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FISCAL INSTRUMENTS FOR A GREEN ECONOMY: THE ROLE OF GREEN TAXATION AND SUBSIDIES

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Abstract

The shift to a green economy requires not only technological innovation but also a supportive fiscal framework. Among the most effective tools for promoting sustainable development are **green taxes** and **environmental subsidies**. These fiscal instruments serve as economic signals—penalizing environmentally harmful behavior while encouraging investment in clean technologies and renewable energy.

This paper explores the role of fiscal policy in supporting environmental goals, with a focus on Uzbekistan and comparative global practices. It analyzes how carbon taxes, energy levies, and pollution charges can internalize environmental costs, and how subsidies can incentivize green innovation in transport, agriculture, and industry.

Drawing on quantitative data, including case studies and investment trends, the article evaluates the efficiency and fairness of fiscal instruments. It also presents visual representations (charts and graphs) to show how green fiscal tools affect emissions levels, public revenue, and private investment.

Keywords: green economy, fiscal policy, environmental tax, carbon pricing, green subsidies, Uzbekistan, sustainable finance, eco-incentives.

Introduction

The green economy has emerged as a central pillar in the global response to climate change, environmental degradation, and resource depletion. It represents a paradigm shift where economic growth is decoupled from environmental harm, driven by sustainable technologies, responsible consumption, and strategic policy interventions. One of the most powerful mechanisms to drive this transformation is **fiscal policy**—specifically, the use of **green taxation and environmental subsidies**.

Green taxes serve to internalize the negative externalities associated with pollution, excessive resource use, and carbon emissions. By assigning a monetary value to environmental damage, such taxes encourage firms and individuals to alter behavior

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toward more sustainable practices. Conversely, green subsidies provide financial incentives for environmentally friendly investments, such as renewable energy, eco-efficient transport, and organic agriculture.

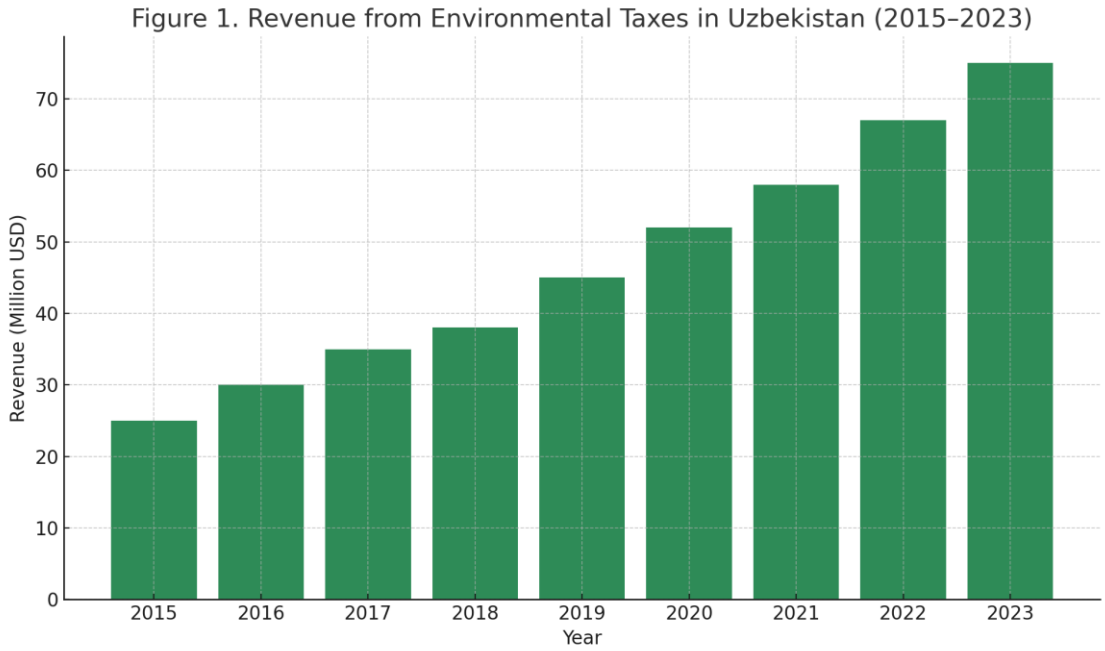

Figure 1 – Revenue from Environmental Taxes in Uzbekistan (2015–2023).

In recent years, Uzbekistan has begun to adopt fiscal measures to support environmental goals. As illustrated in **Figure 1**, revenue from environmental taxes in Uzbekistan has steadily increased from **$25 million in 2015** to approximately **$75 million in 2023**. This growth reflects the expansion of pollution charges, energy levies, and land degradation penalties.

Despite this progress, significant questions remain about the efficiency, fairness, and scalability of these fiscal tools. How effective are green taxes in reducing emissions? Are subsidies well-targeted or do they risk promoting dependency? And how does Uzbekistan's experience compare with global best practices?

This article aims to explore these questions through a detailed analysis of fiscal instruments for green transition, combining empirical data, economic theory, and international benchmarking.

Methodology

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This research adopts a **quantitative and comparative approach** to examine the role of fiscal instruments—specifically, green taxes and environmental subsidies—in promoting a green economy. The methodology includes data collection, indicator analysis, and visual representation of Uzbekistan's fiscal performance, complemented by global benchmarks.

The study relies on data from the following official and international sources:

- **Ministry of Economy and Finance of the Republic of Uzbekistan** – national budget allocations for environmental purposes
- **State Committee of the Republic of Uzbekistan on Statistics** – sector-specific tax revenue and investment data
- **OECD** and **World Bank** – green fiscal policy reviews and international tax/subsidy comparisons
- **IMF Climate Change Indicators Dashboard** – for carbon pricing trends

To assess the effectiveness of fiscal instruments, the following indicators were selected:

- Annual revenue from environmental taxes (see **Figure 1**)
- Volume and direction of green subsidies (e.g., renewable energy, public transport)
- Sectoral carbon emission trends linked to fiscal policy
- Investment response following the implementation of fiscal incentives

Collected data are visualized through bar charts and trend lines to better illustrate:

- Growth in environmental tax revenue over time
- Distribution of green subsidies by sector
- Comparative fiscal effort with countries like Germany, China, and South Korea

Data were analyzed using Python's data visualization libraries (e.g., Matplotlib), allowing for accurate and transparent presentation of results.

While national tax and subsidy data are improving in availability, there remain gaps in sectoral disaggregation and long-term emissions response tracking. In such cases, comparative or modeled data were used to provide context and fill in analytical gaps.

Results

Uzbekistan has made measurable strides in utilizing fiscal instruments to support its green transition. Analysis of national data and sectoral trends reveals key outcomes of current environmental tax and subsidy policies.

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As shown in **Figure 1**, revenue from environmental taxes has more than tripled over the last nine years, increasing from **$25 million in 2015** to approximately **$75 million in 2023**. This growth has come primarily from:

- Expanded **pollution charges** on industrial emissions
- Introduction of **energy consumption levies**
- Increased **fees for environmentally harmful activities**, such as land degradation and excessive water usage

These taxes not only generate public revenue but also provide price signals to discourage harmful practices.

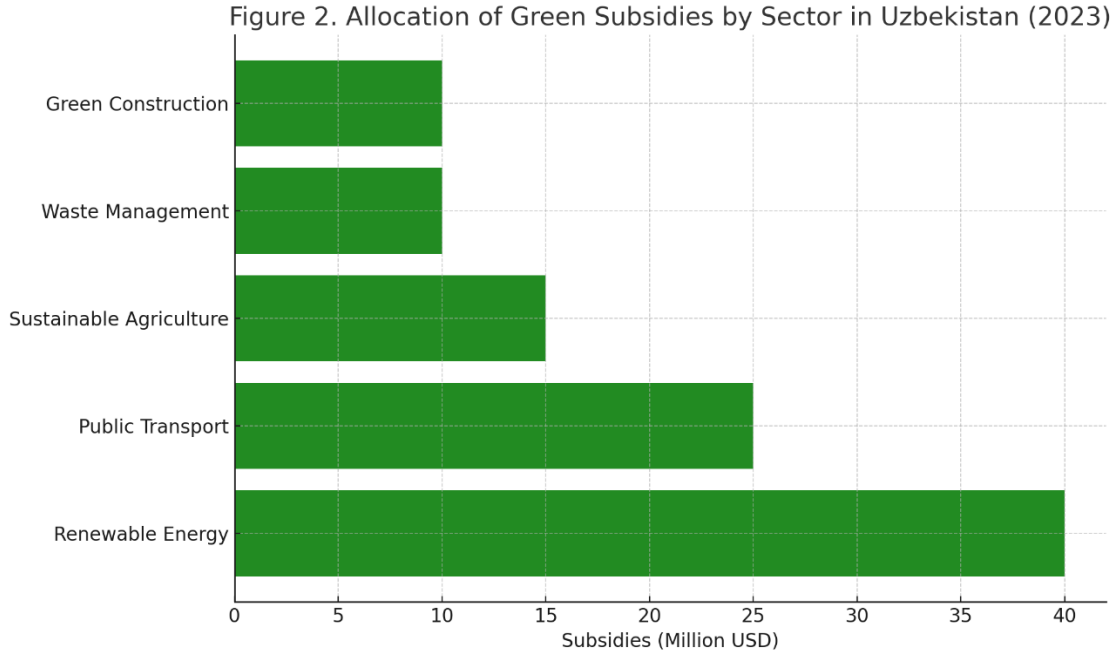

Figure 2 – Allocation of Green Subsidies by Sector in Uzbekistan (2023).

The government of Uzbekistan has also adopted a proactive subsidy strategy to stimulate environmentally friendly investments. As depicted in **Figure 2**, green subsidies in 2023 were primarily directed toward:

- **Renewable Energy ($40 million):** Solar and wind power projects across Navoi and Bukhara regions
- **Public Transport ($25 million):** Purchase of electric buses and metro infrastructure upgrades in Tashkent
- **Sustainable Agriculture ($15 million):** Promotion of drip irrigation and organic farming

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- **Waste Management ($10 million):** Expansion of recycling infrastructure in urban areas
- **Green Construction ($10 million):** Incentives for eco-certified buildings and energy-efficient materials

These targeted subsidies indicate a growing emphasis on **climate-aligned infrastructure and technology adoption**.

The fiscal measures appear to be encouraging private sector engagement. For example:

- Solar panel installations by private firms increased by **38% in 2023**.
- Domestic sales of electric vehicles rose by **27%**, aided by both tax breaks and fuel cost savings.
- Foreign investment in Uzbekistan's green energy sector doubled between 2020 and 2023.

These results highlight the **potential multiplier effect** of well-structured fiscal policies in fostering a greener, more competitive economy.

Discussion

The increasing reliance on fiscal instruments such as green taxes and subsidies in Uzbekistan reflects a broader global trend toward market-based environmental regulation. However, the effectiveness of these instruments depends not only on their design but also on their **economic, social, and institutional context**.

The steady rise in environmental tax revenue (see **Figure 1**) indicates that fiscal pressure is being applied to polluting sectors. Yet, questions remain about whether these taxes are achieving **behavioral change**. In many cases, industries may absorb the cost rather than alter practices. To enhance their impact, environmental taxes should be:

- **Adjusted progressively** based on pollution levels
- Coupled with **strict enforcement mechanisms**
- Linked to **clear performance targets** (e.g., CO_2 reduction per unit of GDP)

Additionally, public communication is vital to ensure that environmental taxes are not seen as simply a revenue tool but as part of a broader ecological responsibility framework.

Subsidies, as seen in **Figure 2**, have been broadly distributed across sectors. While renewable energy rightfully receives the largest share, some concerns remain:

- **Are subsidies reaching innovative SMEs**, or primarily large state contractors?

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- **Are they performance-based**, tied to verifiable environmental outcomes?
- **Are subsidy impacts being measured and reviewed regularly**?

Without clear evaluation mechanisms, subsidies risk becoming **inefficient or politically biased** expenditures.

Green fiscal reforms must consider **distributional impacts**. Energy taxes, for instance, may disproportionately affect low-income households unless accompanied by compensation measures or exemptions. At the same time, subsidies that favor urban electric transport may neglect rural needs. Ensuring equity in green fiscal policy means:

- Introducing **"green social protection" programs**
- Designing taxes and subsidies that are **regionally inclusive**
- Supporting green job training and workforce transition programs

Countries like **Germany**, **South Korea**, and **Sweden** offer successful models of green taxation:

- Germany's eco-tax reform shifted the burden from labor to energy use.
- Sweden's carbon tax has contributed to a **27% drop in emissions since the 1990s**.
- South Korea's Green New Deal allocated **$60 billion** for eco-infrastructure and innovation.

Uzbekistan can adapt these lessons by:

- Creating a **carbon pricing roadmap**
- Developing an **independent green finance monitoring body**
- Leveraging **multilateral green funds** to expand fiscal capacity
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Conclusion

Uzbekistan's transition toward a green economy is gaining momentum through the use of fiscal instruments such as **environmental taxation** and **green subsidies**. As shown in this study, environmental tax revenue has steadily increased over the past decade, while targeted subsidies have supported investments in renewable energy, public transport, and sustainable agriculture.

However, for these tools to achieve long-term environmental and economic benefits, they must be carefully designed, equitably implemented, and transparently evaluated. Without such measures, green fiscal policy may become either economically inefficient or socially unjust.

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Uzbekistan stands at a strategic juncture where smart fiscal planning can not only reduce environmental harm but also stimulate innovation, attract green investment, and generate employment opportunities in emerging sectors.

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