The Relevance of Green Technology Integration in International Governance Processes

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Abstract: This article examines the role of international governance in coordinating environmental policies and the relevance of implementing green technologies. In particular, international legal frameworks such as the United Nations Sustainable Development Goals (SDGs) and the Paris Agreement are considered as key instruments for ensuring policy coherence across states. The main trends in the development of green technologies are illustrated through renewable energy, electric vehicles, the circular economy concept, and smart city initiatives. Using Uzbekistan as a case study, the article analyzes renewable energy projects, water-saving technologies, and international cooperation programs, while emphasizing the importance of adapting advanced foreign practices to national conditions. The conclusion argues that the coordinating role of international governance in environmental policy is a crucial factor for the widespread implementation of green technologies and the transition of national economies toward low-carbon development.

Keywords: international governance, green technologies, sustainable development

Introduction. International governance is a complex interconnection between states, international organizations, and transnational corporations, requiring political coordination in addressing global environmental challenges. The 2030 Agenda for Sustainable Development (SDGs), adopted by the UN in 2015 and endorsed by all UN member states, calls on countries to harmonize policies in areas such as climate action, sustainable energy, and efficient resource management. The SDGs clearly define the necessity of "global partnership" and the alignment of national policies with international objectives [1].

Analysis and Results. One of the most central legal instruments of climate policy is the Paris Agreement, adopted at the COP21 Summit in 2015 and entering into force on November 4, 2016. The Paris Agreement obliges states to reduce emissions through their nationally determined contributions (NDCs) and to introduce a global stocktake mechanism every five years to assess collective progress. This encourages the alignment of national policies with international requirements and scientific objectives [2].

In addition, international governance bodies - such as the OECD and other institutions - are strengthening policy coherence between countries and regions, promoting operational actions by monitoring climate finance flows, and grounding decisions in scientific evidence. According to OECD data, in line with IPCC recommendations, to limit global warming to 1.5°C by 2030, greenhouse gas (GHG) emissions must be reduced by approximately 43% compared to 2019 levels [3]. However, current national commitments do not fully bridge this gap, which underscores the urgent need to align national policies with the Paris objectives.

Another important aspect is the harmonization of regional and sectoral initiatives (for example, the European Union's European Green Deal) with national and corporate strategies, directing them toward green investments, technological transition, and carbon neutrality. Such block-level policies encourage the adoption of green technologies not only through regulatory pressure but also via economic incentives, such as subsidies, taxation, and green bonds [4].

The function of international governance in coordinating environmental policy is not merely a legal or diplomatic obligation but serves as a central mechanism for shaping practical changes through scientific objectives, financial flows, and regional strategies. Through this mechanism, it is possible to implement green technologies on a large scale and adapt national economies to low-carbon development [5]. Over the last decade, several significant trends have been observed in the development of green technologies.

Firstly, renewable energy sources are expanding. For instance, in 2021 nearly 80 percent of newly installed global power capacity came from renewable energy sources, with the largest share accounted for by solar and wind power plants [6]. China, the United States, and India are recognized as leaders in this field.

Secondly, the use of electric and hybrid vehicles in the transport sector is rapidly increasing. According to a BloombergNEF (2023) report [7], by 2030 more than 200 million electric vehicles are expected to be on the roads. This process not only reduces carbon emissions but also significantly decreases global demand for oil.

Thirdly, in the field of waste management, the concept of a "circular economy" is being widely implemented. This approach is based on the reuse and recycling of resources throughout the entire process - from production to consumption and disposal. In the European Union, for example, recycled waste accounts for 47 percent of total waste generated [8].

Fourthly, "smart city" projects are expanding. The smart city concept is based on the efficient management of energy, water, and transport systems through digital technologies. According to McKinsey Global Institute (2018) [9], the large-scale introduction of smart city technologies can reduce urban energy consumption by 20–30 percent. Overall, these trends outline the main directions that integrate international governance with ecological sustainability.

Transnational corporations (TNCs), as the largest players in the global economy, play a significant role in the widespread adoption of green technologies. Since the activities of TNCs impact many countries, their environmental strategies have become an integral part of the international governance system. For example, Tesla Inc., through the popularization of electric vehicles and renewable energy solutions, has provided a strong impetus for the automotive industry's transition to carbon neutrality [10]. Apple has announced its goal to achieve carbon neutrality across its entire value chain by 2030 and has already transitioned all of its offices and manufacturing facilities to 100% renewable energy [11]. Similarly, Toyota is taking the lead in green transportation through its "Hybrid Synergy Drive" technology and the development of hydrogen-powered vehicles [12].

In recent years, ESG (Environmental, Social, Governance) standards have emerged as the primary criteria for assessing the environmental responsibility of transnational corporations (TNCs). ESG indicators allow for the evaluation of companies' performance not only in terms of economic efficiency but also in ecological and social sustainability. For example, in its 2022 report, MSCI ESG Ratings assessed more than 2,800 major corporations worldwide, of which over 70 percent strengthened their commitments in at least one environmental indicator [13]. The World Bank also emphasizes that the adoption of ESG standards can facilitate the formation of sustainable financial flows [14].

Green technologies not only ensure environmental safety but also play an important role in enhancing economic efficiency.

Firstly, the efficient use of resources significantly reduces energy and raw material consumption in the production process. According to the International Labour Organization's estimates [15], the widespread implementation of the green economy concept could increase global GDP by 4.2 percent by 2030.

Secondly, green technologies create new opportunities in the labor market. For instance, in 2022 more than 13 million people were employed in the renewable energy sector, and this figure is projected to reach 38 million by 2030 [16]. This trend strengthens not only economic growth but also social stability.

Thirdly, green technologies are shaping new segments of financial markets. “Green finance” mechanisms, particularly the green bonds market, are rapidly expanding. In 2023, the global volume of green bonds exceeded USD 2 trillion, reflecting the growing interest of international investors in environmental projects [17]. Moreover, according to OECD (2022) [18], at least USD 6.9 trillion in annual investments will be required to achieve carbon neutrality by 2050 through the promotion of green investments.

Overall, green technologies are becoming a key factor not only in ensuring ecological sustainability but also in strengthening economic resilience through economic growth, employment generation, and the formation of sustainable investments.

In recent years, the development of green economy principles in Uzbekistan has become one of the government’s priority policy directions. The “Green Economy Transition Strategy,” adopted in 2019 [19], serves as the country’s main conceptual framework for sustainable development. Within this strategy, a series of measures have been implemented to promote renewable energy sources, ensure efficient use of resources, and maintain ecological sustainability.

Significant projects for the construction of solar and wind power plants are being implemented. For example, in 2021, in cooperation with the Masdar company from the United Arab Emirates, the 100 MW Nur-Navoi Solar Power Plant was commissioned. Additionally, in 2023, large-scale wind power projects began in the Qashqadaryo and Bukhara regions [20].

Furthermore, water-saving technologies are being widely introduced. According to the 2022 report of the Ministry of Agriculture of the Republic of Uzbekistan, drip irrigation systems have been implemented on more than one million hectares, reducing water consumption by an average of 40 percent.

The adoption of international experience is also a key direction. For instance, China’s investments in renewable energy, Germany’s “Energiewende” program, and South Korea’s “Green Growth” strategy serve as effective models for Uzbekistan. These experiences are applied in the country to implement environmentally friendly production, improve energy efficiency, and develop sustainable agriculture projects.

Overall, Uzbekistan aims to achieve sustainable development by expanding international cooperation in the green economy transition and integrating national experience with advanced foreign practices.

Conclusion. Integrating green technologies into the international governance system is one of the central issues of today’s global economic and ecological agenda. Analyses indicate that cooperation among international organizations, states, and transnational corporations plays a decisive role in ensuring ecological security and achieving sustainable development goals. The United Nations’ Sustainable Development Goals, the Paris Climate Agreement, and other international initiatives provide an important legal and institutional basis for coordinating national environmental policies.

Green technologies not only protect the environment but also enhance economic efficiency. Renewable energy, electric vehicles, waste recycling, and “smart city” concepts are creating new markets and investment flows. In this process, transnational corporations and ESG standards play a crucial role as practical expressions of international governance mechanisms.

The experience of Uzbekistan demonstrates that renewable energy projects, water-saving technologies, and resource-efficient initiatives implemented through international cooperation are important steps in aligning the national economy with low-carbon development. Therefore, the coordinating role of international governance should be considered one of the key factors in the widespread implementation of green technologies and the promotion of sustainable development at both national and global levels.

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