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Principles, Existing Challenges, And Prospective Opportunities for Uzbekistan's Transition to a Green Economy

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Abstract: *Today, countries around the world are facing new environmental challenges such as climate change, the depletion of natural resources, and the loss of biodiversity. As an alternative solution to these issues, there is a growing need to transition toward a "green economy," which reduces negative environmental impacts and lays the foundation for equitable development. This article explores the necessity, relevance, principles, challenges, and shortcomings, as well as the promising opportunities associated with Uzbekistan's transition to a green economy.*

Keywords: *green economy, sustainable development, environment, environmental sustainability, ecological challenges, renewable energy sources, waste, natural resources, low-carbon development, climate change, ecology.*

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Introduction

With the increasing global ecological problems, the prevention of environmental pollution, and the implementation of resource-efficient production, new economic development models are being utilized. In the context of transitioning to a green economy, sustainable socio-economic development of the country's economy is being researched, including effective implementation of low-carbon production under global warming conditions, ensuring stable development of regions during various crises and post-crisis periods, and achieving socio-economic equality. In particular, priority is given to research on trends in the greening of economic sectors, methodological foundations of socio-economic sustainable development of regions under the green economy, socio-economic bases of ensuring green growth, increasing decarbonization processes, and ensuring sustainable development through reducing socio-economic and ecological problems. Therefore, in the near future, based on the experience of developed countries, achieving sustainable development in our country by relying on the principles of the green economy, efficiently using existing socio-economic resources and opportunities to organize production processes, adapting the main sectors of the economy to climate change, and sharply reducing environmental protection issues are among the priority tasks that will ensure sustainable development of our economy. Forming a green economy and transitioning to its sustainable development is a priority task not only internationally but also for Uzbekistan. By the initiative of our country's leader Shavkat Miromonovich

Mirziyoyev, the year 2025 was declared the "Year of Environmental Protection and Green Economy."

This decision is based on important factors aimed at ensuring sustainable development of our country and economic growth through solving emerging ecological problems. “Why do we dedicate a whole year to this? To thoroughly review our laws and organize our work. No one believed that Uzbekistan would achieve such progress in wind, solar, and hydroelectric energy. The Year of Green Economy means studying experience. If every decision, law, and decree is directed towards greening, I think it will be good.” Worldwide, cases of negative impact on the environment are increasing. Uzbekistan also faces serious ecological problems such as climate change, air and water pollution. Bringing environmental issues to the forefront of the agenda has allowed the state to address these issues and has raised public awareness and care for nature. Developing the green economy in our country involves ensuring ecological sustainability, reducing greenhouse gas emissions, and introducing new, clean technologies in the energy sector. This process stimulates economic growth by saving energy in agriculture, industry, and transport sectors, efficiently using natural resources, and creating sustainable jobs.

The nationwide project "Green Space" implemented in our country revived the ancient tradition of planting trees and establishing gardens on empty lands, which is one of our people's eternal values. It strengthened the sense of responsibility towards nature. The idea of transitioning to a green economy has facilitated diversification of energy resource consumption, development of renewable energy sources, mitigation of climate change consequences, improvement of efficiency in natural resource use, protection of natural ecosystems, and creation of a favorable environment to ensure an efficient, resource-saving, and ecologically safe economy under climate change conditions. The President of the Republic of Uzbekistan, Shavkat Mirziyoyev, has consistently drawn global attention to issues related to the Aral Sea. At the initiative of our country’s leader, technicians and specialists from all regions of the country were involved to improve the ecological balance in the Aral Sea region. Afforestation work was carried out on the dried-up lands of the Aral Sea, trees suited to the characteristics of the area were planted, and this process is continuing steadily. Transitioning to a “green economy” in our country is considered one of the most important priority tasks to ensure the rational use of natural resources and to mitigate the negative impact of economic activities on the environment.

Literature Review

Among foreign scientists who conducted scientific research on the problems of greening the economy and the transition to a “green economy,” we can mention A.M. Rodrigues, D. Zhang, M. Mohsin, R. Shuderholm, A. Kasztelan, L. Georgeson, and N. Norouzi. Uzbek scientists such as A.V. Vahobov, Sh.X. Khojiboqiyev, T.K. Iminov, A. Isadjanov, D.Sh. Yavmutov, S. Burkhanov, and E.A. Muminova have discussed the characteristics of the “green economy” and its significance in sustainable development in their studies.

Research Methodology

In the scientific research work, widely used general and individual methods of scientific research related to the transition to the “green economy” and green greening were applied. These included dialectical, synthesis and analysis, abstraction, generalization, grouping, comparison, logical approaches, and deduction methods. In essence, the green economy is a sustainability-oriented approach to economic development aimed at reducing environmental impact, increasing resource efficiency, minimizing waste, and ensuring fair distribution of national wealth across all segments of the population. The main focus of the green economy is on environmental sustainability, preserving biodiversity, and preventing the depletion of natural resources.

In today's rapidly changing and evolving world, transitioning to a green economy has become a vital necessity. Cities across the planet are expanding into megacities with populations of 20–35 million people. This trend significantly increases the demand for energy resources, especially fuel. Due to human activity, in the past century, the area of arable land has been reduced by one-fourth, and forests by two-thirds. Moreover, over the last 50 years, the amount of drinking water available per capita has decreased by 60%. Every year, 150–160 cubic kilometers of water used in industry is discharged into rivers and lakes. Due to various disasters and technical errors, 25–30 million tons of oil spill into the oceans annually. Producing one ton of steel in industry requires 300 cubic meters of water, and one ton of paper requires 900 cubic meters of water. Globally, 70% of water is used in agriculture, 20% in industry, and 10% in households. It is estimated that by 2030, 47% of the world's population will face water scarcity issues.

In Uzbekistan, transitioning to a green economy is essential for the rational use of natural resources and mitigating the negative impact of economic activities on the environment. The environmental problems in Uzbekistan can be classified into global, regional, national, and institutional levels. The Presidential Decree No. PF-16 dated January 30, 2025, "On the State Program for the Implementation of the Uzbekistan-2030 Strategy in the Year of Environmental Protection and Green Economy," highlights the importance of implementing a comprehensive "green transformation" in various sectors and industries, fulfilling the country's commitments under the UN Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement. The main objectives include enhancing competitiveness and resource efficiency, mitigating and adapting to climate change, improving living standards, and transitioning to a new model of "green development."

The priority directions for the country's development in the "Year of Environmental Protection and Green Economy" include:

1.1. Improving the ecological outlook of neighborhoods by increasing greenery on streets and creating an environmentally friendly and comfortable living environment;

1.2. Enhancing public health, fostering an ecological lifestyle, and creating conditions for realizing human potential;

1.3. Saving natural resources and ensuring their rational use, as well as maintaining ecological stability;

1.4. Protecting and increasing plant and animal species and preserving biodiversity for future generations;

1.5. Broad implementation of green economy principles and ensuring sustainable financing for projects aimed at adapting the economy to climate change.

In 2025, to further promote green economy principles, decarbonize the economy, and support sustainable financing of projects focused on climate adaptation and mitigation, the following measures will be implemented:

2.1. Based on the requirements of the Paris Agreement, a long-term strategy for achieving carbon neutrality in Uzbekistan will be developed;

2.2. Taking into account adaptation to climate change and the transfer of "green technologies", Uzbekistan's Nationally Determined Contribution (NDC) to reduce greenhouse gas emissions over the next five years will be announced at the global level.

2.3. Within the framework of the obligation to reduce methane emissions, the baseline level of methane emissions in the sectors of natural gas, waste management, and livestock will be determined.

2.4. It is planned to launch large solar and wind power plants with a total capacity of 4.5 GW, install 785 MW of solar panels, and construct hydroelectric power stations (HPPs) with a capacity of 225 MW. As a result, the share of renewable energy sources in electricity production will reach 26%, and their share in the total generation capacity will increase to 40%.

2.5. A "Green Building" certification will be introduced for newly constructed buildings and residential properties, based on their energy efficiency.

To improve access to hygiene and sanitation products, particularly among young people, the "Clean Hands" initiative will be launched on May 1, 2025, along with a wide public awareness campaign.

Uzbekistan's transition to a green economy is based on the following principles:

- Ensuring alignment between national goals and the global goals of sustainable development;
- Rational use of existing resources and achieving sustainable consumption and production;
- Integrating ecological and social criteria into the economic accounting system;
- Prioritizing the use of green tools and approaches to achieve socio-economic development goals;
- Increasing competitiveness in key sectors, creating green jobs, improving well-being, and achieving macroeconomic targets;
- Ensuring the investment attractiveness of efficient resource use measures.

Key reasons for Uzbekistan's transition to a green economy:

- One of the main conditions for a green economy is the development of alternative energy and its environmentally friendly consumption. Uzbekistan has great potential in this regard. The main consumers of electricity in the country are industry (45%), the residential and communal sector (31%), agriculture (9%), and other purposes (15%). These figures indicate that the expected growth of the first two sectors will further increase energy demand in the near future.
- Energy production in the country is almost entirely dependent on hydrocarbons (oil, natural gas, coal). Due to the use of hydrocarbon energy sources, Uzbekistan loses about 4.5% of its GDP annually. Compared to international standards, the country's economy is considered energy-intensive and carbon-intensive. Uzbekistan ranks among the top ten countries in terms of energy intensity of GDP. Moreover, with the depletion of hydrocarbon reserves expected in the next decade, there is an urgent need to develop and use alternative energy sources. Therefore, transitioning to a green economy inevitably requires a shift to green energy, making the formation of an alternative energy system in Uzbekistan an objective necessity.
- A green economy helps to reduce the consumption of natural resources per unit of production by promoting more efficient use of resources and reducing waste and environmental pollution. This ensures the long-term sustainability of ecosystems in resource utilization. It is well known that on September 11, 2023, the President of the Republic of Uzbekistan signed Decree No. PF-158 "On the Strategy 'Uzbekistan – 2030.'"Among the key plans to be implemented within the framework of this Law, Target 51 under the second priority area emphasizes the transition to a "green economy" as a major task, with a strong focus on significantly increasing the use of renewable energy — the foundation of the green economy. According to this, by the year 2030, it is planned to increase the capacity of renewable energy sources to 25,000 megawatts, and raise the share of renewable energy in total consumption to 40 percent. Overall, Uzbekistan's efforts to build a "green economy" demonstrate its commitment to environmental sustainability and the responsible management of natural resources.

Table 1. Problems Related to Uzbekistan's Transition to a Green Economy

	Problem Name	Aspects of the Problem
1	Financial constraints	Difficulties in mobilizing the necessary funding to implement green technologies and infrastructure projects in Uzbekistan
2	Technological problems	Transitioning to a green economy requires the use of modern technologies and know-how, which may be difficult for a country with limited resources
3	Transformation of economic structure	Transitioning to a green economy requires changes in industrial structure and the labor market, which may create socio-economic challenges, including difficulties in reallocating jobs from traditional sectors
4	Education and awareness	There is a need to raise awareness among the population and businesses about the benefits of the green economy through education and information campaigns

It is well known that in our country, the Presidential Decree of the Republic of Uzbekistan No. PQ-436 dated December 2, 2022, "On measures to increase the effectiveness of reforms aimed at the transition of the Republic of Uzbekistan to a green economy by 2030" was adopted.

The "green economy" is based on green technologies, which address the causes of environmental problems rather than just the consequences. This requires a fundamental change in approaches, products, and most importantly, consumer behavior. These include:

- energy efficiency and alternative energy;
- electricity management systems;
- environmentally friendly transport;
- waste, air, and water pollution management.

These technologies make it possible to achieve the following goals set by the modern global economy:

1. Reducing environmental pollution and improving resource efficiency in construction, production, agriculture, and infrastructure.

2. Mitigating negative climate change effects by transitioning to clean, green energy sources (wind, solar, geothermal, ocean waves, hydropower, bioenergy, waste-to-energy, hydrogen) and to low-carbon end-use processes (such as electric or hybrid engines).

3. Reducing vulnerability and adapting to climate change by developing early warning systems and technologies resistant to temperature anomalies.

4. Improving well-being through more efficient and sustainable use of biodiversity resources, including natural cosmetics and pharmaceutical products.

Table 2. Approaches of International Organizations to the "Green Economy"

Name of International Organization	**Objectives and Tasks of Transition to the "Green Economy"**
UN Environment Programme (UNEP)	Improving human well-being and achieving social equity by reducing risks related to environmental changes and decreasing ecological pressure.
Organization for Economic Cooperation and Development	Focusing on economic growth and development while ensuring the sustainability of natural assets related to human well-being.

(OECD)	
World Bank	Efficient use of natural resources, minimizing negative environmental impacts, and achieving economic growth with minimal pollution. Supporting resilience to natural disasters, capital stability, and physical sustainability.

The development of the green economy is being carried out within the framework of the following key trends:

1. Growth of investments in green technologies and infrastructure: Many companies and governments are investing in the development and implementation of green technologies such as solar panels, wind turbines, and electric vehicles, as well as in the development of green infrastructure including waste management systems, public transport, and energy-efficient buildings.

2. Increasing energy efficiency and use of renewable energy:

The rapid advancement of technology enables improved energy efficiency across various sectors of the economy and increases the share of renewable energy in the overall energy mix.

3. Circular economy and waste management:

There is a growing interest in circular economy models, where waste is viewed not as trash to be discarded in landfills but as a resource that can be reused, recycled, or recovered. This includes the development of recycling technologies and the implementation of waste management systems at all levels.

4. Financial support for green projects:

There is a noticeable increase in financial investments in green projects by government bodies, international funds, investment companies, and banks. This includes funding for research and development of green technologies, as well as concessional loans and grants for environmentally sustainable projects.

5. Green standards and certification:

Many countries and organizations are introducing green standards and certification systems to ensure that products and services are environmentally friendly and transparent for consumers. This helps boost demand for green goods and services and encourages companies to adopt sustainable practices.

“Anticipated results of the approaches implemented during the transition to a green economy.”

Methods of Transition to a Green Economy	**Expected Outcomes of the Methods**
Green taxes and incentives	Promotion of environmentally responsible behavior and investments
Development of ecological transport	Reduction of transport-related emissions, improvement of air quality
Support for ecological agriculture	Improvement of food quality, preservation of biodiversity
Support for renewable energy sources (RES)	Reduction of carbon emissions and dependency on fossil fuels
Development of green cities	Improvement of quality of life, reduction of noise and air pollution

The Priority Directions of the Strategy for Transition to a Green Economy in the Republic of Uzbekistan Are as Follows:

- Developing the national economy based on ecological progress:

Implementing an environmentally oriented economic system and promoting economic activities in sectors that are clean and have minimal negative impact.

- Establishing the production and use of green energy:

Advancing renewable (alternative) energy sources, increasing the use of power-efficient energy, and placing strong emphasis on this area.

- Developing ecological tourism:

Expanding the tourism sector based on the proper preservation of natural attractions and ecological sites.

- Developing a green transport system:

Enhancing energy efficiency in the field of technology and transport equipment and expanding the use of electric transportation.

- Aligning the national economy with various ecological certifications and standards:

Adapting the agriculture, industry, and service sectors to environmental standards and ensuring that products obtain reputable ecological certifications.

- Efficient use of natural resources:

Promoting the effective and rational use of natural resources in water, energy, agriculture, industry, and other sectors.

Conclusion

In conclusion, it can be stated that in recent years, significant changes have taken place in the field of ecology and the development of the "green economy" in our country. The decisions, strategies, and international agreements adopted by our President serve as a solid foundation for taking our environmental policy to a new level.

The widespread implementation of the green economy in Uzbekistan creates favorable conditions for the rational use of the country's natural resources, the elimination of various environmental problems, and the promotion of economic growth by increasing the population's eco-literacy.

Today, the most urgent tasks for transitioning to a green economy and promptly addressing environmental challenges in Uzbekistan include the efficient use of energy resources, water, and land; the production of environmentally friendly alternative energy; investments in waste recycling; and strengthening public-private partnership principles.

To ensure economic security in Uzbekistan through the development of the green economy, the following recommendations can be proposed:

- Implementing "green" and low-carbon development measures across economic sectors, including the introduction of renewable energy sources, energy-efficient technologies, green innovations, and attracting investment in this field;
- Developing and executing sectoral plans aimed at transitioning to a green economy to improve the sustainability indicators of organizations operating in the country, and preparing proposals for their future development;

- Ensuring integration between scientific institutions and the production sector to improve energy and resource efficiency and promote the production of low-emission products;
- Guaranteeing adherence to the principles of sustainable and efficient use of natural resources in relevant sectors and industries, and taking measures to enhance the resilience of the economy to natural disasters and climate change;
- Enhancing the skills and retraining of workers during the transition to a green economy in order to create sustainable jobs in the long term, as well as increasing their potential in green growth and developing human capital.

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