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DIFFERENTIATED ECONOMIC MECHANISM FOR STIMULATING GREEN INVESTMENT ACROSS REGIONS: TWO-DIMENSIONAL DESIGN FOR UZBEKISTAN

Tokhtayev Maksud Mansurovich

Independent Researcher Bukhara State University

Abstract

The article develops a differentiated economic mechanism (DGEIM) for stimulating green investment as an instrument of sustainable regional diversification. Building on welfare economics and the empirical literature on green finance, the mechanism differentiates fiscal and financial incentives along two dimensions simultaneously: the ecological-effectiveness category of a project (A, B, C) and the green-investment-attractiveness level of the host region measured by the RGIAI composite index. An inverse-proportionality principle grants stronger incentives to less attractive regions to offset market failure and agglomeration bias. The mechanism operates as a self-renewing annual cycle governed on three administrative levels through a single digital platform and financed from three complementary sources. The design activates the direct, indirect and multiplier channels of green investment precisely in the regions that most need diversification.

Keywords

Green investment, differentiated incentives, regional diversification, ecological effectiveness, RGIAI.

Introduction

Improving the mechanisms for attracting green investment in the context of sustainable regional diversification encompasses three interconnected directions: economic stimulation, organizational-institutional formation, and financial provision. Among them, economic stimulation forms the foundation of the system, because it directly shapes the decision of economic agents to invest in green projects. An effective regional incentive system must simultaneously satisfy two requirements: it should support the directions that deliver the greatest social-ecological benefit, and it should ensure territorially balanced development by accounting for the differing investment attractiveness of regions.

The existing incentive system in Uzbekistan does not adequately satisfy these two requirements, which makes the improvement of the mechanism a pressing task. Green projects benefit society at large by reducing carbon emissions and raising energy

efficiency, yet part of this benefit does not return to the investor. As a consequence, the market mechanism supplies green investment below the socially optimal level, and state incentives serve precisely to close this gap. The purpose of this article is to develop a differentiated economic mechanism that channels scarce public incentives toward the projects and regions with the highest ecological-economic return, thereby turning green stimulation into a practical instrument of sustainable regional diversification.

Literature Review

The theoretical foundation of the mechanism rests on welfare economics. Pigou (1920) established that activities generating positive externalities are underprovided by the market and justify corrective public support, which is directly applicable to green projects whose social return exceeds their private return. The endogenous-growth tradition, represented by Aghion and Howitt (1992), adds that investment in new, knowledge-intensive activities is a primary driver of long-run growth, framing green investment as a channel of structural renewal rather than a mere environmental cost.

The applied literature on green-investment incentives offers direct guidance. Taghizadeh-Hesary and Yoshino (2019) substantiate a mechanism of differentiated interest-rate subsidies that accounts for the spillover effect of renewable-energy projects. Falcone et al. (2018) show the need for coherence between tax incentives and environmental regulation in stimulating green investment. Kharb et al. (2023) confirm that the effectiveness of green-investment incentives in emerging economies depends directly on institutional quality and governance standards. Tolliver et al. (2020) demonstrate that clearly defined national commitments and criteria are decisive for the growth of green-finance markets. The common conclusion of these studies is that incentives should not be applied as a uniform, one-size-fits-all package, but rather differentiated according to the ecological effectiveness of projects and territorial conditions.

Methodology

The study employs systemic analysis, comparative analysis of international practice, and institutional design. International experience of differentiated incentives provides the reference frame. In Germany, feed-in tariffs under the renewable-energy law are differentiated by technology type and capacity; in China, green credit and tax incentives are differentiated by provincial development level and ecological condition; in the European Union, the green taxonomy ties incentives to measurable ecological contribution. These cases confirm that differentiating incentives by ecological effectiveness and territorial context materially raises their economic efficiency.

In Uzbekistan, the normative basis has been formed consistently: the 2019 green-economy transition strategy (President of the Republic of Uzbekistan, 2019), the 2023 National green taxonomy establishing unified project-classification criteria (Cabinet of Ministers of the Republic of Uzbekistan, 2023), and the 2025 introduction of the feed-in-tariff system together enrich the incentive toolkit. Composite-index construction for the regional dimension follows the OECD (2008) methodology. On this basis, the differentiated green-investment incentive mechanism (DGEIM) was designed.

Results and analysis

The essence of DGEIM is to differentiate incentives along two dimensions. The first dimension is the ecological-effectiveness category of the project (A, B, C); the second is

the RGIAI level of the region in which the project is implemented. Importantly, the mechanism does not abolish incentives existing in current legislation: it consolidates existing norms into a single system, extends them to all directions of the taxonomy, and ties their intensity to the objectively measured attractiveness level of the region. The linkage of the second, territorial dimension to the author's RGIAI composite index constitutes the novelty of the mechanism.

Under the first dimension, green-investment projects are divided into three categories according to ecological effectiveness, each receiving differentiated tax and financial incentives proportional to its ecological return (Table 1).

Table 1

Categorisation of green-investment projects by ecological effectiveness and incentive directions

Category	Main directions	Incentive depth
A – high	Solar and wind energy, water-saving technologies, biodiversity conservation	Profit-tax exemption 7 years; property-tax exemption 10 years; social-tax rate −50%; soft loans (−5 pp); subsidy up to 30%; feed-in tariffs
B – medium	Green agriculture, green construction, green transport, waste recycling	Profit-tax exemption 5 years; property-tax exemption 5 years; social-tax rate −30%; soft loans (−3 pp); subsidy up to 20%
C– modernization	Energy efficiency, replacement of obsolete equipment, adaptation to standards	Profit-tax exemption 3 years; property tax −50%; soft loans (−2 pp); subsidy up to 10%

The depth of the base package across the three categories is summarised in Figure 1, which makes visible the proportionality between ecological return and incentive strength.

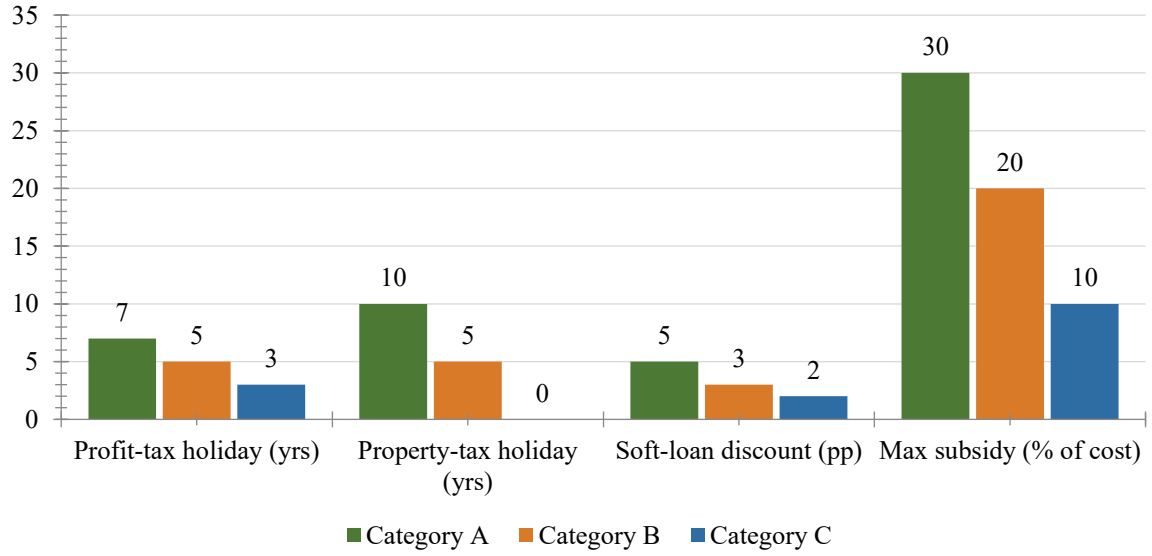


Figure 1. Base incentive depth by ecological-effectiveness category

The categorisation logic rests on the magnitude of the positive externality: the higher the ecological return of a project, the greater the external benefit to society, and the more

economically justified the stronger state incentive. A crucial methodological point is that the category is assigned to a specific investment project rather than to an enterprise, so that a single firm may simultaneously run a category-A solar project and a category-C modernisation project, each receiving its corresponding incentive. The three categories are complementary for diversification: category A yields the highest ecological return, category B is decisive for widening the sectoral structure and creating new value chains, and category C preserves employment by gradually greening existing enterprises.

Under the second dimension, incentive intensity is tied to the region's RGIAI level. On the basis of the RGIAI values computed for the fourteen regions, regions are divided into three tiers, each assigned a corresponding incentive level (Table 2).

Table 2

Grouping of regions by green-investment attractiveness and incentive level

Tier	RGIAI range	Regions	Incentive level
High	above 0.67	Tashkent city	Base
Upper-middle	0.55–0.67	Bukhara, Tashkent region, Navoi, Samarkand, Fergana, Khorezm, Andijan, Karakalpakstan	Enhanced (+15% over base)
Lower-middle	below 0.55	Kashkadarya, Namangan, Surkhandarya, Jizzakh, Syrdarya	Maximal (+30% over base)

The inverse-proportionality principle — stronger incentives for less attractive regions — rests on economic-geography theory. As Krugman (1991) established, investment naturally flows to centres with agglomeration advantages and deepens interregional disparities. A high-attractiveness region attracts green investment relatively easily through the market, so a base incentive suffices; in lower-attractiveness regions the market failure is stronger, so an enhanced incentive acts as the necessary pull factor. The resulting intensity gradient across the three tiers is shown in Figure 2.

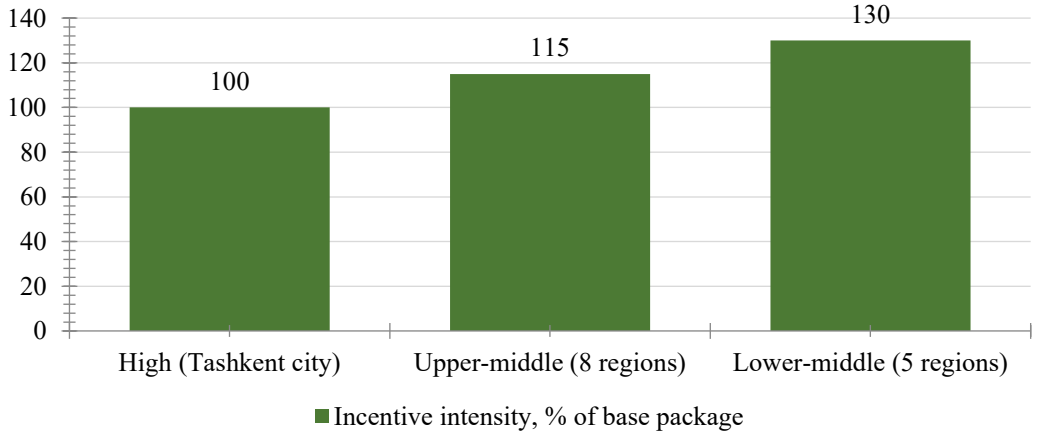


Figure 2. Incentive intensity by regional attractiveness tier

The mechanism operates as an integral annual cycle composed of five interconnected loops (Figure 3). At the start of each year the RGIAI index of all regions is updated from official statistics and published, forming the information foundation; regions are then grouped and their levels fixed for the coming year; during the year investor applications are received and projects categorised; a tailored incentive package — base incentives matched to the category plus an uplift matched to the region — is formed and contracts are concluded; finally, the ecological-economic performance of supported projects is monitored, and its results feed into the next year's index calculation and budget-limit planning. In this way the mechanism functions not as a one-off administrative measure but as a self-renewing governance system.

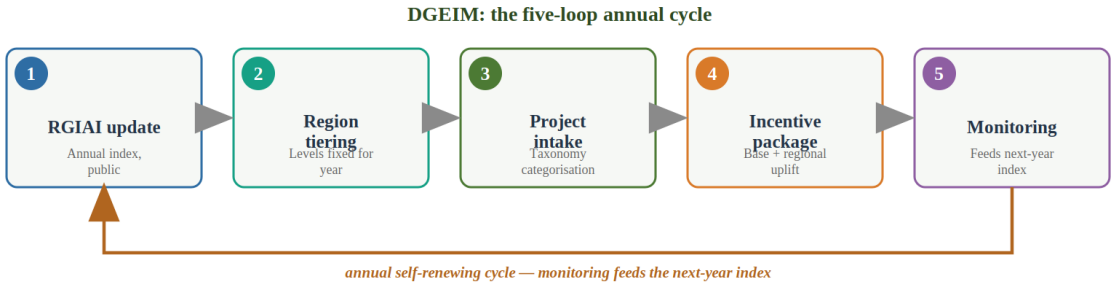


Figure 3. The five-loop annual cycle of DGEIM

Organizationally, the mechanism works on three governance levels with clearly delimited functions (Figure 4). At the republic level the ministry responsible for economy and finance approves the methodology, sets the annual budget limit and coordinates RGIAI monitoring, while the environmental authority runs taxonomic control and verification. At the regional level the main practical load falls on a territorial working group that serves as the single window for investors. At the project level incentives materialise through tax bodies and commercial banks in specific contracts, where annual monitoring is performed. All three levels are united on a single digital platform that carries the entire document flow from application to incentive passport and annual reporting.

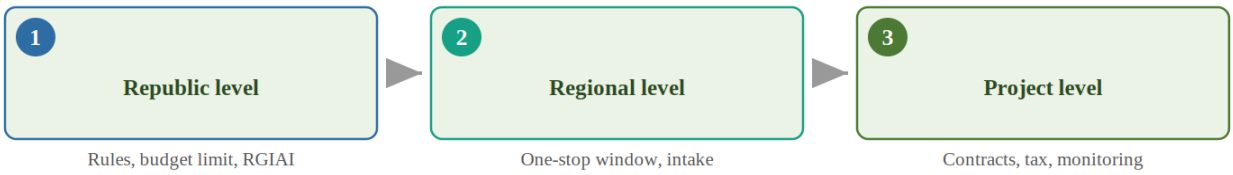


Figure 4. The three governance levels of DGEIM

The financial provision of the mechanism is formed from the synergy of three sources: a single annual limit in the republican budget covering both indirect (tax-relief) and direct (interest-subsidy) expenditures; green credit lines of international financial institutions channelled through local commercial banks and directed as a priority to the maximal-incentive regions; and long-term tariff guarantees under the 2025 feed-in-tariff system, which stabilise the revenue stream of renewable-energy projects without requiring direct budget outlays. Their combined operation allows the mechanism to be financed without relying on the budget alone. Objectivity of categorisation is the decisive condition of effectiveness, so only measurable criteria are applied — emission reduction, energy consumption per unit of output, water and resource saving, and recycling rate —

reinforced by independent expertise and periodic audit on the shared digital platform to prevent greenwashing.

The practical application can be seen in the case of Bukhara region. With an RGIAI of 0.655 the region falls into the upper-middle tier, so its green projects are supported 15% above the base package. Its priority directions follow from the region's natural-economic profile: high solar and wind potential favours category-A projects; under water scarcity, category-B water-saving agricultural technologies and drip irrigation acquire special importance; and the rich historical-cultural heritage enables green construction that combines traditional architecture with energy-efficient technologies.

From the investor's standpoint the mechanism works by neutralising an objective locational disadvantage. Under current conditions it is almost always more convenient for an investor to launch a project in Tashkent city or its adjacent areas, where infrastructure is ready, the financial market is developed, and qualified personnel and administrative services are close at hand. The same project in a less attractive region entails additional costs and higher risks, so capital does not move to peripheral areas on its own even in the absence of formal barriers. Enhanced tax relief lowers the financial burden of the early stage, soft lending reduces the cost of attracted capital, and state and long-term tariff guarantees transfer part of the risk to the state; as a result, the attractiveness gap between two regions is substantially equalised in the investor's financial calculation.

Three risks must be managed in implementation (Table 3). First, the budgetary burden of incentives must be balanced for fiscal stability, so incentives are granted within an annual budget limit with priority for the highest ecological-return projects. Second, imprecise criteria create the risk of greenwashing and abuse, countered by independent verification, periodic audit and a clawback rule. Third, incentives must be time-bound and gradually reduced once a project becomes competitive, otherwise subsidy dependence forms. Fiscally, the mechanism should be treated not as an expenditure but as a medium-term investment, since the growth of investment is associated with higher and more stable growth of regional gross value added, and once green projects reach full capacity the resulting tax revenues offset a substantial part of the incentives granted.

Table 3

Implementation risks of DGEIM and mitigation measures

Risk	Nature	Mitigation
Budgetary burden	Uncontrolled expansion of incentives	Annual budget limit; ecological-return prioritisation
Greenwashing / abuse	Imprecise criteria, false claims	Independent verification; periodic audit; clawback rule
Subsidy dependence	Permanent reliance on support	Time-bound, gradually declining incentives

Conclusion

The differentiated economic mechanism developed here removes the structural limitations of the current uniform system by differentiating the intensity of incentives according to both the ecological-effectiveness category of the project and the RGIAI level of the region, while consolidating existing incentive norms — without abolishing them — into a single system extended to all directions of the taxonomy. The inverse-proportionality principle equalizes, in the investor's calculation, the objective disparity of regions to which the market fails to direct sufficient capital, preventing the concentration of green investment in major centres alone. Its self-renewing annual cycle, single digital platform spanning three governance levels, three-source financing, and control based on independent verification and time limitation together safeguard its fiscal stability and protection against abuse. As a result, the mechanism activates the direct, indirect and multiplier channels of green investment precisely in the regions most in need of diversification, serving as a practical instrument for the sustainable diversification of regional economies.

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