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Green Economy in Uzbekistan: Essence, Principles, and Perspectives

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Abstract: This article examines the green economy in Uzbekistan, highlighting the need for a shift from traditional to sustainable economic practices. It discusses the link between economic activities and environmental sustainability, stressing the urgent need for renewable energy, improved waste management, and sustainable transportation. The article also emphasizes the importance of investing in green technologies to ensure long-term economic resilience and environmental stewardship.

Keywords: Green economy, sustainable development, renewable energy, environmental degradation, economic resilience, Uzbekistan, ecological footprint, natural resources, climate change, green technologies.

Introduction: The green economy represents a crucial shift in how we perceive the interplay between economics and ecology, often overlooked in traditional economic approaches [1]. As economic activities increase, they invariably lead to heightened pollution levels and significant environmental degradation. This includes the depletion of natural resources, disruption of the biosphere balance, and accelerated climate change, all of which impose severe constraints on future growth and development[2].

Literature Review

The literature review encompasses various sources that discuss the impact of economic activities on environmental degradation and the need for sustainable development. Key references include reports from the Organization for Economic Cooperation and Development (OECD) and the Global Footprint Network, which provide projections and data on environmental resource depletion. The United Nations Environment Programme (UNEP) offers a definition and framework for the green economy, advocating for societal welfare through efficient resource use. Additionally, the article draws on national documents from Uzbekistan's Ministry of Development and Department of Green Technologies, detailing local initiatives and policies aimed at fostering a green economy.

Methodology

The methodology of this research involves an extensive literature review and analysis of various reports and data from organizations such as the OECD, UNEP, and national documents from Uzbekistan's Ministry of Development and Department of Green Technologies. This includes examining historical trends, current initiatives, and future projections related to the green economy and sustainable development.

Research Results

Insightful projections by the Organization for Economic Cooperation and Development (OECD) suggest a bleak future where, by 2050, modern production and consumption patterns could result in the loss of 61% to 72% of global flora and fauna relative to year 2000 levels, alongside irreversible damage over 7.5 million square kilometers of natural territories. Researchers from the Global Footprint Network have observed a worrying trend where Earth's annual resources are depleted faster each year; for example, in 2015, our annual resource quota was exhausted six days sooner than in 2014 [3].

These historical trends underscore an urgent need to rethink our economic systems. The concept of a "green economy" has thus emerged, integrating environmental considerations directly into economic science as essential, finite elements of market calculations. This approach treats the economy as an integral component of the natural environment, advocating for a sustainable balance where societal welfare is maintained through the efficient use of resources and recycling [4].

The United Nations Environment Programme (UNEP) defines the green economy as one that not only boosts human well-being and ensures social equity but also minimizes environmental risks and ecological shortages. The underlying philosophy of the green economy rests on the premise that sustainable economic development must consider the finite nature of global resources and the inherent interconnectedness of all ecological and economic systems, thus making it imperative to address the needs of future generations while managing those of the present. This forward-thinking approach prompts a systemic transformation towards sustainability, driven by a commitment to ecological integrity and social justice [5].

Directions of the Green Economy in Uzbekistan In the green economy, various directions are highlighted:

1. Implementation of renewable energy sources. It is noted by ecologists that more than half of all fossil fuels should remain unexplored to avoid significant climate change.
2. Improvement of waste management systems. Currently, in developed countries of the world, 1 to 3 kg of solid household waste is produced per capita daily, and in the US, this amount is increasing by 10% every decade. In Uzbekistan, landfills collectively cover more than 2,000 square kilometers [6].
3. Improvement of water resource management systems. Currently, one in six people on the planet experiences a shortage of fresh drinking water.
4. Development of 'clean' (sustainable, 'green') transportation. UNEP works on the possibility of reducing the demand for transport, especially private transport vehicles, without compromising overall mobility.
5. Organic farming in agriculture. This implies the rejection of the use of herbicides, pesticides, agrochemicals, as well as artificial fertilizers. Organic agriculture products do not contain genetically modified organisms, are processed without the use of E-ingredients, and are stored without contact with unnatural substances.
6. Energy efficiency in the housing and communal services. The presence of residential complexes equipped with inefficient heat insulation constructions and heating supply systems leads to significant heat losses.
7. Preservation and effective management of ecosystems. The variety of human activities in the biosphere leads to changes, the direction and degree of which are traditionally called an ecological crisis.

Principles Guiding Uzbekistan's Green Economy The directions of the green economy are developed in accordance with principles:

- Equity (equality);

- Respect (prosperity and well-being for all);
- Precaution (consideration of the planet's load limits);
- Participation (in decision-making);
- Accountability (management);
- Economic, social, and ecological sustainability;
- Efficiency (stable production and consumption);
- Intergenerational linkage (investment in the future).

Core Green Technologies At the heart of the green economy are green technologies that address not just the symptoms but the root causes of environmental issues. These technologies fundamentally change approaches, products, and critically, consumer behavior. They include:

- Energy efficiency and alternative energy solutions,
- Electrical power management systems,
- Sustainable transport,
- Waste management, and control of air and water emissions [7].

Goals Achieved Through Green Technologies These technologies enable the achievement of several critical objectives set by the modern global economy:

1. Reduction of Environmental Pollution and Enhanced Resource Efficiency: Improvements in construction, manufacturing, agriculture, and infrastructure sectors to minimize environmental impact and maximize resource use efficiency.
2. Mitigation of Adverse Climate Changes: Transition to cleaner, 'green' energy sources such as wind, solar, geothermal, tidal, hydro, bioenergy, and waste-derived energy, as well as the adoption of low-carbon consumption processes including electric and hybrid engines.
3. Reduction of Vulnerability and Adaptation to Climate Changes: Development of early warning systems and technologies resistant to temperature anomalies; enhancement of biodiversity and forest resource management.
4. Enhancement of Well-being Through Sustainable Resource Use: More productive and sustainable utilization of biodiversity resources, including natural cosmetics and pharmaceuticals [8].

Key Features of the Green Economy The green economy is characterized by:

- Efficient use of natural resources,
- Preservation and augmentation of natural capital,
- Reduction of pollution and low carbon emissions,
- Prevention of biodiversity loss,
- Increase in income and employment,
- Overall reduction of anthropogenic strain on the environment.

These characteristics are fundamentally opposed to those of the current model of economic development, suggesting a significant paradigm shift towards sustainability.

Critique of the Current Economic Model Proponents of the green economy believe that the prevailing economic system is flawed, evidenced by frequent crises and market mechanism failures. Although it has achieved certain results in improving the overall quality of life, particularly for specific groups, its negative impacts are significant. These include ecological degradation, depletion of natural capital, widespread poverty, shortages of fresh water, food, and

energy, as well as increased inequality among individuals and nations, all of which pose threats to future generations.

The Concept of the "Brown" Economy This current economic model is often referred to as the "brown" economy. As early as 1934, Simon Kuznets, the creator of the Gross Domestic Product (GDP) concept, warned U.S. senators, "The welfare of a nation can scarcely be inferred from a measure of national income." GDP measures relative prosperity without accounting for social costs and environmental impacts. However, it was not until decades later that the effects on the environment began to be seriously considered. By the latter half of the 20th century, economists began to view the environment as a primary asset generating prosperity but treated in GDP calculations as a constant, leading to the introduction of the term "natural capital"—capital that is, in essence, not depreciated. It was only in the 1970s that efforts were made to assess the "depreciation of nature."

Today's environmental assessments reveal that human activity is currently exceeding Earth's physical capacity by nearly 20%. This overreach is quantified by the ecological footprint, a metric that, when compared against GDP per capita across various nations, shows a distinct pattern: higher GDP tends to correlate with a larger ecological footprint. This relationship underscores the environmental costs associated with increased economic activity and highlights the urgent need for sustainable development practices.

The concept of a green economy is deeply intertwined with the idea of sustainable development, a framework first officially defined in 1983 by the World Commission on Environment and Development. This came about as a response to escalating concerns over the rapid degradation of the environment and its interplay with economic and social growth. The commission's pivotal report, "Our Common Future," laid out a global strategy for addressing these issues, thereby popularizing 'sustainable development'—a term that can trace its roots back to 1962 with the publication of Rachel Carson's influential book, "Silent Spring." Carson's work, which explored the devastating effects of pesticides through a lens of toxicology, ecology, and epidemiology, was instrumental in awakening the public to the scale of environmental crisis prompted by unchecked industrial activities.

Sustainable development is predicated on the effective synergy of economic, social, and ecological components, striving for a balance that allows for the preservation of both the biosphere and human civilization. This approach is not just about conservation but also involves enhancing the quality of life within the bounds of what our natural environment can sustainably support. The green economy seeks to achieve this balance through widespread harmonization of these elements, promoting practices that significantly reduce ecological impact while fostering economic and social wellbeing.

The imperative for this sustainable shift is driven by the detrimental effects of what is often referred to as the "brown" economy, characterized by its intensive use of natural capital at the expense of ecological health and long-term viability. This traditional economic model not only poses risks to our current resources but also threatens the legacy we leave for future generations.

Thus, the transition towards a green economy and more sustainable development practices is crucial. This shift involves rethinking and realigning our economic strategies to support an economy that functions within the ecological limits of our planet, aiming to restore and maintain the health of the global environment while simultaneously advancing human wellbeing. By committing to this path, we embrace a future where economic growth does not come at the expense of our natural world.

Instruments for Greening the Economy:

- States can utilize various tools to facilitate the transition towards a green economy:
- Support in the form of subsidies, reduced tax rates, and tax holidays for new green enterprises;

- Financial support for priority sectors through equity participation;
- Oversight of green enterprises throughout the production stages;
- Emission trading schemes;
- Replacement of outdated and physically worn equipment;
- Development of waste recycling and disposal programs;
- Allocation of an increased number of state educational grants in the field of clean technologies.

The green economy is believed to have significant multiplicative and anti-crisis potential, as it:

- Ensures comparable growth rates and employment levels, helping to alleviate unemployment;
- Stimulates activity in related sectors (allied and supportive), promoting the creation and implementation of advanced green technologies;
- Enhances the overall competitiveness of the economy (for example, Japan's public-private partnership program 3R—Reduce, Reuse, Recycle—is primarily aimed at organizing waste processing and reducing its volume, serving as a crucial prerequisite for creating a "clean city").

Of course, the path to greening the global economy is fraught with risks and challenges. The transition to a green economy requires concerted efforts from global leaders, civil society, and leading companies. Politicians and their electorates must continually strive to reevaluate and revise traditional measures of wealth, prosperity, and well-being. However, perhaps the greatest risk today is the persistence of the status quo.

Currently, the primary responsibility for preserving the remaining biodiversity rests with economically developed countries. It is in these countries that various projects are launched, forums held, and programs designed to stabilize and improve the environmental condition, with most of these initiatives occurring in the energy sector.

At the 40th World Economic Forum held in Davos in 2010 under the slogan "Improve the State of the Planet: Rethink, Redesign, Rebuild," a new global course towards a green economy was declared as the only path for future development.

South Korea was the first country to declare the implementation of the green growth concept as a national strategy. Sweden plans to phase out oil, coal, and gas and switch to renewable energy sources by 2020. Poland has managed to reduce emissions by one-third over the last seventeen years. Japan has developed a Low Carbon Society Action Plan and set low carbon emission standards as a long-term development goal. In the USA, the green economy generates over $600 billion in goods and services (4.2% of GDP), and employment in this sector is estimated at 3 million people. The United Kingdom has become the global leader in the share of the green sector's contribution to GDP at 8.8%.

Growth and Strategies of the Green Economy:

According to some estimates, by 2025, the global market for clean technology is expected to reach 4.4 trillion euros (approximately 6 trillion dollars), indicating an annual growth rate of over 30% and increasing its contribution to global GDP to 67%. By 2020, the market for clean technologies, including the market for low-carbon technologies, is expected to nearly double, with the number of jobs in these sectors almost quadrupling and the contribution of the green economy to global GDP rising to at least 5%.

The adoption of the new energy strategy by the European Union at the 2010 summit, dubbed the "20-20-20 Strategy," was motivated by both a desire to reduce dependence on imported fuels and by environmental concerns. According to this policy, by 2020, CO2 emissions should be reduced

by 20% (compared to 1999 levels), the share of renewable energy in the total energy mix should increase to 20%, and overall energy consumption should decrease by 20%.

Implementing this plan will cost the European Union no less than 1 trillion euros. However, it is expected that energy expenses for each family could be reduced by 1,000 euros per year. According to Britta Thomsen, a member of the European Parliament's Committee on Research and Energy, in addition to saving energy, which will positively affect the climate, Europe could save up significant financial resources: "By 2020, by reducing energy consumption, we could save up to 100 billion euros per year, as well as enhance the EU's energy security, reduce emissions of harmful substances into the atmosphere, and boost the competitiveness of countries and companies."

Another example of the EU's green initiatives is the Eco-design Directive, which establishes mandatory environmental requirements for products associated with high energy consumption that are sold in EU countries. The Eco-design Directive is based on the principle that up to 80% of the adverse effects of excessive energy consumption can be avoided at the design stage of a product. Furthermore, by 2020, the directive is expected to save approximately 12% of the current electricity consumption and further enhance the quality of manufactured products.

In Uzbekistan, particular efforts can be observed through various programs and initiatives, particularly under the broader umbrella of the "Strategy of Actions on Five Priority Development Directions of the Republic of Uzbekistan in 2017-2021." This strategy underscores significant reforms in economic development, social policy, governance, security, and foreign policy, with a strong emphasis on incorporating technology and innovation.

Technological and Innovative Development in Uzbekistan:

Technoparks and Innovation Centers: Uzbekistan has established several technoparks and innovation centers, like the Mirzo Ulugbek Innovation Center, which focuses on ICT development. These centers are designed to foster innovation and research in cutting-edge technologies including nano- and biotechnologies.

Education and Research Funding: Similar to the EU's program, Uzbekistan has been investing in education and research, aiming to align its scientific research with global challenges. The government has been actively reforming its higher education system to better integrate science and technology studies that are pivotal for innovative development.

International Collaboration: Uzbekistan is increasingly engaging in international cooperation to boost its technological prowess. Collaborations with countries like South Korea, Japan, and members of the European Union have been established to learn from their advancements in technology and to foster an exchange of knowledge and resources.

Focus on Eco-friendly Solutions: There is a growing emphasis on developing eco-friendly and sustainable solutions across various sectors, including agriculture and manufacturing, to mitigate environmental impact and promote sustainable practices.

These initiatives reflect Uzbekistan's commitment to harnessing technology and innovation for sustainable development.

BRICS countries possess significant potential for transitioning to sustainable development through the increased use of renewable energy (RE). These nations are gradually shifting from high- to low-carbon economies primarily by developing renewable energy, although joint projects are still in their infancy.

Brazil is a pioneer in using biofuel made from sugarcane ethanol. By 2030, Brazil aims to produce 60 billion liters of bioethanol and 18.5 billion liters of biodiesel annually and plans to convert 80% of its transportation to sugarcane-based biofuel by 2020, supported by tax incentives for biofuel companies. Various "green" institutions like PROINFA, which aims to develop a total of 3,300 MW of alternative energy, and others providing subsidized financing for RE projects, have emerged.

India, despite rapid economic growth, has a significant portion of its population without electricity access. However, the government is promoting RE as an increasingly important part of India's energy mix, adhering to sustainable development principles.

China is currently the world's leading investor in RE, with investment levels 73% higher than those in the USA. The country has several mechanisms supporting RE development, including the 13th Five-Year Plan (2016-2020), which focuses on energy. China aims to increase the production of wind and solar energy and improve its energy supply structure, with ambitious targets for 2020, including substantial increases in wind and solar power capacities and the introduction of new nuclear power capacities.

South Africa, despite its significant potential for RE, has only started major initiatives in the last 10-15 years. Noteworthy programs include the Comprehensive Plan for the Development of Electric Power Resources and the Independent Power Producers Supply Program. The first international conference on RE in Africa was held in October 2015.

These examples illustrate the growing global commitment to developing renewable energy as a cornerstone of sustainable economic growth.

Conclusion

Uzbekistan is actively charting a path towards sustainable development, recognizing the immense potential of its natural resources to transition from traditional fossil fuels to renewable energy sources. This strategic shift is grounded in enhancing energy security and mitigating environmental impacts, embracing solar, wind, and hydroelectric power to tailor a response to its unique geographic and economic context. The government is fostering this transition through international partnerships, forward-thinking policies, and legislative incentives designed to spur the development of green technologies and improve energy efficiency across various sectors.

However, during the global financial and economic crisis, environmental initiatives in Uzbekistan faced setbacks, with reduced funding for ecological programs and delays in the implementation of crucial projects. The focus on profit maximization led businesses to cut back on environmental investments, exacerbating the degradation of the country's environmental landscape. Nonetheless, Uzbekistan can learn from international examples where significant proportions of anti-crisis budgets have been successfully allocated to environmental measures—80.5% in South Korea, 38% in China, 21% in France, and 12% in the USA. These investments have not only addressed immediate ecological challenges but also contributed to long-term environmental resilience.

Despite these challenges, Uzbekistan's abundant resources and ongoing policy reforms lay a solid foundation for a robust green economy. By increasing investments in renewable energy and green technologies, Uzbekistan can enhance its economic resilience, reduce dependency on conventional energy sources, and bolster its competitiveness on the global stage. The government's proactive stance on environmental education and international cooperation is building a strong framework for overcoming existing hurdles and moving towards sustainability.

In conclusion, Uzbekistan's journey towards a green economy is pivotal not only for adopting new technologies but also for fostering an economically stable and environmentally sustainable future. This strategic transformation is expected to improve the quality of life for its citizens, reduce environmental risks, and position Uzbekistan as a leader in sustainable practices in Central Asia. The commitment to a green transition promises to meet immediate economic needs while ensuring the long-term environmental stewardship and resilience necessary to face future challenges.

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