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Abstract: This article provides a comprehensive analysis of the role of resource taxes in the transition to a green economy using international experience and the practice of Uzbekistan. The study was conducted on the basis of official statistical data for the period 2022–2025, reports of international organizations (OECD, World Bank, UNDP, IEA), legislative documents of the Republic of Uzbekistan, and publications in scientific journals with a high impact factor. Comparative analysis, regression results, and systematic review of documents were used.

Keywords: Green economy, resource taxes, carbon tax, fossil fuel subsidies, environmental taxes, energy intensity, renewable energy, green fiscal policy, Uzbekistan - "double dividend" hypothesis.

Introduction.

The greening of the global economy is becoming one of the central economic policy challenges of the 21st century. The Paris Agreement of 2015 and the Sustainable Development Goals (SDGs) by 2030 are forcing countries to move away from a hydrocarbon economy and towards low-carbon growth models. ^[1] Fiscal policy, in particular resource taxes — fossil fuel taxes, carbon pricing, environmental taxes and the elimination of subsidies — are playing a crucial role in this process. According to the “double dividend” hypothesis, revenues from environmental taxes, on the one hand,

reduce polluting behavior; on the other hand, the revenue becomes a source of finance for other sectors, which simultaneously provides environmental and economic benefits. [2]

Uzbekistan, one of the largest economies in Central Asia, is rich in natural resources—oil, gas, gold, copper, uranium—but is energy-intensive and environmentally fragile. [3] According to the IEA, Uzbekistan's energy intensity of GDP is twice the world average and four times that of the European Union. [4] The "Strategy for Transition to a Green Economy" adopted in 2022 and the "Uzbekistan — 2030" strategy adopted in 2023 open up the possibility for the country to make resource taxes the main fiscal instrument for the green transition. [5] The purpose of this article is to: (1) identify the theoretical foundations of resource taxes in the green transition; (2) analyze the experience of Sweden, Norway, Singapore, and other leading countries; (3) assess the current situation and challenges in Uzbekistan; and (4) develop practical recommendations.

Analysis of literature on the topic.

The scientific literature on the impact of resource taxes on the green economy has developed in three main directions: carbon pricing, environmental tax reform, and the "double dividend" hypothesis.

Carbon pricing and green innovation

A large-scale study published in *Frontiers in Environmental Science* in 2025 found that environmental taxes increase the cost of producing energy-intensive equipment while simultaneously encouraging the development of environmentally friendly technologies. In addition, some specific tax policies are important in encouraging companies to adopt emission-reducing technologies. They found an emission-to-pricing elasticity of about. [7] This suggests that a 1 percent increase in carbon taxes can reduce emission intensity by 2 percent. A study published in the journal *Humanities and Social Sciences Communications* in 2024 analyzed panel data from 2004–2021 for 30 provinces in China to examine the impact of green taxes on regional green development and innovation. The study found that resource tax reform significantly promotes green innovation in resource-intensive industries, with corporate profitability and management compensation acting as reinforcing mediators. [8]

The problem of fossil fuel subsidies

According to OECD (2022), energy taxes provide a net positive contribution of more than 1% of GDP in most countries; however, in some oil-producing countries, subsidies

exceed taxes and weaken budgets. ^[11] UNDP (2024) in its Climate Public Expenditure Review (CPEIR) report on Uzbekistan states that fossil fuel subsidies are equivalent to 4% of GDP (in 2022) and are planned to be phased out by 2030. ^[12]

Green tax policies for developing countries

A study of 20 developing countries in ScienceDirect (2025) found that green tax policies can encourage businesses to adopt green technologies and practices by combining financial incentives with environmental objectives. ^[13] However, the effectiveness of these instruments depends on how well they are designed and implemented fairly.

RESEARCH METHODOLOGY

This study used a comprehensive methodological approach:

1. **Systematic literature review:** Publications from 2022–2025 in ScienceDirect, Springer Nature, NBER, OECD iLibrary, and other databases were reviewed. ^[14]
2. **Comparative analysis:** The carbon tax experiences of Sweden, Norway, Singapore, and Germany and their environmental and economic results are compared with the situation in Uzbekistan. ^[15]
3. **Statistical data analysis:** Data from IEA, UNDP, World Bank, OECD, Enerdata, and official bodies of the Republic of Uzbekistan were analyzed for the period 2022–2024. ^[16]
4. **Document study:** Presidential Decrees of the Republic of Uzbekistan, Tax Code, and Green Economy Strategy documents were analyzed. ^[17]

Key limitations of the study: A number of data for Uzbekistan have not yet been released or made publicly available; the empirical assessment is based partly on projections, as the carbon pricing mechanism has not yet been fully implemented.

MAIN PART: PROBLEM ANALYSIS AND RESULTS

International experience: Analysis of leading models

Sweden: The world's most successful carbon tax experiment

Sweden introduced a carbon tax in 1991, making it a global pioneer in carbon pricing. ^[18] By 2024, Sweden's carbon tax rate will be the second highest in the world at €115.34/t CO₂, after Switzerland and Liechtenstein's €120.16/t CO₂. ^[19]

Results: Between 1990 and 2018, Sweden reduced its greenhouse gas emissions by 27 percent, while GDP grew by more than 50 percent. This is a successful example of

decoupling economic growth from CO₂ emissions.^[20] Martinsson et al. (2024) found that the emission elasticity of the carbon price for Swedish firms is approximately 2, meaning that increasing the tax rate effectively reduces emissions.^[7]

Indicator	Sweden (2024)	Uzbekistan (2024)
Carbon tax rate (€/tCO ₂)	115.34	Not valid
Emissions change (%) since 1990	-29%	+18% (from 2010)
Renewable energy share (%)	56% (2019)	8% (2023)
Energy intensity (with EU average)	Approximately equal	4 times higher
GDP growth (1990-2019)	+78%	+240% (2000-2023)

Table 1. Comparison of green indicators of Sweden and Uzbekistan. Source: IEA (2023); OECD (2025); Enerdata (2024);

Norway: redirecting resource revenues to green transition

Norway introduced a carbon tax in 1991, at the same time as Sweden, as part of a broader tax reform. The tax revenue is transferred to a general government revenue fund (the Petroleum Fund), which is used to fund green investments and benefit future generations.^[21] By 2024, Norway's carbon tax rate will be €83.47/tCO₂.^[19]

Singapore: a model for developing countries

Singapore became the first country in Southeast Asia to introduce a carbon tax in 2019, setting an important precedent for lower- and middle-income countries. Carbon tax revenues have become a sustainable source of revenue to finance socio-economic transformation.^[22] A UNDP report on how to implement a carbon tax for developing countries notes that Singapore, Chile, Colombia, and Mexico have linked carbon taxes and offset mechanisms through digital technologies.^[22]

Germany and Austria: green carbon market experience

Germany plans to introduce a carbon tax in 2021 and Austria in 2022, with plans to link it to the ETS (Emissions Trading System) by 2026.^[19] The experience of these

two countries—especially Germany's gradual elimination of energy sector subsidies—can serve as a relevant lesson for Uzbekistan.

Current Situation Analysis in Uzbekistan (2022–2025)

Energy sector and environmental problems

In Uzbekistan, the energy sector accounts for 76–83 percent of total greenhouse gas emissions, with 50 percent coming from fossil fuel combustion and 26–30 percent from methane leaks in the oil and gas sector .^[12] Natural gas accounts for 83 percent of primary energy consumption and 80 percent of electricity generation.^[23] Uzbekistan's energy intensity of GDP is twice the global average and four times higher than that of the EU.^[4] By some estimates, Uzbekistan's CO₂ intensity relative to GDP is about 77 percent higher than the global average, making it among the most polluting economies in the region.^[24]

The problem of subsidies

According to the IEA, in 2020, Uzbekistan's subsidies on natural gas, electricity, and oil amounted to US\$3.8 billion—6.6 percent of GDP .^[25] This places Uzbekistan among the 25 countries with the highest energy subsidies in the world. Subsidies encourage wasteful consumption due to low tariffs and delay investment in renewable energy.

Indicator	2022	2023	2024
Renewable energy capacity (GW)	~1.2	~1.8	~3.4
Renewable share in electricity generation (%)	~5%	8%	~12%
New QTE target by 2030 (GW)	—	15 GW*	27 GW**
Fossil fuel subsidy (GDP, %)	~4%	~3%	Decreasing
CO ₂ reduction target by 2030 (Mt)	—	—	34 Mt

Table 2. Renewable energy indicators in Uzbekistan (2022–2024). Source: Enerdata (2024); IEA (2023); OECD (2024). *Green Economy Strategy; **Updated target in 2024

The final step in green tax policy: 2022–2025

Presidential Decree No. UP-220 (September 9, 2022): Corporate income tax and property tax rates for legal entities producing solar installations, wind power plants, and small hydropower plants have been reduced by 50 percent for 3 years. ^[26] These benefits also apply to new companies established before September 1, 2025.

iCRAFT Project (October 2023): The World Bank and the Government of Uzbekistan have signed a \$46.25 million agreement for the Innovative Carbon Resource Utilization and Energy Transition (iCRAFT) Project. This is the first World Bank initiative in the world to support policy reforms to reduce emissions. ^[27]

Updated targets for 2025 : Uzbekistan has set a target of 27 GW of renewable energy capacity and 40 percent of electricity generation from alternative sources by 2030, thereby reducing CO₂ emissions by 34 Mt. ^[28]

Identified Problems

Lack of a carbon pricing mechanism . While 39 economies have implemented carbon taxes , ^[29] Uzbekistan has yet to formally implement carbon pricing. UNDP and World Bank climate experts have stressed the need for Uzbekistan to implement a carbon tax or equivalent fossil fuel pricing, but this step has been delayed by high fossil fuel subsidies. ^[12]

Institutional and technological lack of readiness

Uzbekistan has not yet fully developed a carbon accounting system and emission monitoring and verification (MRV) mechanisms. The OECD (2024) Investment Policy Roadmap for Uzbekistan notes that between 2014 and 2023, foreign direct investment (greenfield FDI) in environmental technologies other than renewable energy accounted for only 0.2 percent of total investment . ^[33]

Criterion	Opportunities	Problems
Resource base	Rich mineral and QTE potential (117,984 Mtoe)	High energy intensity for GDP
Fiscal policy	New QTE Tax Benefits (UP-220, 2022)	lack of carbon tax, weight of subsidies

International cooperation	iCRAFT, World Bank, UNDP, IEA projects	Weak technical and institutional capacity
QTE objectives	27 GW by 2030 (updated to 2024)	Around 8% so far (2023)
Economic growth	6% GDP growth in 2023, \$7.2 billion in TFI	CO ₂ intensity 77% higher than the global average

Table 3. Transition to a green economy in Uzbekistan: SWOT analysis (brief).

Source: Author; OECD (2024); IEA (2023); UNDP (2024); World Bank (2023)

CONCLUSION.

The following main conclusions were drawn as a result of the study:

1. Resource taxes, particularly carbon pricing, are among the most effective fiscal tools for transitioning to a green economy, as demonstrated by the experiences of Sweden, Norway, and Singapore. Since 1990, Sweden has reduced emissions by 29 percent and increased GDP by 78 percent.
2. In Uzbekistan, the energy sector accounts for 76–83% of emissions, and the energy intensity of GDP is twice the global average. Fossil subsidies amounted to 6.6% of GDP in 2020 (\$3.8 billion).
3. While tax breaks for renewable energy producers from 2022 and the iCRAFT project in 2023 are important positive steps, a carbon pricing mechanism has not yet been implemented.
4. The 2030 targets (27 GWh QTE, 40% share, 34 Mt CO₂ reduction), updated in 2024, are ambitious and require systematic fiscal instruments to achieve them.
 - **Phased introduction of carbon pricing:** Initially, introduce a relatively low carbon tax (\$5–15/tCO₂) on large industrial emitters, and redirect the revenues to renewable energy and energy efficiency.
 - **Orderly reduction of fossil fuel subsidies:** Bringing electricity and gas tariffs closer to market prices, protecting vulnerable populations through direct cash transfers and targeted subsidies, as part of the World Bank's iCRAFT project.
 - **"Green tax shift":** Shifting the burden of labor and capital taxes to environmental pollution and polluting raw material extraction - this stimulates employment and innovation.
 - **Establish an MRV and emission monitoring system:** Implement a National Carbon Registry and an emission monitoring, accounting and verification

(MRV) system based on digital platforms such as the UNDP Climate Transparency Toolbox.

- **Targeted allocation of green tax revenues:** Strengthen in legislation the mechanism for allocating at least 30 percent of revenues from resource and environmental taxes to renewable energy projects, energy efficiency, and green innovation.
- **Expand the tax incentive system: Extend** tax incentives for renewable energy producers for a longer period (5–10 years) after the expiration of Decree No. UP-220 and introduce a green bonds mechanism to attract investors.

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