SUSTAINABLE ECONOMY PRINCIPLES, ECOLOGICAL INDUSTRY, AND GREEN TECHNOLOGIES IN UZBEKISTAN: „OPPORTUNITIES OF FEZS''

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Abstract. This article explores the opportunities for implementing sustainable development principles, ecological industry, and green technologies in the Free Economic Zones (FEZ) of Uzbekistan. Special attention is given to the use of renewable energy sources, increasing energy efficiency, introducing environmentally friendly technologies, and reducing the negative impact on the environment. The role of the company "Energy Eco Sources" in developing and implementing innovative solutions for FEZs is also discussed, along with successful projects in solar energy and environmentally clean production processes. This approach contributes to the sustainable development of FEZs and creates the foundation for an environmentally safe and innovative economy in Uzbekistan.

Keywords: Free Economic Zones, sustainable development, green economy, solar energy, renewable energy sources, energy efficiency, environmental safety, environmentally friendly technologies, innovative technologies, "Energy Eco Sources", Uzbekistan, FEZ, zero-waste production.

O‘ZBEKISTONDA BARQAROR IQTISODIYOT TAMOYILLARI, EKOLOGIK SANOAT VA YASHIL TEXNOLOGIYALAR: „EIZLAR IMKONIYATLARI''

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Annotatsiya. Ushbu maqolada O‘zbekistonning Erkin Iqtisodiy Zonalarida (EIZ) yashil iqtisodiyot konsepsiyasining rivojlanishi va quyosh energetikasining ahamiyati tahlil etilgan. Maqolada, ayniqsa, qayta tiklanuvchi energiya manbalaridan foydalanish, ekologik xavfsizlikni ta’minlash, energiya samaradorligini oshirish va

sanoat ishlab chiqarish jarayonlarida ekologik toza texnologiyalarni joriy etish kabi muhim masalalar yoritilgan. EIZlarda amalga oshirilayotgan quyosh energetikasi loyihalari, energiya tejovchi texnologiyalar va chiqindisiz ishlab chiqarish tizimlari orqali barqaror rivojlanishga erishish yo‘llari ko‘rsatilgan. Shuningdek, maqola O‘zbekistonni ekologik xavfsiz va innovatsion iqtisodiyotga yo‘naltirishda EIZlarning muhim rolini ta’kidlaydi va yashil iqtisodiyotga o‘tish jarayonining davom etishini ko‘rsatib o‘tadi.

Kalit so’zlar: Erkin Iqtisodiy Zonalar, yashil iqtisodiyot, quyosh energetikasi, qayta tiklanuvchi energiya manbalari, ekologik xavfsizlik, energiya samaradorligi, barqaror rivojlanish, chiqindisiz ishlab chiqarish, innovatsion texnologiyalar, "Energy Eco Sources", EIZlarda ekologik toza texnologiyalar, energiya tejovchi tizimlar.

ПРИНЦИПЫ УСТОЙЧИВОЙ ЭКОНОМИКИ, ЭКОЛОГИЧЕСКАЯ ПРОМЫШЛЕННОСТЬ И ЗЕЛЕНЫЕ ТЕХНОЛОГИИ В УЗБЕКИСТАНЕ: „ВОЗМОЖНОСТИ ФЭЗ’’

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Аннотация. В данной статье рассматриваются возможности внедрения принципов устойчивого развития, экологической промышленности и зелёных технологий в свободных экономических зонах (СЭЗ) Узбекистана. Особое внимание уделено применению возобновляемых источников энергии, повышению энергоэффективности, внедрению экологически чистых технологий и снижению негативного воздействия на окружающую среду. В статье также освещается роль компании "Energy Eco Sources" в разработке и внедрении инновационных решений для ЭИЗ, а также пример успешных проектов в области солнечной энергетики и экологически чистых производственных процессов. Данный подход способствует устойчивому развитию СЭЗ и создает предпосылки для экологически безопасной и инновационной экономики Узбекистана.

Ключевые слова: Свободные экономические зоны, устойчивое развитие, зелёная экономика, солнечная энергетика, возобновляемые источники энергии, энергоэффективность, экологическая безопасность, экологически чистые технологии, инновационные технологии, "Energy Eco Sources", Узбекистан, СЭЗ, безотходное производство.

Introduction. Today, the issue of environmental sustainability is becoming increasingly urgent worldwide. In the process of economic development, reducing environmental damage, ensuring the efficient use of natural resources, and the widespread implementation of energy-saving technologies have become crucially important. From this perspective, the concept of a **green economy** has emerged as one of the most significant directions of the 21st century.

The green economy is a model aimed at sustainable development that harmonizes economic growth with environmental protection. It encourages the rational use of natural resources, waste reduction, and the deployment of eco-friendly technologies. This approach plays a particularly vital role in the operations of **Free Economic Zones (FEZs)**.

In recent years, the government of Uzbekistan has launched several initiatives to transition toward a green economy and develop environmentally sustainable industrial zones. For instance, the decree "On measures to increase the efficiency of reforms aimed at the transition of the Republic of Uzbekistan to a 'green' economy until 2030" outlines a series of targets focused on using renewable energy sources, increasing energy efficiency, and protecting the environment. Free Economic Zones established across the country play a pivotal role in the industrial and trade sectors, serving as favorable environments for attracting foreign investment, creating new jobs, and introducing innovative technologies. Simultaneously, the number of enterprises implementing green economy principles within these zones is rising, driven by the goal of minimizing negative environmental impacts through sustainable adaptation.

In his article titled "Effectiveness of Managing the Development of Free Economic Zones," **Davron Nizom o‘g‘li To‘xtamurodov (2023)** investigates the activities of free economic zones in managing the effective use of investments. The study explores the foundations and significance of organizing FEZ activities under the conditions of economic modernization. The author offers practical recommendations for improving the management efficiency of free economic zones within Uzbekistan's economy.

In the research presented by **J.A. Turg‘unov**, titled "The Status and Main Directions of Introducing the Green Economy in Our Country," the theoretical foundations of developing a green economy in Uzbekistan are reviewed. The study analyzes the priority directions for ensuring a green economy and "green growth."

Methodology. This study focuses on exploring the current status and future prospects of developing a green economy within Free Economic Zones. Within the scope of the research, initial emphasis was placed on studying secondary sources related to the topic. Specifically, official statistical reports, government decrees, and scientific articles regarding the activities of free economic zones in Uzbekistan, the

implementation of green technologies, and their environmental impacts were analyzed.

Discussion and results. In recent years, a number of new projects and initiatives have been implemented to ensure environmental sustainability within Uzbekistan's Free Economic Zones (FEZs). These zones are primarily territories equipped with special tax incentives, customs privileges, and other economic conveniences. They stand out for their innovative approaches and initiatives aimed at preserving ecological balance.

Developing green technologies and implementing ecological initiatives, such as tree planting campaigns through FEZs, contribute significantly to the country's overall environmental and economic development.

The table below outlines the environmental sustainability initiatives and green technologies currently being implemented in selected Free Economic Zones across Uzbekistan:

Environmentally Sustainable Initiatives in Uzbekistan's Free Economic Zones

1st Table[1]

Free Economic Zones	Industrial Sectors	Green Technologies and Initiatives	Ensuring Environmental Sustainability
Andijan FEZ	Construction materials, metallurgy, and other industrial sectors.	47 enterprises (1 in the energy industry, 12 in construction materials, 8 in the metallurgy industry, and 26 in other sectors); over 10,000 seedlings were planted on 20.5 hectares of land.	Reducing negative environmental impacts and introducing green technologies.
Bukhara FEZ	Energy, construction materials, and other industrial sectors.	68 enterprises (13 in the energy industry, 35 in construction materials, and 20 in other sectors); over 79,000 seedlings were planted on 25.5 hectares of land.	Ensuring ecological safety and developing the green economy.
Navoi FEZ	Construction materials, metallurgy, and other industrial sectors.	Production of solar panels and utilizing renewable energy sources.	Utilizing solar energy and increasing energy efficiency.
Jizzakh FEZ	Construction materials, pharmaceuticals, and industrial manufacturing.	Implementing energy-saving technologies.	Energy conservation and ensuring ecological safety.
Angren FEZ	Construction materials, metallurgy, and other industrial sectors.	Waste recycling and establishing new manufacturing enterprises.	Zero-waste production and enhancing ecological safety.

[1] https://yuz.uz/uz/news/erkin-iqtisodiy-zonalar--rivojlanishning-muhim-omili

The table illustrates the primary industrial sectors, green economy activities, and environmental impacts of each FEZ. Notably, initiatives such as utilizing solar energy, waste recycling, implementing energy-saving technologies, and planting seedlings are driving the sustainable development of these FEZs.

Based on observed trends, Free Economic Zones (FEZs) in Uzbekistan play a crucial role in developing industry and attracting foreign investment. Currently, the country hosts 10 free manufacturing zones, 7 pharmaceutical zones, and 1 zone each dedicated to the development of tourism, fisheries, and the agro-industrial sector. Specifically, 7 new free economic zones specialized in the pharmaceutical sector have been established: "Nukus-farm", "Zomin-farm", "Kosonsoy-farm", "Sirdaryo-farm", "Boysun-farm", "Bo‘stonliq-farm", and "Parkent-farm".

Free economic zones in Uzbekistan serve not only as vital drivers of industrial growth but also create massive opportunities for implementing green economy principles. Solar and wind energy, eco-friendly technologies, zero-waste manufacturing, and green transport systems—all of these represent priority areas for ensuring sustainable development in FEZs, steering the country toward an ecologically safe and innovative economy.

The expansion of solar energy holds significant importance for the advancement of the green economy within FEZs. Today, operating with 17 years of experience in developing energy efficiency and energy-saving technologies in our capital city, the company "Energy Eco Sources" offers solar power plant installations, energy-saving systems, and technologies that enhance energy efficiency. These technologies not only reinforce the energy supply but also guarantee the use of clean, sustainable energy sources. Furthermore, the innovative solar energy systems provided by the company enable manufacturing enterprises within FEZs to conserve energy resources and reduce production costs. This, in turn, makes a substantial contribution to the development of the green economy within FEZs.

Conclusion

Free Economic Zones are of great significance to the economic development of Uzbekistan. If strategic measures for developing green industry are effectively implemented, Uzbekistan could become one of Central Asia's leading eco-friendly industrial hubs. This would serve not only economic growth but also environmental protection, public health, and the creation of favorable living conditions for future generations. FEZs built upon a green economy represent a path toward sustainable development and an investment in the future. Approaches such as solar and wind energy, eco-friendly technologies, zero-waste manufacturing, and green transport systems stand as priority areas for ensuring sustainable development within FEZs, guiding the country toward an ecologically safe and innovative economy.

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