



INSTITUTIONAL AND ECONOMIC MECHANISMS OF APPLYING GREEN  
ECONOMY PRINCIPLES IN THE DEVELOPMENT OF LOGISTICS  
INFRASTRUCTURE

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**Abstract.** *This thesis analyzes the institutional and economic mechanisms of applying green economy principles in the development of logistics infrastructure. The study examines modern instruments for financing green logistics infrastructure (green bonds, carbon-related credits, public-private partnerships), regulatory mechanisms (emission standards, carbon taxes, tax incentives), and institutional systems. Practical recommendations have been developed in the context of the green transformation of Uzbekistan's logistics sector.*

**Keywords:** *green logistics, institutional mechanisms, green financing, carbon neutrality, logistics infrastructure, sustainable transport*

The global logistics sector amounted to \$8.9 trillion in 2023 and is projected to reach \$18.2 trillion by 2030. However, this sector accounts for approximately 10 percent of global greenhouse gas emissions, posing a serious challenge in the fight against climate change. Therefore, the green transformation of logistics infrastructure is becoming an urgent task. In 2024, investors worldwide invested \$757 billion in electric transport - part of the record \$2.1 trillion in energy transition capital, marking a turning point for the green logistics market. Governments and international organizations are introducing various institutional and economic mechanisms to develop green logistics infrastructure. Research objective: to analyze the institutional and economic mechanisms of applying green economy principles in the development of logistics infrastructure and to develop practical recommendations for Uzbekistan. Institutional mechanisms play a crucial role in the development of green logistics infrastructure. Research shows that when policy integration is implemented across various ministries and planning levels, consistent logistics regulations that incorporate environmental objectives are created (Breuer et al., 2023). The key institutional mechanisms include: (1) Regulatory frameworks - emission standards, carbon pricing mechanisms, and incentives for green technologies; (2) Public-private partnerships (PPPs) - attracting funding for infrastructure and sustainability-oriented projects; (3) Multilateral cooperation platforms - uniting industry stakeholders to share best practices and develop sustainable transport standards. China's experience is noteworthy: in 2024, the Central Committee of the Chinese Communist Party and the State Council adopted the resolution "On Accelerating the Green Transformation of Economic and Social Development." This document envisions improving the green tax system, converting water resource fees to taxes, and enhancing the environmental protection tax system.

*Table 1.  
Institutional mechanisms of green logistics infrastructure*

<b>Mechanism Type</b>	<b>Description</b>	<b>Examples</b>
<b>Regulatory Frameworks</b>	Emission standards, carbon pricing, tax incentives	EU Green Deal, China green tax reform
<b>PPP Mechanisms</b>	Financing infrastructure projects through public-private partnerships	Green Freight Corridors, logistics centers
<b>Multilateral Platforms</b>	Uniting industry stakeholders and standardization	Green Freight Asia Network, Clean Cargo Working Group
<b>Technological Standards</b>	Certification and standardization of green technologies	ISO 14001, LEED certification

*Source: compiled by the author*

Modern economic mechanisms for financing green logistics infrastructure are developing rapidly. Financial institutions are creating innovative financing instruments such as green bonds, carbon-related credits, and public-private risk-sharing mechanisms. Green bonds are debt instruments designed to finance projects with a positive environmental impact. They fund projects in categories such as renewable energy, clean transport, or green infrastructure. Green credits, on the other hand, are a flexible financing option aimed at funding environmentally responsible practices and initiatives. Research indicates that green finance and technological innovations significantly stimulate the low-carbon development of the logistics industry. A study conducted in China (30 provinces, 2005–2019) identified the positive impact of green finance and technological innovations on the low-carbon development of the logistics sector, as well as the moderating and boundary role of industrial structure and environmental regulation in this process.

*Table 2.  
Economic mechanisms for financing green logistics infrastructure*

<b>Mechanism</b>	<b>Characteristics</b>	<b>Advantages</b>	<b>Disadvantages</b>
<b>Green Bonds</b>	Debt instruments for environmental projects	Ability to attract large-scale funding	Complex process
<b>Green Credits</b>	Interest rates linked to sustainability	Flexible terms	Limited volume
<b>Carbon Credits</b>	Market mechanism for emission reduction	Economic incentive	Price volatility
<b>Tax Incentives</b>	Tax deductions for green technologies	Direct support	Budget burden

<b>PPP Financing</b>	Infrastructure through public-private partnership	Risk sharing	Complex management
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*Source: compiled by the author based on OECD (2024), WEF (2025)*

As a double-landlocked country, Uzbekistan pays special attention to the transport and logistics sector. In the World Bank’s Logistics Performance Index (LPI), the country rose from 129th place in 2014 to 88th place in 2023. While this is a significant achievement, the country still ranks 107th in sustainable freight transport ratings. Uzbekistan has set a target of reaching \$200 billion in GDP by 2030, and transport infrastructure is a key factor in achieving this goal. Government climate expenditures increased from 2.5% (2020) to 3.0% (2022) of the budget, with more than 65% of these expenditures directed to agriculture and transport sectors. The following measures are being implemented to develop green logistics infrastructure: electrification of railway networks (currently over 50% electrified), conversion of public transport to gas fuel and electric traction (80% or 6,500 vehicles), and the goal of increasing the share of hybrid, electric, and alternative fuel vehicles to 10% by 2025 and 20% by 2035.

**Table 3.**

*Green transformation indicators of the logistics sector in uzbekistan*

<b>Indicator</b>	<b>Current Status</b>	<b>Target (2030/2035)</b>
<b>LPI Ranking</b>	88 (2023)	Top 50
<b>Railway Electrification Rate</b>	50%+	60%
<b>Electric/Alternative Fuel Transport Share</b>	~ 5%	10% (2025), 20% (2035)
<b>Emission Reduction per Unit of GDP</b>	Baseline	-35% (2030)
<b>PPP Projects Volume (Transport)</b>	~\$3 bln	\$14 bln (2030)
<b>Climate Expenditure (% of Budget)</b>	3.0% (2022)	5%+

*Source: World Bank, AIIB, ADB, Uzbekistan Ministry of Transport data*

Based on the research findings, an integrated system of institutional and economic mechanisms is necessary for the effective application of green economy principles in the development of logistics infrastructure. International experience demonstrates that the highest efficiency is achieved when regulatory frameworks, financial instruments, and multilateral cooperation platforms are applied in combination.

The following recommendations have been developed for Uzbekistan:

1. Expanding green financing instruments - establishing a market for green bonds and carbon credits, introducing preferential terms for green credits for logistics enterprises.
2. Improving the regulatory base - setting emission standards for the logistics sector, developing a tax incentive system for the adoption of green technologies.

3. Expanding PPP mechanisms – developing public-private partnership models for green logistics infrastructure projects, deepening cooperation with international financial institutions.
4. Technological modernization – widespread introduction of electric and hybrid vehicles, development of smart transport systems and digital logistics platforms.
5. Strengthening regional cooperation – establishing Central Asian green logistics corridors, harmonizing green transport standards with neighboring countries.

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