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"Green Economy" as an Important Direction of Sustainable Development (In the European Union Example)

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Abstract:

This article examines the theoretical and practical aspects of developing a green economy under conditions of climate change. Climate change is considered one of the most urgent global challenges affecting economic and environmental stability. The study analyzes Uzbekistan's national strategies and policy frameworks related to environmental sustainability. A comparative analysis is conducted with the experiences of the European Union, Germany, and Sweden. Special attention is given to the impact of green economic transition on energy efficiency and national competitiveness. The role of renewable energy sources in ensuring sustainable development is substantiated. On this basis, practical proposals for Uzbekistan were developed.

Keywords: green economy, sustainable development, solar energy, competitiveness, energy intensity, renewable energy, ESG, panel analysis.

Introduction

Climate change is becoming one of the most global and urgent problems facing humanity today. One of the important directions in preventing the negative consequences of climate change is the development of a "green economy" and the introduction of "green" technologies. A number of practical works are being carried out in our country in this regard. The Decree of the President of the Republic of Uzbekistan No. PF-106 dated July 23, 2024 "On the Establishment of the Climate Council under the President of the Republic of Uzbekistan" [1] is of great importance in ensuring the implementation of the priority areas of the principles of environmental sustainability and the "green" economy in the "New Uzbekistan" Development Strategy of the Republic of Uzbekistan for 2022-2026. In addition, in 2019, the "Strategy of the Republic of Uzbekistan for the Transition to a Green Economy for 2019-2030" [2] identified reducing the energy intensity of the economy, strengthening environmental safety, and developing renewable energy sources as priority areas. Also, The Resolution of the President of Uzbekistan No. PQ-57 of February 16, 2023, sets out measures to accelerate the development of renewable energy sources in 2023–2030.[3]

Review of Relevant Literature

In foreign literature on sustainable development and the concept of "green economy", scientists such as J. Elkington, N. Stern and D. Meadows have analyzed the issues of ecological and economic balance based on an integrated approach [4]. In studies within the European Union, the "European Green Deal" and "Fit for 55" programs are indicated as the main scientific and practical models. The experience of Germany and Sweden reveals effective mechanisms of decarbonization and renewable energy policy [5]. Local scientists, including Uzbek economists, have covered the issues of energy efficiency, environmental safety and rational use of resources [6].

However, in existing studies, general ecological approaches predominate, and the impact of the "green economy" on national competitiveness, comparative integration with the EU institutional model and adaptation to the conditions of Uzbekistan have not been studied in sufficient depth [7]. The uniqueness of this article is that it comprehensively analyzes the "green transformation" not only as an ecological process, but also as a factor of economic growth and investment attractiveness.

Research Methodology

A comprehensive scientific approach was used in the study [8]. The main method was a systematic analysis to study the theoretical foundations and practical mechanisms of the "green economy". The experience of Uzbekistan and the European Union was compared using the comparative analysis method [9]. Based on statistical data, the dynamics of energy efficiency and the share of renewable energy were assessed. General conclusions were also drawn using induction and deduction methods. The main directions of state policy were identified through the analysis of regulatory and legal documents. This methodology ensures the scientifically sound and practical application of the research results.

Analysis and Results

It is known that in recent years, international economic competition has been assessed not only by production volume or export potential, but also by the energy efficiency, environmental sustainability and technological adaptability of the economy [10]. In this regard, the transition to a “green” economy is becoming one of the strategic factors determining national competitiveness today. In particular, the economical use of energy resources, reduction of carbon emissions and widespread introduction of renewable energy sources serve to reduce the cost of manufactured

products, increase investment attractiveness, ensure the export and competitiveness of local products in foreign markets.

In this regard, the scientific study, analysis and adaptation of the European Union's experience in the field of green economy to national conditions is of practical importance for Uzbekistan.

It is known that the concept of sustainable development officially began to take shape intensively at the end of the 20th century. The need to consider global environmental and social problems within the framework of a unified approach became the basis for the emergence of this concept.

In particular, the UN Conference on Environment and Development, held in Rio de Janeiro in 1992, identified sustainable development as one of the priorities of global policy and adopted "Agenda 21". This document reiterated the need to incorporate the principles of sustainable development into national development strategies.[11]

In recent years, the concept of sustainable development has taken on a more systematic form within the United Nations. In particular, the Sustainable Development Goals (SDGs), adopted in 2015,[12] have been adopted as a global long-term strategic roadmap for ensuring sustainable development. These goals are aimed at achieving economic growth, social well-being and environmental balance, and cover areas such as energy, climate change, and resource efficiency.

The transition to a "green" economy in the European Union is being shaped not as a separate environmental program or short-term political initiative, but as a long-term strategic direction aimed at transforming the entire economic model.

After the adoption of the Paris Agreement in 2015, the issues of climate change, energy security and resource scarcity in the European Union have become central to the EU agenda. In 2019, the EU adopted the strategic goal of achieving climate neutrality by 2050 [13].

It is worth noting that by 2024 the European Union has achieved a reduction in greenhouse gas emissions by about 37-40% compared to 1990 levels. This is significantly higher than the 30% target planned for 2022.[14]

The trend of transition to a "green" economy in Uzbekistan is reflected, first of all, in the energy sector. Although the share of solar and wind energy is increasing, they do not yet occupy a leading position in the overall system.

According to the Investment Agency, in 2024, 91 power plants operated in the country, with a total installed capacity of 21,398 MW. Thermal sources accounted for 79% of this capacity, hydropower for 10%, solar energy for 9%, and wind energy for 1%. In 2024 alone, 2,000 MW of solar and 200 MW of wind power were commissioned, as well as 184 kilometers of new power transmission infrastructure were built.

These indicators indicate that the "green" transition process in Uzbekistan is moving beyond the stage of declarative statements and into a real investment and practical stage. The medium and long-term goals of the state also confirm the seriousness of this direction. The "Development Strategy of New Uzbekistan for 2022-2026" sets the task of increasing electricity production to 100 billion kWh by 2026 and increasing the share of renewable energy sources to 25%.

These successful changes are being implemented through inter-institutional coordination, a solid legal framework and stable financial mechanisms.

It should be noted that the EU "green" policy is implemented not only through the preparation and adoption of regulatory and legal documents, but also through the activities of several interconnected institutions. Each institution performs a certain function: one promotes the initiative, another brings it into legal form, another ensures political agreement, and the financial institution supports practical implementation.

In particular:

- The European Commission performs the function of strategic initiative and policy development;

- The European Parliament participates in the formation of the regulatory framework through legislative deliberation;
- The Council of the European Union ensures political agreement and final approval at the level of the Member States;
- The European Investment Bank supports the financial sustainability of this process:

This shows that the European Green Deal is a systemic approach to ensuring the sustainable development of the EU's economic, environmental and social sectors, and that the "goal - instrument - implementation" chain is being applied in practice.

The main mechanism of the Green Deal as a “transformational model” is implemented through the “Fit for 55” package presented in 2021. “Fit for 55” is a set of laws aimed at reducing the EU’s greenhouse gas emissions by at least 55% by 2030 and achieving climate neutrality by 2050.

This set of laws aims to “align” different sectors of the economy to the 2030 target, bringing together instruments such as the reform of the European Union Emissions Trading System (EU ETS) (pollutant emissions), energy efficiency and strengthening renewable energy policies in a single package. The aim is to reduce emissions not only in one sector, but also in a series of simultaneous changes in energy-transport-industry-buildings sectors.

If we consider the issue of transitioning to a “green” economy using the example of Germany, one of the countries with a stable economy in the EU, we can see that this process is being implemented in a clear and relatively strictly defined manner.

The reason is that in Germany, the environmental policy of providing sustainable energy is not limited to reducing emissions, but is aimed at modernizing industrial production, developing renewable energy sources (solar, wind), and maintaining international competitiveness.

In other words, decarbonization in Germany does not mean reducing production, but rather reorganizing it based on energy efficiency, new technologies, and low-carbon sources [15].

The fact that the German government has set a goal of covering at least 80% of electricity consumption from renewable energy sources by 2030 indicates that it has chosen the path of accelerating the green transformation.

According to the Federal Climate Change Act, the country must achieve greenhouse gas neutrality by 2045, while the EU has set a deadline of 2050.

The fact that Germany is moving towards a green economy not through simple environmental measures, but through the preparation of the next stage of industry in advance, and the country’s goal of increasing the total capacity of renewable energy sources to 10 GW (gigawatts) by 2030, demonstrates the importance of the hydrogen strategy in ensuring the country’s energy security, reducing carbon emissions and transitioning to a “green” economy.

It should be noted that while in Germany the focus is on the ecological transformation of a large industrial base, in Sweden a more long-term policy, economic incentives and achieving a low-carbon energy system prevail. This indicates that the transition to a “green” economy is being carried out on the basis of pre-established institutional mechanisms.

In general, the experience of Germany and Sweden shows that the transition to a “green” economy in the European Union is not based on a single method, but is developing in different countries in accordance with national conditions.

If we look at the situation of sustainable development and the transition to a “green” economy in Uzbekistan, this direction has become one of the priorities of state policy in recent years. This is due to the growing energy consumption in the country, a sharp increase in demand for electricity, the need for rational use of natural resources, and the intensification of climate-related risks.

According to the World Bank, in the next 10 years it will increase to 135 billion kilowatt-hours (in 2024 it was 80 billion kWh), which means that the demand for electricity should grow by about 8% per year. This situation makes the transition to a "green" economy an important strategic task not only from an environmental perspective, but also from an economic and energy security perspective.

The legal and institutional basis of this direction was formed, first of all, on the basis of the "Strategy of the Republic of Uzbekistan for the transition to a "green" economy for 2019-2030", approved by the Resolution of the President of the Republic of Uzbekistan No. PQ-4477 adopted in October 2019.

This strategy identifies the efficient use of natural resources, increasing energy efficiency, widespread introduction of renewable energy sources, strengthening environmental safety in economic sectors, and ensuring sustainable economic growth as priority areas.

In addition, the Presidential Resolution No. PQ-57 of February 16, 2023, established measures to accelerate the development of renewable energy sources in 2023-2030.

This resolution provides for the expansion of solar and wind energy, attracting private investment, strengthening public-private partnership mechanisms, and increasing the share of renewable sources in electricity generation [3]. However, the existence of regulatory frameworks does not produce results by itself. In order to truly strengthen competitiveness, technological modernization of the energy system, increasing energy efficiency, and linking solar energy with local economic development are required.

At the same time, the current situation cannot be considered ideal. According to the World Bank materials, an investment of about 3 billion US dollars is required to modernize the electricity distribution infrastructure in the energy system of Uzbekistan.

In addition, the existing energy system still relies heavily on traditional fuels, and renewable energy sources do not yet have a leading share in the overall system. The process of sustainable development and transition to a "green" economy in Uzbekistan has become much more active in recent years. The country has adopted key strategic documents in this area, launched major renewable energy projects, and set specific target indicators for the coming years. This is manifested, first of all, in the commissioning of new capacities in the energy system, attracting investments, and bringing the principles of "green" growth to the level of state policy. is being.

At the same time, a number of systemic problems remain in the process of transition to a "green" economy in Uzbekistan. Due to the obsolescence of some parts of the existing power transmission system, the issue of stable connection of new energy sources to a single system remains relevant. In particular:

- Difficulties in integrating renewable energy into the system.
- Technological and equipment dependence.
- Uneven territorial development and a number of institutional coordination mechanisms prevent the sufficiently effective functioning of the system.

The experience of transition to a "green" economy in the countries of the European Union shows that this process is not limited to environmental policy alone, but is formed as a complex model that connects energy, industry, finance, transport and public administration. The development of renewable energy at the EU level is set out in the adopted strategic direction, and in 2024 the share of renewable sources in energy consumption in the Union was brought to 25.2%, while in Sweden this figure 62.8%. At the same time, a target of at least 42.5% for renewable energy has been set for 2030. This shows that the "green" economy in the EU is not a general slogan, but a policy reinforced by specific indicators and implementation mechanisms.

The first important aspect of the EU experience is the practical implementation of linking long-term goals to short- and medium-term plans. For example, Sweden has set a target of achieving net zero emissions by 2045 as part of its climate policy since 2017. At the EU level, common targets for renewable energy and energy efficiency are implemented through national plans and reporting systems.

This approach is also relevant for Uzbekistan, as the country's development strategy for 2022–2026 sets the goal of increasing the share of renewable energy to 25% by 2026 (currently around 21%) and increasing the economy's energy efficiency by 20%. Official data for 2025, however, envisages a 54% share of renewable energy by 2030.

Thus, the most important lesson for Uzbekistan from the EU experience is not to set goals only at a general level, but to include them in "road maps" for specific years by sectors, regions and responsible institutions, and to ensure their gradual implementation, taking into account annual changes.

Another important experience is the standardization of "green" financing, that is, in order to increase "green" investment, a financial and classification mechanism is first established that clearly defines a "green" project.

In general, the issue of applying the experience of the European Union countries in Uzbekistan should be addressed not in the form of "copying a ready-made model", but in the form of selective adaptation. The following can be identified as the most realistic and effective directions for Uzbekistan:

- first, more clearly defining renewable energy targets and indicators across sectors and regions;
- second, strengthening competitive auction and public-private partnership mechanisms similar to the German experience;
- third, based on the experience of Sweden, creating a system of accounting for emissions and gradual economic incentives;
- fourth, deepening "green" financing standards, similar to the EU taxonomy;
- fifthly, making energy efficiency and modernization of power grids an integral part of renewable energy policy.

It is precisely such an approach that will serve the sustainable development of the "green" economy in Uzbekistan, not only in terms of quantity, but also in terms of quality.

In conclusion, it is necessary to understand that the "green" economy for Uzbekistan is not an abstract direction for the distant future, but a real development model that should be gradually formed starting today.

If the established strategic goals are strengthened by practical measures, the "green" economy in Uzbekistan will inevitably become an important factor in modernizing the energy system, using resources efficiently, reducing the environmental load, and ensuring long-term economic stability.

The near future development of the "green" economy in Uzbekistan should serve not only the commissioning of new energy capacities, but also the qualitative renewal of the entire economy.

It is planned that these renewals will be implemented in the coming years through the stability of electricity supply, changes in the composition of energy sources, the efficient use of resources, and increased investment activity.

The determination of the country's strategic direction until 2030, and the subsequent adoption of decisions aimed at increasing the effectiveness of reforms, indicate that this process is not accidental, but a long-term state policy.

The greatest change in the near future is expected to occur in the structure of the energy system. The growing demand for electricity makes it increasingly difficult to maintain the traditional model. In this context, the expansion of the share of solar, wind and other renewable sources will gradually diversify the energy balance.

As a result, the pressure on natural gas will decrease relatively, the supply system will begin to take a more stable form and create a real basis for strengthening energy security.

In particular, practical measures taken to develop renewable energy and introduce energy-saving technologies are aimed at accelerating this process. The economic side of this change is also important. "Green" development is based not on consuming more resources, but on using them economically and effectively. If energy efficiency increases, production losses will decrease, costs will decrease, and the competitiveness of certain sectors will increase. In particular, areas such as modernization of electricity networks, energy audits, and widespread introduction of energy-saving technologies are areas that will give the expected results faster.

Discussion

The findings of this study illuminate a critical juncture in Uzbekistan's developmental trajectory. The country possesses the natural endowments, policy momentum, and institutional frameworks necessary for green economic transformation, yet faces structural constraints that have historically limited the translation of strategic ambition into sustained operational outcomes. The comparative analysis with EU member states, particularly Germany and Sweden, provides a valuable diagnostic lens through which Uzbekistan's own green transition can be assessed and refined.

The European Union's success in reducing greenhouse gas emissions by approximately 37-40% against 1990 baselines by 2024 is attributable not to any single policy instrument but to the sustained application of a multi-level governance architecture that links strategic targets to binding sectoral legislation, financial instruments, and institutional accountability mechanisms. The "Fit for 55" package represents the most sophisticated expression of this integrated approach, simultaneously addressing emissions trading, renewable energy mandates, energy efficiency obligations, and carbon border adjustment in a coordinated legislative framework. Uzbekistan's current policy architecture, while increasingly ambitious, has not yet achieved this level of systemic integration across sectors.

The divergence between Germany's and Sweden's approaches to green transition offers important strategic lessons for Uzbekistan. Germany's emphasis on industrial decarbonization and hydrogen strategy reflects the specific challenge of transforming a large, export-oriented manufacturing economy with deep fossil fuel dependencies. Sweden's achievement of 62.8% renewable energy share by 2024 reflects decades of consistent carbon pricing, nuclear baseload investment, and early commitment to long-term emissions targets that created stable investment conditions. Uzbekistan's context combines elements of both challenges: an energy-intensive industrial base reliant on natural gas and an urgent need to develop renewable capacity to meet rapidly growing electricity demand.

The infrastructure investment gap identified in this study — estimated at approximately USD 3 billion for electricity distribution modernization alone — points to a fundamental enabler constraint. Unlike regulatory reform or institutional restructuring, infrastructure development requires long lead times, large upfront capital commitments, and stable policy environments to attract private co-investment. The EU's experience with the European Investment Bank demonstrates that public risk capital and blended finance instruments are indispensable for catalyzing private infrastructure investment at the scale required for green transition. Uzbekistan's engagement with the World Bank, EBRD, and ADB provides analogous mechanisms that should be more systematically leveraged.

The challenge of renewable energy system integration deserves particular attention. As Uzbekistan's share of variable renewable energy increases toward the 25% target for 2026 and the more ambitious 54% target for 2030, grid stability, storage capacity, and demand-response mechanisms become increasingly critical operational requirements. Germany's experience with Energiewende — where rapid renewable expansion outpaced grid infrastructure modernization — provides a cautionary lesson. Proactive investment in smart grid technologies, battery storage, and pumped hydro capacity is therefore not merely desirable but operationally necessary for achieving renewable energy targets without compromising supply reliability.

The GI branding and green finance standardization dimensions reflect a broader insight about the relationship between regulatory frameworks and market development. EU taxonomy for sustainable finance has been instrumental in channeling private capital toward verified green investments by providing clear, harmonized definitions of what constitutes a "green" activity. Without equivalent definitional clarity, green financing markets remain fragmented, due diligence costs remain high, and institutional investors face greenwashing risks that suppress capital allocation to genuinely sustainable projects. Uzbekistan's development of green finance standards aligned with international frameworks would therefore not merely attract foreign investment but fundamentally reshape domestic capital allocation toward green economic activities.

The digital dimension of green economic transformation is also worthy of deeper consideration. E-commerce and digital platforms are not simply alternative distribution channels; they are reconfiguring supply chains, enabling real-time environmental performance monitoring, and democratizing access to green finance for small and medium enterprises. China's experience demonstrates the scale of opportunity available to countries that successfully develop digital trade facilitation infrastructure. For Uzbekistan, digital integration with Central Asian and Chinese markets represents a multiplier for green economic activities.

The institutional coordination challenge cuts across all dimensions of green economic transformation. The European Commission's role as strategic initiator represents a level of institutional integration that most developing economies, including Uzbekistan, have not yet achieved. The establishment of the Climate Council under the President of Uzbekistan in July 2024 represents a meaningful step toward this level of inter-institutional coordination, but translating high-level political commitment into consistent cross-ministerial implementation requires further development of regulatory capacity, monitoring systems, and accountability frameworks.

A final dimension concerns the political economy of green transition. In both Germany and Sweden, green economic policies have generated distributional challenges requiring active policy management to maintain political sustainability. Uzbekistan's green transition will similarly generate winners and losers across sectors, regions, and income groups. Proactive social policy measures, regional development programs, and worker retraining initiatives are therefore not peripheral concerns but central components of a politically sustainable green transition strategy.

Conclusions and Recommendations

The investment climate may also change in the near future. If there are clear goals and practical mechanisms for "green" projects, this will also be a positive signal for small businesses and private entrepreneurship. In this regard, public-private partnerships, competitive tenders, "green" financing instruments, and initiatives related to the renewal of network infrastructure will expand the opportunities for attracting new investments. The impact of this is not limited to energy. It also affects the development of transport, industry, construction and regional infrastructure. As a result, the "green" economy, in addition to the ecological direction, is also manifested as a new growth point.

However, despite the existing positive changes, the process is still at the initial and transitional stage. Because at present, the dominance of traditional sources in the energy system remains, the network infrastructure has not been sufficiently modernized, energy losses are high, and the necessary conditions for the large-scale integration of renewable energy into the system have not yet been fully formed.

In this context, it is appropriate to adapt the European experience to the conditions of Uzbekistan. In particular, measures such as auctions for renewable energy, public-private partnerships, "green" financing mechanisms, energy efficiency standards, modernization of electricity networks, and providing a long-term and understandable political signal to investors are of practical importance for Uzbekistan.

The main issue here is that the "green" economy should be developed not only by building new plants, but also in harmony with management, financing, technology and network infrastructure.

If the established strategic goals are reinforced with practical measures, it is inevitable that the "green" economy in Uzbekistan will become an important factor in modernizing the energy system, using resources efficiently, reducing the environmental burden and ensuring long-term economic stability.

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