indicators show that the green economy is no longer peripheral to Uzbekistan's energy system; it is becoming a major component of national infrastructure policy.

Indicator	Recent value / target	Economic interpretation
Total electricity generating capacity	25,800 MW	Indicates rapid expansion of national energy infrastructure.
Renewable generating capacity	8,000 MW	Shows that renewable sources have become a significant part of the energy system.
Share of renewables in generating capacity	31%	Reflects progress toward diversification away from fossil-fuel dependence.
Projected electricity production in 2026	90 billion kWh	Demonstrates rising demand linked to industrialization and population growth.
Planned new renewable capacity by 2030	More than 17,000 MW	Confirms the strategic scale of the future green-energy pipeline.
Target share of green energy in total generation by 2030	54%	Shows a shift from moderate renewable expansion to structural transformation of the energy mix.

**Source:** Compiled from official presidential energy-sector information and strategic announcements.

The table demonstrates that Uzbekistan's green transition is not limited to symbolic projects. The renewable component has already reached a scale that affects energy planning, grid modernization and investment policy. The economic meaning of this progress is substantial. First, renewable energy reduces exposure to natural



gas constraints and improves energy security. Second, it creates demand for grid infrastructure, storage systems, engineering services and domestic manufacturing. Third, it improves the country's investment profile by linking energy reform with public-private partnerships and international financial standards.

At the same time, these indicators also reveal unresolved problems. The expansion of renewable capacity requires parallel investment in transmission networks, dispatching systems and storage technologies. Without grid modernization, renewable projects may face curtailment, instability and inefficient integration. The President's office has already emphasized the need to construct high-voltage networks and expand substations to integrate new capacities into a unified energy system. This means that the next stage of Uzbekistan's green transition will depend not only on building solar and wind plants but also on strengthening the technical architecture of the entire electricity system.

Green finance has become the second important pillar of the transition. The issuance of green sovereign Eurobonds demonstrated that Uzbekistan is beginning to connect environmental policy with capital-market instruments. This is economically important because public budgets alone cannot finance the scale of modernization required in energy, transport, water management and waste systems. Green bonds, sustainability-linked loans and climate-oriented credit lines can attract institutional investors, improve project transparency and introduce measurable environmental impact criteria.

International financial institutions are already playing a major role. The EBRD reported in 2026 that it had supported 1.65 GW of wind capacity, 2.4 GW of solar photovoltaic capacity and 668 MW / 1,837 MWh of battery energy storage systems in Uzbekistan. It also stated that its renewable-energy support aligns with a government plan targeting 25 GW of solar and wind capacity by 2030. Such participation is significant because international finance brings not only capital but also procurement standards, environmental safeguards, project discipline and technical expertise.



However, green finance in Uzbekistan still faces institutional limitations. Domestic capital markets remain relatively shallow, and many green projects depend on sovereign guarantees, development-bank lending or foreign investors. For green finance to become a stable national mechanism, Uzbekistan needs stronger taxonomy rules, transparent reporting, independent verification and a wider range of private-sector financial instruments. Banks must also develop the capacity to evaluate energy-saving projects, climate risks and environmental returns, rather than treating green finance as a narrow donor-funded segment.

A third direction is the development of circular economy elements. Waste management has become one of the most practical areas where environmental policy can produce economic returns. Uzbekistan announced waste-to-energy projects worth about US\$1.28 billion, designed to process more than 4.7 million tons of household waste annually, generate 2.1 billion kWh of electricity, reduce landfill pressure and cut greenhouse gas emissions by 2.4 million tons. These projects have several economic implications: they convert waste into an energy resource, reduce land-use pressure from landfills, create jobs and introduce industrial-scale recycling and thermal processing technologies.

Nevertheless, circular economy development should not rely only on waste incineration. A mature circular model requires waste sorting, recycling markets, producer responsibility, eco-industrial zones and incentives for resource-efficient production. Uzbekistan's future policy should therefore combine waste-to-energy projects with upstream measures such as separate collection, material recovery, recycling infrastructure and green procurement.

Environmental policy and institutional reforms have also become more visible. Uzbekistan declared 2025 the "Year of Environmental Protection and Green Economy," reflecting an attempt to embed sustainability into broader development policy. Official ecological materials highlight rising temperatures, water scarcity and the Aral Sea crisis as factors requiring transformative action rather than incremental change. This policy framing is important because it moves green economy



development beyond the energy sector and connects it with agriculture, urban development, public health, youth policy and regional resilience.

The key analytical result is that Uzbekistan's green economy is developing through a hybrid model: strong state strategic direction, growing foreign investment, gradual market liberalization and selective use of green financial instruments. This model has clear advantages. It allows the state to coordinate large infrastructure projects, attract international partners and align green transition with national development priorities. At the same time, it carries risks if institutional reform does not keep pace with investment expansion. Large projects may increase capacity, but long-term sustainability requires efficient regulation, transparent tariffs, environmental accountability and competitive domestic green industries.

From the standpoint of long-term competitiveness, the green economy can become a source of industrial renewal. Energy-efficient production lowers costs; renewable electricity improves export positioning in markets sensitive to carbon intensity; green certification increases the attractiveness of domestic products; and climate-resilient infrastructure reduces future economic losses. In this sense, the green transition should be understood not as an environmental burden but as an economic modernization strategy.

## Conclusion

The analysis shows that Uzbekistan has entered a decisive stage of green economy development. Renewable energy capacity, green finance instruments, waste-to-energy projects and environmental policy reforms indicate that the country is moving from general sustainability declarations toward concrete economic transformation. The green transition is strategically important because it strengthens energy security, reduces resource intensity, attracts sustainable investment and supports long-term competitiveness.

At the same time, the success of this transition depends on the quality of implementation. Uzbekistan needs not only more renewable energy projects but also stronger grids, storage systems, transparent green finance rules, domestic technological capacity, circular economy infrastructure and reliable environmental



monitoring. Green economy policy should be integrated with industrial modernization, regional development and human capital formation.

The main scientific conclusion is that Uzbekistan's green economy should be viewed as a systemic modernization model rather than a separate environmental program. Its effectiveness will depend on the interaction between energy reform, financial innovation, institutional governance and resource-saving technologies. Practical policy priorities include expanding private-sector participation, strengthening green project verification, developing domestic green industries, improving energy-efficiency standards and accelerating circular economy mechanisms. If these directions are implemented consistently, the green economy can become one of the main foundations of Uzbekistan's sustainable and competitive growth.

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