

GREEN TECHNOLOGIES AND SUSTAINABLE ECONOMY:GLOBAL TRENDS AND PROSPECTS

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Abstract: This scientific article discusses green technologies and sustainable development.

Keywords: Green economy, green technologies, energy, natural resources, ecology, sustainability, climate.

In Uzbekistan, one of the key programmatic initiatives aimed at ensuring sustainable development based on the principles of the green economy is the “Strategy for the Transition of the Republic of Uzbekistan to a Green Economy for 2019–2030,” approved by the President of the Republic of Uzbekistan on October 4, 2019. Among the main objectives of the transition to a green economy are increasing energy efficiency in the economy and ensuring the rational consumption of natural resources. These targeted goals are expected to be achieved through technological modernization and the development of financial mechanisms.

During the implementation of the strategy through 2030, the specific greenhouse gas emissions per unit of gross domestic product are expected to decrease by 10% compared to 2010 levels. In addition, it is planned to ensure that 100% of the population and economic sectors have access to modern, affordable, and reliable electricity. The use and production of environmentally improved motor fuels and vehicles will be expanded, and electric transport will be further developed.

Green technologies are technologies designed to achieve ecological sustainability, efficient use of resources, waste reduction and recycling, and mitigation of climate change. These technologies are mainly focused on the use of renewable energy sources, improving energy efficiency, waste management, and reducing environmental footprints. Through green technologies, we can reduce our ecological footprint and move toward sustainable technologies by protecting the environment.

Paving the Way to Sustainable Technologies through Green Technologies

Green technologies are a key instrument in achieving sustainable technologies. Some of their main areas of application include the following:

1. **Renewable Energy Sources:** Utilizing renewable energy sources such as solar, wind, geothermal energy, and biogas enables us to produce sustainable energy. These sources not only generate energy from natural resources but also reduce environmental impact.
2. **Energy Saving and Efficiency Improvement:** Green technologies aim to enhance energy efficiency. They reduce energy consumption through the development of energy-efficient devices, efficient energy systems, and climate-adapted buildings.
3. **Recycling and Waste Management:** Green technologies focus on recycling and reducing waste. For instance, resources can be reused by recycling plastic waste, composting organic waste, and processing industrial waste.
4. **Water Resource Management:** Green technologies help conserve water and improve its quality. For example, advanced irrigation systems and water recycling technologies allow for

the efficient use of water resources.

Green technologies are an essential tool for achieving sustainable technologies, serving to ensure environmental sustainability, conserve resources, and reduce waste. By developing green technologies, it is possible to protect the environment and promote social well-being. For the effective implementation of green technologies, it is necessary to create favorable political and economic conditions. Cooperation between governments, the private sector, and international organizations plays a crucial role in this process. Achieving sustainable technologies through green technologies not only addresses environmental issues but also contributes to solving economic and social problems.

In Uzbekistan, the use and management of natural resources can be significantly improved. The efficiency of natural resource utilization in the country is much lower than that of the European Union and other middle-income countries. In particular, water usage in Uzbekistan remains highly inefficient. The country's energy consumption per unit of GDP is nearly three times higher than the average in Europe and Central Asia, and twice as high as in neighboring Kazakhstan.

At the same time, air pollution from urban and industrial sources—especially during windy, dusty, and stormy days—is exacerbating the drying of agricultural lands and increasing plant vulnerability to diseases. A large proportion of the population is regularly exposed to air considered hazardous to health, leading to a rise in illness and a noticeable decrease in the age of onset for related diseases. The loss of agricultural land due to salinization is becoming increasingly costly for the economy and is caused by interconnected environmental challenges.

To redirect the global economy toward a model of sustainable economic, social, and environmental growth, the principles of the green economy must be integrated into ongoing structural reforms. Experts identify four main channels (and their respective impacts) through which the formation of a green economy and associated structural reforms can become key drivers of economic growth, including contributing to an increase in gross domestic product (GDP).

- First, the transition to a green economy can enhance the input resources of natural, physical, and human capital (these are referred to as input effects). This refers to increasing the productivity of natural resources (such as forests, fisheries, agricultural land, etc.) through more efficient management of natural capital; improving the quality of human capital through better health outcomes; reducing disease prevalence due to improved environmental conditions; and finally, decreasing economic losses associated with physical capital damage by managing ecological risks—such as forest fires, floods, and other natural disasters—more effectively.

- Second, this transition is likely to occur alongside favorable structural changes and will require substantial investments in a range of key systemic sectors—such as energy, construction, housing, and utilities—focused on modernizing production infrastructure, improving energy efficiency, transitioning to alternative technologies, and reducing energy consumption and greenhouse gas emissions. All of these outcomes reflect increased efficiency in the core sectors of the economy (efficiency effect).

- Third, investments aimed at developing “green” infrastructure—including water supply and sanitation systems, and public transport oriented toward alternative fuel sources—are identified as critical drivers of growth. These investments may simultaneously stimulate economic growth on both the supply and demand sides, while also expanding employment and reducing unemployment (particularly important during times of crisis).

- Fourth, the transition to a green economy stimulates innovation activity, including at the firm level (typically measured by R&D expenditures and patent activity). This should be supported by a conducive competitive environment and can be facilitated through regulatory mechanisms such as the implementation of standards and norms.

In conclusion, it should be emphasized that the economic mechanisms of the green economy play an important role in ensuring sustainable development. “Greening” the national economy contributes to increasing the export volume of high value-added products through deep

processing of natural resources, diversifying the export structure, and enhancing the competitiveness of national companies in international markets.

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