European Journal of Economics, Finance and Business Development
ISSN (E): 2938-3633
Volume 3, Issue 4, April - 2025

STRATEGIC PATHWAYS AND STRUCTURAL BARRIERS IN UZBEKISTAN'S TRANSITION TO A GREEN ECONOMY

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Abstract

Uzbekistan stands at an important turning point on the path to attaining sustainable development among many developing nations. The country set significant goals for the transition to a green economy until 2030 at a time when environmental problems are becoming increasingly relevant throughout the world and the region. This article will critically analyze the strategic directions implemented by Uzbekistan – in particular, measures to develop renewable energy sources, promote green financing and adapt to international environmental obligations. At the same time, the article also covers such factors as systemic problems that hinder progress – outdated infrastructure, institutional restrictions and low environmental awareness of the population.

Keywords: Green economy, environmental obligations, systematic obstacles, strategic directions, Concept Note, energy transition, green finance, sustainable agriculture, green urban development, awareness campaigns, infrastructure gaps, regional comparisons, green sector.

Introduction

There are linked behaviors that favorably balance environmental and social aims for the benefit of nature, people, and companies as the world changes with the advancement of technology, climate, politics, and economics. Leading the way is the green economy, an economic model that reduces environmental hazards and ecological shortages while nonetheless giving human well-being and social fairness first priority. Still, what really is a green economy? The green economy is the application of sustainable development supported by public and private investment to produce infrastructure promoting social and environmental sustainability. The green economy is important as it guarantees that natural assets will always provide the resources and environmental services needed for our continuous survival and motivates businesses to become more sustainable and low-carbon.

Many nations all over are now striving for a "green" economy as a means of ensuring steady growth. Many academics worldwide stress the need to switch to a "green" economy because of ecological concerns, including climate change, continuous population increase—social problems, and rising unemployment—economic problems, all resulting from continuing crises

in many spheres of the economy. Extreme fluctuations in the temperature and unusual natural occurrences create new ecological hazards that cause instability and erratic anxiety for the surroundings and humanity (R. Macsweeney, 2024). Underlining the need to shift to a "green" economy, the measurements and ideas embraced by all nations and international organizations to attain sustainable development represent global interests. Many see this change as a crucial step in establishing a foundation for long-term prosperity.

The idea of a "green economy" became a direction in the field of economics in the late 1990s and has now reached Uzbekistan. This economy is an important part of the natural world and shows one of its aspects. A green economy incorporates principles from several philosophical and scientific subfields into its overall framework, such as resource-based economics, ecological economics (which studies human interactions with the natural and built environments), and environmental economics (which studies the effects of green policies on population growth). When it comes to nations like Uzbekistan, which have a long history of being dependent on resource-intensive industries like agriculture and fossil fuels, the transition toward a green economy brings both significant potential and daunting obstacles. Although it is strategically positioned in Central Asia, rich in natural resources, and home to a wide variety of ecosystems, Uzbekistan is also confronted with serious environmental issues, such as a lack of water, pollution of the air and soil, and the consequences of climate change. The nation's economy is mostly dependent on agriculture; therefore, it is imperative that it undergoes transformation in order to include sustainable practices (Saidov, R.B., 2024).

This article examines Uzbekistan's present efforts and potential future routes toward attaining ecological stability and economic resilience via the adoption of a green economy, highlighting both the opportunities and the obstacles that lie ahead. Several suggestions are offered in this article for improving the current situation and creating growth that is more sustainable and friendly to the environment.

Methods

This research makes use of a qualitative research methodology, and it conducts a thorough literature assessment of the current policies and frameworks in Uzbekistan that are associated with the green economy. To assess the present situation of environmental practices, economic interdependence, and possible sites of green investment, data has been gathered from government reports, international organizations, and academic publications. The analytical approach encompasses environmental sustainability measurements, economic viability assessments, and social effect evaluations, allowing a comprehensive understanding of Uzbekistan's trajectory toward a green economy. Insights into applicable strategies are gained through case studies of regionally successful green projects and comparing them to other nations that have achieved sustainability goals.

Policy Framework and National Strategies

The transition to a green economy is outlined in many decrees and initiatives by President Shavkat Mirziyoyev. The Uzbek government has enacted several energy-related policies and

legislation in an effort to guarantee energy security and encourage the use of renewable energy sources. These instructions address a broad spectrum of actions, comprising:

- Reducing fossil fuel use by promoting solar and wind power.
- Integrating energy efficiency throughout all industries.
- Developing a nationwide recycling and waste reduction system.
- Preservation and restoration of forests, wetlands, and waterways.
- Supporting sustainable economic growth using green technology and infrastructure.

The Uzbek government is diligently establishing a legislative and administrative framework for the transition to a green economy. In 2019, a Presidential Decree established the "Strategy for the Transition of the Republic of Uzbekistan to a Green Economy for the period 2019-2030," which serves as the principal instrument for incorporating climate change principles into the sustainable growth of the national economy.

The primary objective of the Strategy is to attain sustainable economic advancement that fosters social development, mitigates greenhouse gas emissions, and enhances climatic and environmental sustainability by incorporating green economy concepts into structural changes. To attain these aims, these tasks are planned:

- Enhancing energy efficiency and natural resource management via technology and finance.
- Integrating worldwide green criteria into state investments and expenditures.
- Using governmental incentives, public-private partnerships, and international financial institutions to support green economy pilot initiatives.
- Building a green economic training system via education investments and international collaboration.
- Addressing the Aral Sea environmental catastrophe.
- Promoting green economic cooperation via bilateral and multinational agreements.

In May 2020, the government formulated the Concept Note to guarantee power supply in Uzbekistan for the period 2020-2030, in accordance with the Strategy for 2019-2030. This concept paper delineates the medium- and long-term aims and strategies for the development of the electricity industry. It delineates six primary aims to enhance power supply: 1) Meeting the nation's power demand; 2) Enhancing national energy efficiency; 3) Augmenting the energy efficiency of power generation and transmission; 4) Mitigating the damage to power infrastructure; 5) Advancing the development and integration of renewable energy sources; and 6) Establishing an efficient electricity market.

The Renewable Energy Sources Utilization Law, enacted in May 2019, delineates possibilities and incentives for people and producers of renewable energy systems, including exemptions from property and land taxes. The Law on Public-Private Partnership (PPP) was adopted to facilitate private sector involvement in public infrastructure projects, especially those within the electricity sector.

Concept of environmental protection of the Republic of Uzbekistan until 2030 outlines area of environmental protection policy key directions and steps to extend protected natural areas and enhance waste management systems, thereby preserving the environment (atmospheric air, waterways, lands, soils, subsoil, biodiversity, protected natural areas) from human effect and other negative elements. It also saw the creation of an emissions inventory.

Strategic Pathways Toward a Green Economy

Energy transition. Uzbekistan is diligently developing its renewable energy industry as a crucial element of its transition to a green economy. Uzbekistan intends to build twelve advanced thermal power plants in the Bukhara, Tashkent, Khorezm, Kashkadarya, Jizzakh, Surkhandarya, and Syrdarya districts by 2027. These initiatives are anticipated to produce an extra 49.7 billion kWh of power per year and, as claimed by Uzbekistan's political leadership, would be executed via public-private partnerships mostly funded by foreign capital. Additionally, in conjunction with its partnerships with Kazakhstan and Azerbaijan, Uzbekistan's green energy initiatives offer prospects for strengthening economic and political collaboration with other Central Asian nations, including Tajikistan and Kyrgyzstan, which possess a competitive edge in hydropower generation.

An event that might have a significant impact on the growth of green energy in Central Asia and the South Caucasus occurred near the end of 2024. Kazakhstan, Azerbaijan, and Uzbekistan inked a strategic collaboration agreement on November 13 during the World Leaders Climate Action Summit in Baku that focuses on green energy generation and transmission. The Ministry of Energy of Uzbekistan states that by 2030, the nation will start exporting green energy, mostly produced by solar and wind power, to Europe via Kazakhstan and Azerbaijan. With more than 320 sunny days per year and an abundance of cheap labor, Uzbekistan is well-positioned to realize its green energy potential. According to research, Uzbekistan has Central Asia's most promising potential for solar and wind energy.

With the help of organizations like Masdar and ACWA Power, Uzbekistan has been making strides in recent years to lessen its impact on the environment by creating renewable energy and introducing energy-saving technology. The percentage of power produced from renewable sources is expected to rise sharply to 26% as part of the state program. This will be accomplished by building hydroelectric power plants with a combined capacity of 160 MW and launching 16 new green power plants with a combined capacity of 3.5 GW. The initiative also intends to equip 27,000 business and public institutions, as well as 35,000 homes, with modest solar panels. 3,000 small hydropower units with a total capacity of 164 MW are expected to be built by the end of 2026. The implementation of special rates for energy produced by solar and wind power, as well as trash utilization, beginning on April 1, 2025, will be a significant step in promoting the "green" economy.

Green finance and investment: Uzbekistan is executing public-private partnership (PPP) initiatives as a component of a comprehensive plan to entice international investment, upgrade infrastructure, and enhance the delivery of public services. Following the enactment of the Law "On PPP" in 2019, the center for public-private partnership projects has been advancing several PPP projects across energy, healthcare, education, transport, and more sectors. Public-private partnership (PPP) projects are executed in collaboration with International Financial Institutions, including the Asian Development Bank, the European Bank for Reconstruction and Development, the International Finance Corporation, the Inter-American Development Bank, and the World Bank. The objective of PPP projects is to enhance the quality and appeal of initiatives, guarantee their sustainability, and execute them quickly and cost-effectively.

In October 2023, Uzbekistan made history by issuing its very first Green Sovereign Eurobonds, which were valued at 4.25 trillion UZS and were traded on the London Stock Exchange. This action served to underscore the country's unwavering dedication to the promotion of green growth and green transition. Over thirty foreign investors from countries such as the United States of America, Great Britain, the European Union, Asia, the Middle East, and Northern Africa, among others, registered their interest in the issue of Green Bonds. The continuous changes that Uzbekistan is implementing, such as the transition to a green economy, the deregulation of the energy sector, the privatization of state-owned firms, and the pursuit of trade liberalization via World Trade Organization entrance, have been well-received by investors.

With the help of a $250 million policy-based loan, the Asian Development Bank (ADB) is backing Uzbekistan's government's initiatives to speed up climate change mitigation efforts, improve the connections and interactions between adaptation priorities, and fortify institutional frameworks for climate transition. With the help of the Accelerating the Climate Transition Program, the Uzbek government will be able to make three reforms: improve the management of public funds and institutions; fast-track the transition to a low-carbon economy in areas like energy and transportation; and make the country more resilient to climate change in areas like water and land resource management, farming, and social protection systems.

Sustainable agriculture: Uzbekistan is home to seemingly endless wheat fields; for the people there, the grain is more than just food; it's a way of life. Wheat output has increased by an astounding 700% in the last 20 years, guaranteeing food security and sustaining lives. But there are costs to this incredible growth: degraded land, more intense dust storms, polluted water, dwindling biodiversity, and less resilient agriculture. Under the guidance of the International Union for Conservation of Nature (IUCN), Uzbekistan is striving to balance agricultural output with ecosystem health in order to address these urgent issues. The IUCN provides internationally acclaimed knowledge and resources to help align these initiatives with international norms for environmentally friendly land usage and the preservation of biodiversity. IUCN is committed to assisting Uzbekistan on its path to environmental transformation by spreading and implementing the Restoration Opportunities Assessment Methodology (ROAM) and the IUCN Global Standard for Nature-based Solutions (NbS).” This method not only helps farmers deal with issues like damaged land and falling production, but it also has additional advantages like carbon sequestration, more biodiversity, and stronger communities. The program also presents a positive outlook on sustainable agriculture, showing how interventions rooted in nature may improve ecosystems and ensure food security in the long run.

Green urban development: public transport, energy-efficient buildings: In 2023, Uzbekistan's Ministry of Transport and other Uzbek state agencies, together with representatives from international organizations, commercial enterprises, and academics, held a dissemination event on decarbonizing pathways for urban mobility. In order to find effective measures that would decrease carbon emissions in Tashkent's transportation sector, the

International Transport Forum (ITF) undertook research on decarbonizing urban mobility. This analysis examined the effects of three policy scenarios on passenger transport demand and emissions in Tashkent from 2015 to 2050. In response to these findings, the ITF formulated a set of policy proposals to advance and enable the execution of more ambitious decarbonization strategies for Tashkent's urban transportation sector.

The World Bank granted a $143 million concessional loan to a project in June 2022 with the goal of making Uzbekistan's public buildings more energy efficient, making the country's construction industry more resistant to the effects of climate change, and cutting down on gas emissions and energy consumption. The newly adopted World Bank Country Partnership Framework for 2022–2026 includes this initiative as one of its objectives; among other things, it seeks to assist Uzbekistan in making the shift to more sustainable development. In order to prevent under- or overheating, the public buildings that are part of this project will undergo modernization to satisfy national thermal comfort requirements. Lower energy consumption, better air quality, a more reliable energy supply (especially in the winter), and higher-quality public services will all contribute to a more pleasant environment for everyone involved, including students, patients, and staff at the schools and hospitals that are part of the project's purview.

Education and awareness campaigns: Uzbekistan is taking meaningful steps to raise environmental awareness and build a more sustainable future by putting education at the heart of its green economy plans. From classrooms to communities, the focus is on helping people understand why a greener way of living matters. From an early age, children are learning about sustainability and climate change; many colleges are also part of worldwide initiatives to become green. From neighborhood communities to national initiatives, campaigns like the "Year of Environmental Protection and Green Economy" involve people at every level. Young individuals are also launching environmental groups and driving change in their campuses and hometowns. These projects are being supported by organizations like UNDP, UNICEF, and CAREC, which provide people with the knowledge and tools required for everyday environmental maintenance. All taken together, this grassroots effort is changing a greener mentality from awareness to action all throughout the country.

Structural Barriers and Implementation Challenges

Infrastructure gaps: outdated energy and transport systems: Uzbekistan is among the world's most energy- and resource-intensive nations. The anticipated fast population and economic expansion under this resource-intensive economic model would cause a notable spike in emissions, putting an undue burden on the country's ecosystems and natural resources. Furthermore, the Aral Sea ecological disaster, water scarcity, droughts, extreme heat, rainfall variability, dust storms, and other climate change effects will have major negative consequences on the well-being and health of people as well as development prospects. About 75% of Uzbekistan's GHG emissions come from the country's great reliance on draining natural gas supplies. Moreover, Uzbekistan has considerable climate-related threats to its

transportation infrastructure, with projected average yearly losses around 8.43 million USD, mostly impacting roads and railroads.

Institutional capacity and governance weaknesses: The results of the National Capacity Self-Assessment (NCSA) and the following study of the current possibilities during the preparatory process clearly show that the national system of environmental management has to be improved if we are to better accommodate global environmental priorities (PDF-A). Currently, no cooperative structure exists that lets government departments involved in environmental and natural resource management coordinate their activities for the better implementation of environmentally friendly policies. Consequently, companies engaged in environmental management and every other aspect of the national economy find themselves developing compartmentalized strategies of action that contradict one another because they neglect the plans of other areas of the economy. These conditions call for improved methods for coordination and cooperation. Further contributing to this alienation is staff personnel from participating sectoral and environmental ministries, who have a poor awareness of the actual value of environmental products and services as well as their importance to the long-term development of the country.

Lack of skilled workforce and green technologies: According to a 2017 manufacturing industry study, small businesses (75% of respondents) and big businesses (49%) were more concerned about the shortage of experienced engineers and workers. Ranked second most important obstacle (out of 13 barriers) by big companies and fourth by small enterprises in the same poll was the lack of access to qualified workers resulting from inadequate quality of education and training. The move to a green economy depends on having employees skilled in green technologies. Surveys indicate that a main obstacle to sustainable practices and technology acceptance is a shortage of competent engineers and personnel. Smaller companies particularly should pay close attention to this.

Insufficient public awareness: Following an analysis of the situation in Uzbekistan in the context of issues related to the implementation of the green economy, a survey was carried out to investigate the difficulties and opportunities associated with the implementation of green technologies in various sectors of Uzbekistan. The lack of information and awareness among Uzbek citizens is one of the primary challenges that people face when it comes to the deployment of environmentally friendly technology. People may have a tough time accepting and supporting the adoption of such innovative and environmentally friendly technology in the nation because they do not have sufficient knowledge of the perceived advantages that green technologies provide in tackling various environmental challenges. In the event that these concerns are not appropriately addressed, they have the potential to block the advancement of sustainable practices and innovative ideas.

Case Studies / Regional Comparisons

Examples from Central Asia or countries at a similar development level that have succeeded or struggled with the green transition: Investigating the green transition experiences of surrounding nations provides insightful analysis for Uzbekistan's path toward sustainable development.

Kazakhstan

Through its partnerships with international financial institutions, Kazakhstan has brought about tremendous advancements in its efforts to develop environmentally friendly energy sources. In an effort to combat climate change, the country has declared its intention to achieve carbon neutrality by the year 2060. These ambitious goals have been established. Following the guidelines provided in the nation's Green Energy Concept and Carbon Neutrality Strategy for 2060, the country intends to accomplish this by lowering its emissions of greenhouse gases and transitioning to renewable energy sources. At the moment, Kazakhstan's energy generation is dependent on coal for more than 70 percent of its total output. Nevertheless, the nation's goal is to have renewable energy provide fifty percent of its power by the year 2050 and fifteen percent by the year 2030. Due to the excellent progress that Kazakhstan has made, the country has decided to adjust its initial objective for 2030, which was to hit 10% in 2021.

Azerbaijan

In the process of pursuing sustainable development, Uzbekistan may learn a lot from Azerbaijan's proactive approach toward adopting renewable energy. The Republic of Azerbaijan serves as an example of good policy direction since it has established defined objectives, such as the objective of achieving a thirty percent share of its power output from renewable sources by the year 2030. The country has been successful in attracting major investments, and it intends to build two gigawatts of capacity for renewable energy sources by the year 2027, with expenditures of more than two billion dollars on green energy projects. Azerbaijan is also working to improve its energy infrastructure in order to include renewable sources in the national grid. This will ensure that the transmission of energy is both efficient and reliable. When it comes to creating a successful energy transition, these solutions highlight the need to establish crystal-clear goals, cultivate an atmosphere that is favorable to investment, and strengthen infrastructure.

Kyrgyzstan

Kyrgyzstan has moved toward a green economy by putting more attention on green finance. Kyrgyzstan sent a group to Mongolia to learn more about how to get green money. As a result, plans are being made to create a Kyrgyz Green Finance Corporation. The goal of this project is to encourage growth in the private sector and push for changes in society that will make things more sustainable.

Georgia’s case is useful for offering valuable lessons for Uzbekistan’s green transition by integrating renewable energy sources into the move toward a more sustainable economy. Georgia has established energy protection and turned an energy sector into a significant

economic driver via the implementation of energy sector improvements. One example is an energy transmission line of the Black Sea that allows electricity to flow freely across the borders of Europe. This infrastructure project emphasizes the necessity of regional cooperation for the long-term sustainability of energy.

Lessons Uzbekistan can learn: The lessons that Uzbekistan may take from these regional experiences are as follows:

1. Policies pertaining to the green economy should be consistent and backed by market and governance principles in order to ensure effective implementation.
2. In order to ensure energy security and environmental sustainability, it is necessary to diversify the economy away from its reliance on fossil fuels by creating renewable energy sources.
3. Green Finance Mobilization: Investment and sustainable development might be boosted via the use of financial organizations that specialize in creating environmentally friendly initiatives.
4. In order to encourage the growth of renewable energy sectors, it is necessary to carry out activities that are associated with the enforcement of legislative and regulatory frameworks that are favorable.
5. Collaborative Partnerships: It is beneficial to interact with international organizations and the corporate sector of the economy in order to share expertise and money for environmentally conscious projects.

Opportunities and Future Prospects

Green energy potential: Uzbekistan has very good wind and solar energy potential and is already taking advantage of them to produce electricity to meet growing electricity demands. Large-scale solar projects of the Nur Navoi and Nurabad Solar Parks have been initiated by the government and have registered major contributions to the national grid. Along with that, the start of green hydrogen projects, including a joint project with ACWA Power, demonstrates that Uzbekistan is on board with clean energy.

Role of digitalization and innovation: Digital technology has shown its revolutionary potential, which has led Uzbekistan to invest in new digital systems and workforce development. The "Empowering Youth to Embrace the Digital Economy" project actively works to boost digital innovation among young people to develop technological growth throughout the country. The development of the IT sector and green and digital technologies receives dedicated support from the government as part of this vision.

Youth and entrepreneurship in the green sector: The Uzbek government has declared 2024 the “Year of Support for Youth and Business; the state guides its focus toward youth involvement in the green economy. The government continues to work on lowering financial barriers, which allow young entrepreneurs to start new green businesses that develop sustainable business models. The government has established digital literacy development

programs that combine digital education initiatives for preparing future leaders of green sectors.

Uzbekistan will transform into a sustainable green economic leader in Central Asia by using its renewable energy potential and by developing digital innovation and youth empowerment initiatives.

Recommendations

Policy Recommendations for Government and Ministries:

- The government must define precise environmental objectives by implementing a comprehensive strategy that delineates net-zero emission thresholds and formulates enduring low-emission development strategies for policy and investment initiatives.
- Ministries tasked with environmental stewardship need assistance to enhance their operational competencies for implementing sustainable programs.
- Public institutions should use green public procurement as a mechanism to exemplify environmentally sustainable behaviors, therefore steering the market towards sustainability objectives.

Recommendations for the Private Sector, Academia, and Civil Society:

- The private sector needs to finance green innovation while implementing sustainable business practices that align with national objectives and attract environmentally concerned customers.
- The academic community needs to undertake scientific research on renewable resources, resource efficiency, and climate adaptation to provide evidence-based solutions for policy formulation and professional implementation.
- Civil society needs to employ activists to do environmental lobbying and provide sustainability education via community programs while overseeing stakeholder activities.

Call for Enhanced Global Cooperation:

- Uzbekistan needs to establish strategic relationships that facilitate engagement with international organizations, neighboring nations, and development partners to share expertise, financial resources, and technical assets.
- The government must unequivocally endorse international climate accords by actively engaging in forums aimed at realizing global environmental objectives.

Conclusion

Uzbekistan is progressing in its efforts to develop a green economy via legislative reforms, international partnerships, and a heightened commitment to sustainability. Uzbekistan has persistent issues stemming from unmet infrastructural requirements, constrained institutional capacities, and continuous reliance on carbon-intensive sectors. Successful sustainable environmental management necessitates the collaboration of all sectors with a committed attitude to environmental stewardship over an extended timeframe. The effective execution of this transition would enhance environmental and economic resilience for Uzbekistan,

positioning it as a prominent leader in Central Asia's sustainable development and benefiting all regional stakeholders.

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