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GREEN ECONOMY AS A KEY ASPECT OF NATIONAL DEVELOPMENT

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Abstract - The green economy represents an innovative development model aimed at achieving sustainable economic growth while simultaneously reducing environmental impact and promoting more rational use of natural resources. In the context of global climate change, shrinking biodiversity, and ecosystem degradation, the transition to a green economy becomes an urgent task for all nations, especially for developing countries. This article explores the role of the green economy as a key factor in socio-economic and environmental progress. It analyzes the core principles, implementation mechanisms, and the potential for national-level adaptation. Special attention is given to international experiences in implementing green strategies and their applicability to Uzbekistan. The article also examines existing challenges, barriers, and prospects for transitioning to a green model, as well as the roles of government, business, and society in ensuring a sustainable future.

Keywords: education, environmental literacy, green economy, investments, educational programs.

Introduction

Global environmental and socio-economic challenges require a rethinking of development strategies. The modern model of the green economy provides a response to escalating ecological crises and inefficient resource use. It is based on the integration of economic growth, social progress, and environmental protection. And based on the economic state of the country, resources for the development of a green economy outpace GDP.

1. Concept and Principles of the Green Economy

The green economy is defined as an economy that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. Its foundation lies in decoupling economic growth from environmental degradation and resource depletion. Key principles of the green economy include:

- Sustainable use of natural resources
- Low-carbon development
- Energy efficiency and renewable energy sources
- Circular economy and waste minimization
- Social inclusiveness and employment growth in green sectors

A green economy does not replace sustainable development but rather offers a practical framework for achieving it.

2. Role of Green Economy in Sustainable Development

The green economy fosters inclusive growth by creating green jobs, enhancing energy security, and promoting technological innovation. It contributes to poverty reduction through investments in clean energy, sustainable agriculture, and eco-tourism. Moreover, it helps preserve biodiversity and natural ecosystems.

Transitioning to a green economy allows countries to achieve the UN Sustainable Development Goals (SDGs), including goals on clean energy, sustainable cities, responsible consumption, and climate action.

3. International Experience in Green Economy Implementation

Countries such as Germany, South Korea, and the Nordic nations have taken the lead in adopting green economy principles. Germany's "Energiewende" (energy transition) focuses on phasing out nuclear power and fossil fuels while investing in renewables. South Korea implemented a comprehensive Green New Deal focusing on smart grids, green transportation, and environmental technologies. The Nordic countries prioritize eco-innovation, circular economy, and high environmental standards while maintaining high levels of human development.

These international examples highlight the importance of political will, public-private partnerships, and investment in education and innovation. Developing countries can learn from these models while tailoring strategies to their specific contexts.

4. The Green Economy in the Context of Uzbekistan

Uzbekistan, with its unique geographic and climatic conditions, faces significant environmental challenges, including water scarcity, land degradation, and air pollution. Recognizing these threats, the government has initiated several reforms to transition toward a green economy. National strategies now emphasize energy efficiency, renewable energy development (especially solar and wind), and sustainable agriculture.

The Strategy for the Transition to a Green Economy (2019–2030) outlines key goals, including increasing the share of renewable energy in the energy mix, modernizing water and waste systems, and developing green transport. International cooperation and financial support from organizations such as the World Bank and UNDP have been instrumental in launching pilot green projects in rural areas.

Despite progress, challenges remain, particularly in terms of infrastructure, regulatory frameworks, and public awareness.

5. Challenges and Barriers

Implementing a green economy in Uzbekistan and similar countries faces several key obstacles:

- Limited financial and technical capacity
- Dependence on fossil fuels and outdated infrastructure
- Institutional inefficiencies and lack of regulatory incentives
- Low level of environmental education and public participation

Overcoming these barriers requires systemic reforms, targeted investments, and international cooperation. Engaging the private sector and civil society is crucial for scaling up green solutions.

6. Strategies and Mechanisms for Implementation

To effectively transition to a green economy, Uzbekistan should focus on:

- Enhancing environmental legislation and governance
- Expanding access to green finance and public-private investment models
- Supporting green innovation, research, and development
- Promoting education and awareness on sustainability principles
- Strengthening partnerships with international environmental organizations

The integration of green principles into national development planning and budgeting is essential for long-term success.

Methods

The study is based on a combination of literature review, policy analysis, and case study methodology. Relevant national and international documents, including reports by UNEP, the World Bank, and national strategy papers from Uzbekistan, were reviewed to identify trends, policy approaches, and implementation barriers. A comparative analysis method was used to examine successful green economy transitions in selected countries and assess their relevance to Uzbekistan. In the course of the study, the following methods were used methods of theoretical and applied scientific knowledge, including: methods of comparative analysis, methods of generalization,

horizontal and vertical analysis, methods of synthesis, induction and deduction. Statistical data were used in the preparation of the study International financial institutions and organizations, statistical data of the Agency of Statistics under the President of the Republic of Uzbekistan. The emergence of a green economy imposes fundamentally new organizational and technological requirements not only for environmental protection, but also for the functioning of many sectors of the economy, changing the conditions of their activity. The transition to green growth has and will continue to have a significant impact, including on international trade, creating new conditions., challenges and opportunities for its implementation. In this regard, it is important to take a closer look at the process of the formation of a green economy in the world. and identify the changes that may affect the development of international economic relations in the coming decades. The solution of the above tasks of the article is carried out using such methods as the analysis of domestic and foreign literature and electronic resources, systematization and synthesis of the results obtained.

Discussion and research results.

The analysis shows that the green economy can play a transformative role in Uzbekistan's development. Policy initiatives such as the Strategy for the Transition to a Green Economy (2019–2030) demonstrate a clear commitment to sustainability. However, infrastructural and institutional limitations hinder the full realization of these goals. Successful international models provide frameworks that can be adapted locally, particularly in energy, agriculture, and urban development sectors.

Key results include:

- Uzbekistan's renewable energy potential is significant but underutilized.
- Policy frameworks exist but require more robust enforcement mechanisms.
- Public awareness and education on environmental issues remain low.
- International cooperation and investment are critical enablers of green transformation.

Education plays a key role in the effective use of the tools and mechanisms of the "green" economy in practice. The causes of almost all environmental disasters are explained as a consequence of improper and wasteful human attitude to natural resources. Education as a social institution is the most important of the basic conditions for transition towards a "green" economy, as it contributes to the support and dissemination of innovations, both technological, economic and socio-cultural. It is the ability of society to generate new ideas and approaches to solving problems. The challenges and opportunities to demonstrate the effectiveness of these innovations and their widespread adoption become the key to the competitiveness of national economies.

Similarly, education in the interests of a green economy can play the role of supplying new personnel to the labor market or retraining some of the former ones. In the course of the development of "green" industries in the labor market, there is an increasing demand for specialists in new professions who train students – the so-called "green collars". At the moment, there is already a shortage of personnel for specialists in the "green" sectors of the economy, for example, there is a shortage of personnel in the biofuel production sector in Brazil, in renewable energy and the production of environmental goods and technologies in Germany, the USA and Bangladesh, in the construction sector in Australia, China, Europe and South Africa [2].

In addition to specific qualifications and competencies related to employment in the environmental goods and services sector, the task of "greening" the entire workforce in all sectors and at all levels is equally important. In general, in terms of content, approaches and methods, education for the "green" economy – this is primarily education for people, since the transition to sustainable development and a "green" economy requires the abandonment of outdated forms of management. The rules are not only formal (government policy, legislation), but also informal (business ethics, social norms and values). In the new conditions, education is required to be effective in training creative and proactive individuals. Teachers who are able to solve complex problems in innovative and flexible ways play a great role in this. We see our approach to training personnel for

the "green economy" in fundamentally new in the context of Uzbek education in bachelor's and competitive master's degree programs.

The purpose of creating new programs on green economy is the comprehensive ecological and economic training of highly qualified personnel to solve problems of ensuring environmental safety and rational use of natural resources. Due to its innovativeness and interdisciplinary nature, the course on ecology could be taught to master's students studying courses on energy saving, ecological management, environmental and economic security. Today, the tendency of the world community to preserve the environment is undeniable, and ecology plays one of the leading roles in achieving the goals of sustainable development of the world economy. The development and implementation of technologies that contribute to improving the environmental situation, increasing safety in the workplace, the emergence of new types of economic activity with a focus on waste-free production and improving the quality of life are becoming relevant every day. Therefore, one of the main tasks of teachers is to form an environmental culture and disseminate knowledge among students and support all initiatives in the field of ecology, which were identified as priorities by the United Nations, and the role of teachers and students is great. Modern education needs to attract highly qualified personnel to universities who have not only a pedagogical education, but also training in related areas. And the role of "environmental" education and its influence on ensuring "green" growth is important and teachers must create new programs, textbooks on green economics, and the knowledge gained by students will serve as a guarantee of intensive industrialization of our country. For the purposes of Sustainable Development of the economy and in the process of transition of the global economy of the republic to "green", the economic and educational role of higher education plays an important role in shaping the culture and environment in order to prepare a new generation of scientific researchers and experts, as well as the implementation of developments in the field of ecology. Universities can and should indeed become the engine of social and technological transformations, and they have gone through several stages of development. The first universities that emerged in the Middle Ages, the so-called universities 1.0, were knowledge centers closed to the public, built around religious institutions or individual philosophers. They mainly performed the function of collecting and storing the ideas about the world that existed at that time. Over time, such specialized communities became the basis of humanitarian education. The next stage of university development was positioned as a research university, which arose in a post-industrial society and became the center of technological progress based on research. The Joint Belarusian-Uzbek Intersectoral Institute of Technical Qualification in Tashkent can be called an entrepreneurial university, performing a variety of educational and scientific functions. Today, new global challenges require the educational sector to develop new approaches to training professional personnel. The accumulation of knowledge and ideas of teachers should be directed, first of all, to solving pressing issues on the application of artificial intelligence and the green economy in the creation of new topics in the educational process.

In terms of attracting universities within the country to the UIGreenMetric program, the first three positions are occupied by: Indonesia - 66 universities, the USA - 61 universities, Russia 42 universities. But if we take into account the fact that the number of higher education institutions in Russia is 1217 units, then the percentage of universities included in the program is 3.5% of the total number of universities. The leading places in the UIGreenMetric rating in Russia are occupied by: Peoples' Friendship University of Russia (RUDN), Stavropol State Agrarian University (SSAU), Oryol State University named after I.S. Turgenev (OSU) [3]. We consider it expedient for our universities to join the programs for the development of regional green economy. As is known, the "green" economy is designed to improve the well-being and comfortable living of people, while improving the state of the environment and reducing the deficit of natural resources. In turn, the

formation of a "green" economy requires the training of professional personnel, which is already being carried out in foreign countries. Interest in the field of research into so-called "green jobs" is rapidly growing worldwide. Today, the role of "ecological" education and its impact on ensuring "green" growth is great and the knowledge acquired by students, including fundamental knowledge, serves as a guarantee of intensive industrialization. It is necessary to accelerate the process of high-quality reforms in the system of training professional personnel and develop coordinated actions by the government, employers and labor exchanges with an emphasis on creating environmentally safe and decent working conditions. The concentration of pollutants in water and air is increasing. We can list them endlessly, so I will quote Eckhart Tolle: "Pollution of the planet is only an external reflection of our internal pollution, the result of millions of unconscious people irresponsibly treating their inner space." Based on the above, it can be seen that each stage of knowledge acquisition should be accompanied by an environmental component. This will serve as a certain step for instilling the ability to make decisions, taking into account environmental assessment. The initiative "Education for Sustainable Development" launched in 2005 under the auspices of the UN was discussed by the world community and experts came to understanding that quality education should include not only basic skills, but also develop universal human values and provide for the integration of sustainable development with the teaching of green economy in the country's universities. For this purpose, the Fund for the Development of Socially Significant Initiatives in Kazakhstan was established to develop a unified system of continuous environmental, humane education and upbringing. Such social humane and moral environmental initiatives are necessary for our society. The development and implementation of effective policies that promote the introduction of cleaner technologies and investments in the interests of improving life are invaluable for our society. Of course, access to knowledge and information flows are very important, since real environmental emergencies .

According to world statistics, by the end of 2022, there was a new increase in CO2 emissions (+2.5%) related to energy to a record level exceeding. In 2019, however, the increase was slower than in 2021, but significantly higher than in the period 2010-2019 (+1%/year). Emissions have reached record levels of more than 33.8 GtCO2, despite the global economic decline in many countries. CO2 emissions increased slightly in the two largest emitting countries, namely China (+1% as the growth of energy consumption in the industrial sector slowed, and the share of wind and solar energy in the Chinese energy structure continues to increase) and the United States (+1.2%), as emissions decrease. The CO2 associated with coal was more than offset by the increase in emissions, related to gas) (see Fig.1) [10]. Thanks to the dynamic economic growth, CO2 emissions grew very rapidly in coal-dependent India (+8.8%) and Indonesia (+28%), oil-dependent Saudi Arabia (+10%) and Mexico (+10%). On the other hand, CO2 emissions decreased in Europe (-2%, including -1.8% in the EU, -2.7% in Turkey and -2.6% in the UK), in Brazil (-6.2%, while the growth of hydroelectric power generation reduced gas consumption), in South Africa (-4.7%, as technical problems prevented coal-fired power generation) and South Korea (-2.9%, due to higher levels of nuclear power production). They stayed stable in Japan and Russia (an increase in coal-related emissions was offset by a decrease in gas-related emissions).

At the same time, it should be noted that according to the International Energy Agency report, in 2023 the growth in renewable energy capacity was almost 50% or 550 GW, in China alone, in one year, solar photovoltaic systems were put into operation with a volume equal to the combined volume of all countries in the world in 2022. The UN Environment Programme (UNEP) report for 2023 outlined progress since the signing of the Paris Agreement in 2015. If at the time of signing it was expected that emissions would grow by 16% in 2030, then taking into account the measures taken around the world, this forecast has decreased to an expected 3% growth, however, with the implementation of all projects and agreements, the volume of greenhouse gas emissions should decrease by 28% [11]. In the Republic of Uzbekistan, the need for electricity in Uzbekistan is 69

billion kWh. Almost 90% of this energy is generated by burning gas and coal, the remaining 10% is produced from renewable energy sources. 16.5 billion cubic meters of natural gas and 2.3 million tons of coal are used to generate electricity. However, by the end of 2022, CO2 emissions decreased by 6% compared to the previous year; in 2023, due to direct foreign investment from the Masdar company, the first stages of 3 solar power plants with a total capacity of 2400 megawatts were built in the Jizzakh, Samarkand and Surkhandarya regions, a modern wind station is being built, and its first capacity for the production of 100 megawatts was launched. Together with the Gezhouba company, solar stations are being built in Bukhara and Kashkadarya, which will begin to generate 400 megawatts of energy. It should be noted that all projects are being implemented at the expense of foreign direct investment on the basis of public-private partnership.

It is expected that "due to new projects with a total cost of 2 billion US dollars, 6 billion kW of electricity will be produced per year, 2 billion cubic meters of natural gas were saved, 2 million homes will be provided with continuous and guaranteed electricity" [3]. In accordance with the development strategy of New Uzbekistan until 2030, it is planned to double the volume of industrial production in such sectors as metallurgy, petrochemistry and mechanical engineering, which implies an increase in demand for energy resources by more than 40 billion kilowatt-hours, which is planned to be covered primarily by renewable energy sources. For these purposes, 25 power purchase agreements and investment agreements with a total capacity of 11,954 MW have been signed with international companies , which provide for the commissioning of 25 power plants with a total capacity of 11,954 MW (9 thermal, 9 solar and 7 wind power plants) by the end of 2026, which is 60% of the current capacity of the power system of Uzbekistan. In order to stimulate the sector, a "Solar House" system is being created in Uzbekistan to provide preferential loans and subsidies for the installation of solar panels, and guaranteed purchase of the generated electricity. In 2023 alone, solar panels were installed by 50 thousand households and entrepreneurs. A methodology for certification of "Green Energy" products produced from "green" energy has been developed. "The introduction of green technologies has given impetus to the development of new types of production, related industries to provide service and maintenance of green energy, 4 enterprises have started production of solar panels, 2 enterprises - metal structures. About 50 projects in the field of "green" energy create a cable market additionally worth 500 million dollars" [3]. The President of the Republic of Uzbekistan Sh.M. Mirziyev put forward an initiative to hold the Samarkand International Climate Forum in 2024, which will become a new global platform for exchanging opinions and combining efforts in achieving the goals of "green" development in Central Asia: "We expect that this forum will become a practical step in the creation of the "Samarkand Dialogue for the Future" to find answers to global threats to sustainable development" [4]. New technologies have also affected the development of the financial sector of Uzbekistan. For the first time in 2023, green sovereign Eurobonds of the Republic of Uzbekistan for 4.25 trillion soums and Eurobonds for 660 million dollars were placed on the London Stock Exchange. The funds received will be used by the state to finance projects for the introduction of water-saving technologies, development of railway transport and the metro, the organization of sanitation and cleaning works and ensuring cleanliness in populated areas, creation of ecological forest plantations against wind erosion and sand flooding of water management facilities.

The country strategies for cooperation with the largest global and regional financial institutions, such as the World Bank Group, the Asian Development Bank, the Asian Infrastructure Investment Bank and the European Bank for Reconstruction and Development, include priorities for the implementation of green economy investment projects, as well as the development of green financing instruments in the market. The development of a green economy and green financing is a long-term process that requires significant financial, material and labor resources. Large industrial

enterprises of the republic need to modernize equipment, introduce resource-saving technologies, develop corporate management principles, and introduce new requirements for socially responsible investment of ESG principles. The banking sector of Uzbekistan will not be able to meet the growing demand for large-scale investment programs of industrial enterprises using its own resources; in this regard, attracting foreign loans and direct investment plays a major role in the implementation of green projects. Most banks have begun to offer green loans in their product line, mainly aimed at purchasing and installing renewable energy devices, implementing energy-saving technologies, and financing measures to improve the energy efficiency of production processes.

Transitioning to a green economy is a complex, multidimensional task that requires coordinated efforts across sectors. Uzbekistan's environmental challenges, such as water scarcity and air pollution, underscore the urgency of adopting sustainable practices. While government strategies show alignment with global green economy principles, implementation gaps remain. Lessons from Germany, South Korea, and Nordic countries highlight the importance of strong governance, public-private partnerships, and citizen engagement.

Uzbekistan can benefit from:

- Building local capacity for green technology deployment
- Creating incentives for private sector participation
- Enhancing regulatory coherence
- Incorporating sustainability into all levels of education

Conclusion

The green economy is not just a theoretical concept but a practical necessity for countries seeking sustainable development. For Uzbekistan, it offers a pathway to modernize the economy, improve environmental quality, and enhance quality of life. By learning from international best practices and addressing internal challenges, Uzbekistan can establish itself as a regional leader in green development.

Strategic vision, institutional commitment, and inclusive participation will be the pillars of a successful green transition.

It is necessary to further strengthen innovative and educational activities to create and implement joint projects and R & D with the attraction of funding and solve the following tasks: • Involvement of teachers, staff and students of the institute in the implementation of the "Green University" concept. • Attracting investments to improve the environmental infrastructure of the institute. • Implementation of innovative educational programs in the field of ecology in Tashkent and other regions of the republic and their support. • Attracting new partners to implement the concept of the "Green Institute". • Entering the international level and disseminating the results of the concept of the "Green University" in Uzbekistan. • Create professional development centers and ecology centers in the regions of the republic jointly with regional universities.. • Increase the share of international projects in cooperation with international companies and universities. • Increase the number of international publications in highly rated journals. • Participate in international networks of research institutes. • Increase the number of international researchers of the institutes. • Strengthen international cooperation with industry and business in the field of ecology. - Increase the number of projects in areas of international interest, including in the field of Sustainable Development Goals (SDGs), in particular on the development of clean sources of energy and ecology. In Uzbekistan, a favorable trend has been created in teaching students green economy, in particular, at the Joint Belarusian-Uzbek Intersectoral Institute of Technical Qualification in Tashkent, programs have been created on the subject of green economy, and the number of "green" universities is growing every year.

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