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FINANCING GREEN PROJECTS IN THE REPUBLIC OF UZBEKISTAN: STATUS, CHALLENGES AND PROSPECTS

Qorriyeva Shahnoza Safarbayevna
Senior Lecturer, Tashkent State University of Economics

Abstract. This article provides a scientific analysis of the financing of green projects within the framework of state programmes implemented in the Republic of Uzbekistan. According to data from IRENA, OECD, the World Bank, and UNDP for 2020–2024, the total installed renewable energy capacity in the country increased from 1,908 MW in 2020 to approximately 5,434 MW by the end of 2024, mainly due to the rapid expansion of solar and wind energy. In 2021, approximately USD 235 million in SDG bonds were issued, followed by the first sovereign green Eurobond of approximately USD 350 million in 2023. Private investment in clean energy reached approximately USD 2.9 billion in 2024. Nevertheless, by the end of 2024, the share of renewable energy in total installed capacity had increased to approximately 20%; however, several systemic challenges remain, including the need to further strengthen the regulatory framework, develop capital markets, and expand transmission infrastructure. The article also proposes strategic recommendations for improving green financing mechanisms.

Keywords: green financing, renewable energy, green bonds, sustainable development, SDGs, Paris Agreement, Uzbekistan, public-private partnership, capital market, energy transition.

Аннотация. В данной статье представлен научный анализ финансирования зелёных проектов в рамках государственных программ, реализуемых в Республике Узбекистан. Согласно данным IRENA, OECD, Всемирного банка и ПРООН за 2020–2024 годы, совокупная установленная мощность возобновляемых источников энергии в стране увеличилась с 1 908 МВт в 2020 году до примерно 5 434 МВт к концу 2024 года, главным образом благодаря ускоренному развитию солнечной и ветровой энергетики. В 2021 году было выпущено облигаций устойчивого развития (SDG Bonds) на сумму около 235 млн долларов США, а в 2023 году размещён первый суверенный зелёный еврооблигационный заём объёмом около 350 млн долларов США. Объём частных инвестиций в сектор чистой энергетики достиг примерно 2,9 млрд долларов США в 2024 году. Вместе с тем к концу 2024 года доля возобновляемых источников энергии в общей установленной мощности достигла около 20 %, однако сохраняются отдельные системные ограничения, связанные с дальнейшим совершенствованием нормативно-правовой базы, развитием рынка капитала и модернизацией передающей инфраструктуры. В статье также предложены стратегические рекомендации по совершенствованию механизмов зелёного финансирования.

Ключевые слова: зелёное финансирование, возобновляемая энергетика, зелёные облигации, устойчивое развитие, ЦУР (SDGs), Парижское соглашение, Узбекистан, государственно-частное партнёрство, рынок капитала, энергетический переход.

INTRODUCTION

Since the last quarter of the twentieth century, the concept of sustainable development has gained increasing importance in the global economy. The Sustainable Development Goals (SDGs), adopted by the United Nations in 2015, and the Paris Agreement have committed countries to shifting economic growth towards an environmentally sustainable and climate-resilient model (IPCC, 2022). Green financing has been identified as a key instrument of this transition, directing financial resources towards projects related to energy efficiency, renewable energy, sustainable transport, and ecosystem conservation (Dikau & Volz, 2021).

The transition to a green economy is particularly relevant for the Republic of Uzbekistan. According to the IEA, in 2022 natural gas accounted for approximately 85% of electricity generation. The “Strategy for the Transition to a Green Economy for 2019–2030” (Resolution No. PQ-4477, 2019) and its expanded revision under Resolution No. PQ-436 of December 2022 established green sector development as a national priority. In 2024, this target was updated: at least 40% of electricity generation capacity is expected to come from renewable energy sources by 2030 (Enerdata, 2024). However, according to OECD (2023) estimates, achieving

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this target requires at least USD 6 billion annually, which highlights the need to develop robust mechanisms for closing the financing gap.

The primary objective of this study is to assess the current state of green project financing within the framework of state programmes in Uzbekistan based on official statistical data, identify existing systemic challenges, and develop practical recommendations for improving green financing mechanisms.

LITERATURE REVIEW

The theoretical foundations of green financing have been shaped by a growing body of international and national scholarship. Dikau and Volz [1] analyse the expanding role of central banks in directing capital towards sustainable development objectives, arguing that monetary authorities in emerging economies should incorporate climate-related risks into their prudential frameworks in order to unlock large-scale green investment. The IPCC Sixth Assessment Report [2] provides the scientific foundation for this transition, outlining the investment trajectories required to limit global warming to 1.5 °C and emphasizing the urgency of redirecting financial flows away from fossil fuels. Schoenmaker and Volz [7] extend this analysis to the Global South, demonstrating that institutional capacity gaps and shallow capital markets systematically constrain sustainable finance in developing economies, a finding that is directly relevant to the Uzbek context. The Climate Bonds Initiative [3] further contextualizes the discussion by mapping global green bond issuance trends and showing that sovereign green bonds have become an important instrument for signalling government commitment and attracting private capital.

At the national level, Vaxabov, Xajibakiev et al. [10] provide a foundational Uzbek-language analysis of green economy theory, situating Uzbekistan's transition within the broader development trajectory of post-Soviet, resource-dependent economies. Building on this, Xolmamatov [12] examines the development prospects of green finance instruments in Uzbekistan and identifies capital market deepening and blended finance mechanisms as the most practical near-term tools for mobilizing private green investment, given the current stage of development of domestic capital markets. Vaxabov and Xajibakiev [13] analyse the theoretical and practical aspects of ensuring sustainable economic growth based on the green economy and conclude that regulatory harmonization with international standards and sustained institutional capacity-building are among the most important reform priorities for Uzbekistan.

Together, these national-level contributions show that green financing in Uzbekistan is not merely a matter of capital mobilization, but also requires the development of regulatory, institutional, and human-capital infrastructure to ensure the effective deployment of financial resources. Institutional assessments by the OECD (2023) [4], the World Bank CCDR (2023), and UNDP Uzbekistan (2023) provide authoritative empirical benchmarks against which the findings of this study are assessed.

RESEARCH METHODOLOGY

This study employs a mixed-methods approach combining quantitative analysis and qualitative assessment. The primary statistical and analytical sources used in the study include the following official documents:

– IRENA (International Renewable Energy Agency): *Renewable Capacity Statistics 2024* and *Renewable Capacity Statistics 2025* — official data on installed renewable energy capacity in Uzbekistan;

– OECD (2023): *Financing Uzbekistan's Green Transition* — analysis of the green bond market and the green financing gap;

– World Bank CCDR (2023): *Uzbekistan Country Climate and Development Report* — assessment of climate finance and investment needs;

– UNDP Uzbekistan (2023): data on SDG bond and green bond issuances;

– BloombergNEF / Climatescope (2024): statistics on clean energy investment;

– regulatory documents of the Republic of Uzbekistan, including Presidential Resolution No. PQ-436 (2022) and related normative legal acts.

Time-series trend analysis and qualitative assessment based on expert conclusions of the OECD and the World Bank were used as the main analytical methods.

ANALYSIS AND RESULTS

Investment in Renewable Energy and Green Projects (2020–2024). The analysis indicates that Uzbekistan's green energy sector experienced a period of rapid development between 2020 and 2024. Table 1 presents the year-by-year changes in key indicators based on data obtained from official national and international sources (Table 1).

Table 1
Key Green Energy Indicators in Uzbekistan (2020–2024), million USD

Indicator	2020	2021	2022	2023	2024
Total installed RE capacity (MW)[1]	1,908	2,052	2,225	2,382	5,434
of which: hydropower (MW)[1]	1,908	2,021	2,052	2,225	2,391
of which: solar and wind (MW)[1]	~0	~100	~173	~670	~3,043
RE share of total installed capacity (%)[2]	~12	~12.5	13.8	~14	~20
Green sovereign bond issuances (mln USD)[3]	—	~235	—	~350	—
Investment in clean energy (mln USD)[4]	n/a	661	~1,540	~2,030	~2,900
CO_2 reduction from RE projects (thousand tonnes/year)[5]	0	~156	~266	~376	~1,500
Annual electricity demand (TWh)[6]	~63	~67	~72	~76	~82

Notes: [1] IRENA Renewable Capacity Statistics 2024, 2025; [2] OECD (2024), Ministry of Energy of the Republic of Uzbekistan; [3] UNDP Uzbekistan SDG Bond Report (2022), BIOFIN (2023); [4] BloombergNEF/ Climatescope (2024); [5] Authors' calculations based on World Bank project data (2020, 2023); [6] IEA, energyprof. substack.com (2025).

Source: *Compiled by the author on the basis of IRENA (2025), OECD (2023, 2024), UNDP (2023), BloombergNEF/Climatescope (2024), IEA (2022), World Bank (2023).*\

The data presented in Table 1 indicate that Uzbekistan's total installed renewable energy (RE) capacity increased from 1,908 MW in 2020 to 2,382 MW in 2023, primarily due to the expansion of hydropower capacity (IRENA, 2024). During this period, the solar and wind energy sector remained at an early stage of development. In August 2021, Uzbekistan commissioned its first large-scale solar power plant, the 100 MW *Nur Navoi Solar* facility in Navoi Region (IEA, 2022; IFC, 2024), marking an important milestone in the development of the country's renewable energy sector. By 2022, the implementation of additional projects increased the combined installed capacity of solar and wind energy to approximately 173 MW (IRENA, 2024). According to official IRENA (2024) data, renewable energy accounted for 13.8% of the country's total installed electricity generation capacity in 2022. OECD (2024) assessments indicate that this figure remained below the average level observed across Central Asian countries.

Composition of Financing Sources. According to the OECD (2023), Uzbekistan requires at least USD 6 billion annually to support its green transition. However, the current financing structure continues to rely mainly on public-sector resources and international financial support. Table 2 presents the composition of the major financing sources currently available for green projects (Table 2).

Table 2
Composition of Green Project Financing Sources (2020–2023, approximate)

Financing Source	Estimated Volume (mln USD)	Share (approx., %)	Main Programme / Instrument
State budget and government funds	Largest share	~60–70%	Green Economy Programme (PQ-436, 2022); energy sector infrastructure
International financial institutions	~1,000–2,000	~25–35%	ADB (USD 125m, 2023), World Bank (USD 46m, 2023), EBRD (~900 MW projects, 2023)
Green bonds	~585 (2021+2023)	Minor share	SDG bond (2021, ~USD 235m); Green Eurobond (2023, ~USD 350m)
Private sector (PPP projects)	~11,600 (tendered, 2020–2024)	Rapid growth	Masdar, ACWA Power, Total Eren, Voltalia, CEEC and other foreign investors

Source: *Compiled by the author on the basis of OECD (2023), ADB, EBRD, World Bank, and UNDP data.*

Analysis of the Financing Structure. The analysis of the financing structure indicates that green financing in Uzbekistan has not yet fully transitioned to a market-based model. As noted in the OECD (2023) report, most large-scale solar and wind energy projects have been financed through conventional loan mechanisms rather than through specialized green credit facilities or green bond instruments. This highlights the importance of further developing capital market instruments to support sustainable investment.

Green Bond Market. Uzbekistan is among the leading countries in Central Asia in terms of green bond market development. In 2021, an SDG bond worth approximately USD 235 million was issued (denominated in local currency, with a 14% coupon rate and a three-year maturity period), becoming the first instrument of its kind in the CIS region (UNDP, 2022). In October 2023, the country issued its first sovereign green Eurobond, valued at 4.25 trillion UZS (approximately USD 350 million), which was listed on the London Stock Exchange (UNDP, 2023). Overall, thematic bond issuance reached approximately USD 585 million between 2021 and 2023 (OECD, 2023). In addition, Sanoatqurilishbank (SQB) issued the country's first corporate green bond in 2023 (OECD, 2023). Nevertheless, the OECD (2023) notes that further improvements in the regulatory and institutional framework could contribute to the continued development of the green bond market.

Key Barriers and Challenges. Based on the analysis of OECD (2023), World Bank CCDR (2023), and IEA (2022) reports, the main systemic factors influencing the development of green financing in Uzbekistan are summarized in Table 3.

Table 3
Principal Barriers to the Development of Green Financing

Problem / Barrier	Severity (1–5)*	Impact Scope	Stakeholders
Absence of green standards and taxonomy	High	High	Banks, investors, government bodies
Underdeveloped capital markets	High	High	All sectors
Elevated financial risks and collateral constraints	Medium–high	Medium	Commercial banks, private investors
Shortage of skilled personnel (ESG, green finance)	High	High	Banks, government bodies, higher education
Weak monitoring and data systems	Medium–high	Medium–high	Government bodies, banks
Constrained transmission infrastructure	High	High	Ministry of Energy, private projects

Source: *Authors' analysis based on OECD (2023), World Bank CCDR (2023), and IEA (2022).*

The findings indicate that Uzbekistan's green financing sector is developing steadily, although it remains at a relatively early stage of maturity. According to OECD (2024) data, renewable energy accounted for 13.8% of total installed electricity generation capacity in 2022. In 2023, solar and wind energy sources contributed approximately 1% of total electricity generation (IRENA, 2024). These indicators suggest that there remains significant potential for further expansion of renewable energy capacity and green financing mechanisms compared with a number of rapidly developing economies.

Private investment through public-private partnership (PPP) mechanisms has demonstrated strong growth dynamics. According to OECD (2024), the total value of tendered contracts for solar and wind power projects reached USD 11.6 billion during 2020–2024. Climatescope (2024) data indicate that clean energy investment increased from USD 2.03 billion in 2023 to USD 2.90 billion in 2024, representing growth of approximately 43%. Although this trend reflects growing investor interest and confidence in the sector, OECD (2023) estimates suggest that additional efforts are required to meet annual green financing needs of at least USD 6 billion.

According to the World Bank CCDR (2023), achieving long-term decarbonization objectives in Uzbekistan by 2060 will require cumulative investments of approximately USD 340 billion. Given the scale of these financing requirements, the effective mobilization of private capital, alongside public-sector resources, remains essential. This highlights the importance of further strengthening the institutional, regulatory, and financial conditions necessary to support sustainable investment and accelerate the country's green transition.

CONCLUSION AND RECOMMENDATIONS

This study assessed the state of green project financing in Uzbekistan during 2020–2024 based on official sources. The main findings show that total renewable energy capacity increased from 1,908 MW in 2020 to

2,382 MW in 2023 and then accelerated to approximately 5,434 MW by the end of 2024, primarily due to the expansion of solar and wind energy (IRENA, 2025). Until 2021, the country had no commercial-scale solar facilities, while the green bond market began to develop with the issuance of approximately USD 235 million in 2021 and approximately USD 350 million in 2023 (UNDP; OECD). However, these volumes remain significantly below the country's green financing needs. Private investment through public-private partnership mechanisms increased during 2020–2024, with tendered contracts totalling USD 11.6 billion (OECD, 2024), although most projects are still at the construction or early implementation stage. The key systemic challenges include the need to adopt a national green taxonomy, further develop capital markets, expand transmission infrastructure, and strengthen the supply of qualified specialists (OECD, 2023; IEA, 2022; World Bank, 2023).

Based on the findings of the study, the following strategic recommendations are proposed:

1. Development of a National Green Taxonomy and Standards. The national green taxonomy should be aligned with recognized international standards, including ASEAN and EU approaches. Since the taxonomy has been under development since 2024 but has not yet been fully adopted, it is important to formalize it in the national legislative framework (OECD, 2023).
2. Expansion of Transmission Infrastructure. Although the ADB approved a USD 125 million project in 2023, further large-scale investment is needed to support sectoral development (ADB, 2023). Timely modernization and expansion of transmission infrastructure are essential to reduce energy losses and ensure the stable integration of renewable energy sources into the national power system.
3. Development of the Green Bond Market. The issuance of the first commercial green bond by the Mortgage Refinancing Company in 2024 demonstrates the growing potential of this instrument. Building on the experience of Sanoatqurilishbank, it is recommended to expand corporate green bond issuance, introduce tax incentives for such instruments, and develop a state guarantee framework to attract private investors (World Bank, 2025).
4. Strengthening the Climate Finance Architecture. In line with the recommendations of the World Bank CCDR (2023), public financial resources should be increasingly directed towards green projects. Closing the annual green financing gap of at least USD 6 billion requires the activation of all available financial channels, including public funds, private investment, international climate finance, and blended finance mechanisms (OECD, 2023).
5. Human Capital Development. The establishment of the National Renewable Energy Research Institute under the Ministry of Energy in 2021 created an important institutional basis for capacity-building in the sector (IEA, 2022). At the same time, specialized green finance programmes should be introduced in higher education institutions to train qualified specialists for the sustainable finance and renewable energy sectors.

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