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## An investment-budget approach to stimulating green financing

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**Abstract.** The scientific article explores the investment-budgetary approach as a key mechanism for stimulating green financing in Kazakhstan amid global climate change and the growing demand for sustainable development. It examines the theoretical foundations of how public investments and budget classifications influence the attraction of private capital to green projects, drawing on crowding-in signal theory and public-private partnership concepts. The study analyzes the current state and effectiveness of existing green-finance programs in Kazakhstan, identifying the main constraints and barriers to their development. Based on international best practices from leading countries in green finance, the authors propose recommendations for adapting successful measures to Kazakhstan. Particular attention is given to the role of government guarantees and budget co-financing as tools for catalyzing green investment. The conclusion outlines the advantages and potential risks of the investment-budgetary approach and considers scenarios for the development of green financing in Kazakhstan through 2030. The article is relevant to specialists in green economics, researchers, government agencies, the financial and investment sectors, international organizations, and businesses.

**Keywords:** investment and budget policy, green financing, environmental investments, government spending, sustainable development, climate initiatives, Kazakhstan.

### Introduction

Amid global climate change and increasing demands for environmental sustainability, green financing has become one of the priority areas of economic policy [1]. Kazakhstan, a country endowed with abundant natural resources and a developing economy, faces the need to adapt to global sustainable-development standards [2]. The main challenge is the need to transform investment mechanisms with due regard to environmental factors [3]. The transition to a green

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economy is one of the key strategic priorities of Kazakhstan's development policy. In this context, the role of green finance has significantly increased. The investment and budgetary approach serve as a mechanism for directing financial resources toward environmentally sustainable projects, contributing to the achievement of national and international climate goals.

Thus, the relevance of this study is driven by the need to attract sustainable investment and to allocate public funds efficiently. At the same time, Kazakhstan faces a number of problems: budget constraints, a weak institutional base, and low private-sector involvement. The proposed investment-budgetary approach may prove an effective tool capable of uniting the efforts of government and business.

The purpose of this study is to determine the potential of the investment-budgetary approach in stimulating green financing in Kazakhstan. Specifically, we seek to answer the following research question: What mechanisms and opportunities does the investment-budgetary approach offer for mobilizing public and private investment in green projects in Kazakhstan, and how can its application help overcome existing barriers and constraints?

## **Literature review**

The topic of the investment-budgetary approach to stimulating green financing is widely covered in both foreign and domestic academic literature. Under conditions of macroeconomic instability, fiscal incentives and the financing of green initiatives have a favorable impact on cost and innovation, especially in energy-saving companies [4]. In developing countries, green budget tagging increases the transparency of budget funds allocated to climate initiatives, although its introduction can be accompanied by problems such as a lack of technical resources and insufficient coordination among government bodies [5].

Studies on China highlight the strategic importance of budgetary and investment policy in stimulating green financing. Government investments, subsidies, and regulations facilitate the faster attainment of a sustainable energy future [6, 7, 8, 9, 10]. The issuance of green bonds helps reduce emissions by 20-30 percent, especially among major air polluters, and the crucial role of the state as a key player in creating a favorable environment for green financing is emphasized [11, 12]. Research shows that the investment-budgetary approach, through targeted budget incentives and reward and sanction mechanisms, promotes the transition to a low-carbon economy [13]. Many governments use subsidies, green taxation, and other benefits to attract private investment to environmentally related projects [14].

In the European Union, along with investment guarantees, green subsidies, and taxation, the importance of cross-country coordination, strategic management, and institutional clarity is noted [15]. OECD countries, compared with others, demonstrate greater effectiveness of the investment-budgetary approach thanks to a better institutional environment, fiscal commitments, and mechanisms for assessing and labeling green expenditures [16]. Zhao et al. point out that in South Asian countries, government support, institutional reforms, and the reallocation of financial resources to environmental goals help attract green investment [17]. In addition to macroeconomic, political, institutional, and legislative barriers, researchers also identify fossil-fuel fiscal subsidies as one of the serious obstacles to the green transition [18]. Thus, countries with active investment-budgetary policies in the environmental sphere achieve

an increase in private green capital and enhance the nation's investment attractiveness in the eyes of international sustainable investors [19].

The investment-budgetary approach plays a crucial role in stimulating green financing, especially in resource-dependent countries such as Kazakhstan [20]. Studies note institutional barriers (environmental taxes are insufficiently converted into green subsidies), political barriers (policy dependence on oil), and financial barriers (stock-market liquidity, credit availability) to financing environmental initiatives [21, 22]. Without government involvement, green financing in Kazakhstan would remain fragmented [23]. Several Kazakhstani researchers focus on developing green bonds and environmental taxes as key mechanisms of green finance in Kazakhstan [24, 25]. The investment-budgetary approach in Kazakhstan, implemented through green credit policy, is a critically important tool for promoting sustainable development because it provides financial support for green projects and influences companies' technological capabilities [26]. In Kazakhstan, the mechanisms of the investment-budgetary approach are implemented to an insufficient extent, necessitating reforms in environmental subsidies and taxation as well as the introduction of green budget tagging instruments [27]. Based on this literature review, the present study augments the existing theoretical and empirical base on the investment-budgetary approach in the context of stimulating green financing.

## **Methodology**

The research methodology is based on an integrated approach, utilizing analytical, comparative, and graphical methods. The theoretical framework draws on the analysis and synthesis of both Kazakh and international academic literature on green finance, investment strategies, and budgetary mechanisms, as well as an examination of Kazakhstan's legislative framework in the sphere of green economy and sustainable development. The hypothesis of the study is that the active application of an investment and budgetary approach, including government guarantees, budget co-financing and public-private partnership mechanisms, contributes to an increase in private investment in the field of green finance in Kazakhstan, subject to institutional stability and regulatory coherence.

A comparative analysis enabled the identification of effective international practices in green finance, with special attention to the institutional and cultural contexts of leading economies and post-Soviet states. The study examined mechanisms of public support, institutional arrangements, co-financing tools, and the implementation of budget guarantees and public-private partnership (PPP) projects related to environmental initiatives. Particular focus was placed on Kazakhstan's green finance programs, assessing investment dynamics, the scale of budgetary support, the involvement of businesses and international organizations, as well as the identification of key barriers to the development of the sustainable finance sector.

Graphical methods were employed to visualize statistical data concerning the structure and evolution of Kazakhstan's sustainable finance market. The empirical base comprised data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, alongside reports from the Astana International Financial Center, the Ministry of Energy of Kazakhstan, the United Nations, the World Bank, the OECD, the EBRD, and the European Commission. Additionally, peer-reviewed research articles indexed in the Scopus database were incorporated into the analysis.

## Findings and discussion

The current state of green finance in Kazakhstan. By the end of 2023, the volume of the sustainable finance market in Kazakhstan reached 226.9 billion tenge. The main share is occupied by green bonds (112.9 billion tenge, 50%) and green loans (37.3 billion tenge, 16%). A significant part (76.7 billion tenge, 34%) is made up of other instruments, which include:

- Environmental grants: provided by both government and international organizations to support pilot and innovative environmental projects.
- ESG funds: investment funds focused on companies that comply with environmental, social, and corporate governance principles.
- International climate programs: include financing and technical assistance from international climate funds and multilateral development banks.

The Green Economy State Program (active since 2013) has contributed to some progress, but its effectiveness remains moderate and uneven. Main achievements include the establishment of the Green Finance Center at the IFC and the introduction of preferential loans for projects in the field of renewable energy sources (RES). However, the volume of concessional loans remains relatively small compared to the overall investment needs.

Table 1. Main constraints and barriers to the development of green finance

Main limitations	Explanation
Policy fragmentation	Leads to insufficient coordination between various government agencies.
Low awareness	About the possibilities of green financing.
Insufficient budget	allocated budget funds to support green projects.
The main barriers	
Lack of a unified national classification	creates uncertainty for investors and makes it difficult to compare and evaluate investment opportunities
Insufficient assessment and certification infrastructure	reduces investor confidence and increases the risks of "green camouflage".
Shortage of qualified personnel	a limiting factor for the development of the market.
Regulatory gaps	reduce the transparency and attractiveness of "green" investments.

Note: compiled based on data from [28], [29], [30], [31]

International experience. To identify the most relevant models for stimulating green finance, several regions and countries were selected whose experience could be useful for Kazakhstan:

- European Union (EU): Their experience with the European Taxonomy is especially valuable for Kazakhstan, which is forming its own national classification and reporting system.
- China: A unique case due to the active and purposeful role of the state in stimulating green financing. The study of the Chinese experience can provide valuable lessons on how to use government financial institutions and tools.

- Scandinavian countries (Norway and Sweden): They demonstrate a mature green bond market where institutional investors and municipalities play a key role. Their experience can be useful for developing Kazakhstan's domestic capital market.

- CIS countries (Russia and Uzbekistan): Given the similarity of economic structures, their experience may be particularly relevant. Russia's experience reveals both successful practices and potential difficulties, while Uzbekistan's provides a valuable example of a practical implementation of a national taxonomy.

Table 2. Investment and budgetary approach: mechanisms and opportunities

<b>Implementation mechanisms</b>	<b>Details and examples</b>
Targeted government programs (including Zhasyl Kazakhstan)	The Zhasyl Kazakhstan program can be strengthened through a clear integration of green financing mechanisms. Potential projects include large-scale thermal modernization of buildings, the development of public electric transport, and the creation of waste recycling infrastructure.
Government guarantees	They can significantly reduce the risks for private investors, especially for projects with a long payback period. Potential examples: guarantees for large wind and solar power plants, or to support the issuance of green bonds by regional authorities.
Budget co-financing	Direct government involvement can make green projects more attractive to private investors. This can be applied to green construction, the development of sustainable agriculture, and the creation of electric transport infrastructure.

Note: compiled based on data from [29], [30], [31], [32]

PPP tools in environmental projects: Public-private partnerships combine the resources and expertise of the public and private sectors to implement complex and capital-intensive environmental projects.

Table 3. Instruments of public-private partnership in environmental projects

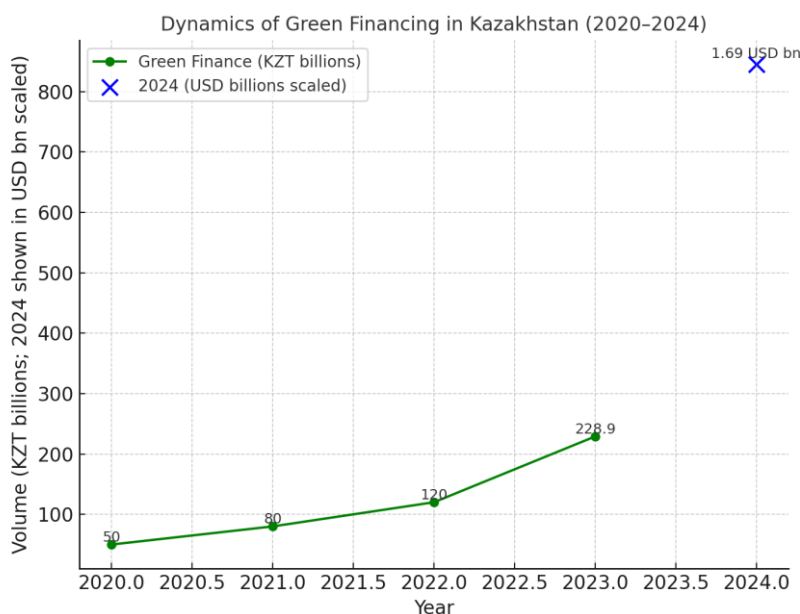
<b>PPP implementation mechanisms</b>	<b>Successful models in other countries and their adaptation for Kazakhstan</b>
Concessions	France: successful experience in water and waste management. Kazakhstan can adapt this model to modernize outdated water supply systems.
Production Sharing Agreements (PSAs)	Germany: a well-developed PPP system for renewable energy. Kazakhstan can use this experience to further develop the RES sector.
Service contracts	Canada: successful examples in cleaning up polluted areas. Kazakhstan can use this experience to address environmental legacy issues.

Urban infrastructure	Singapore: active use of PPP in creating green urban infrastructure. Kazakhstan can study this experience for planning the sustainable development of its cities.
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Note: compiled based on data from [28], [30], [33]

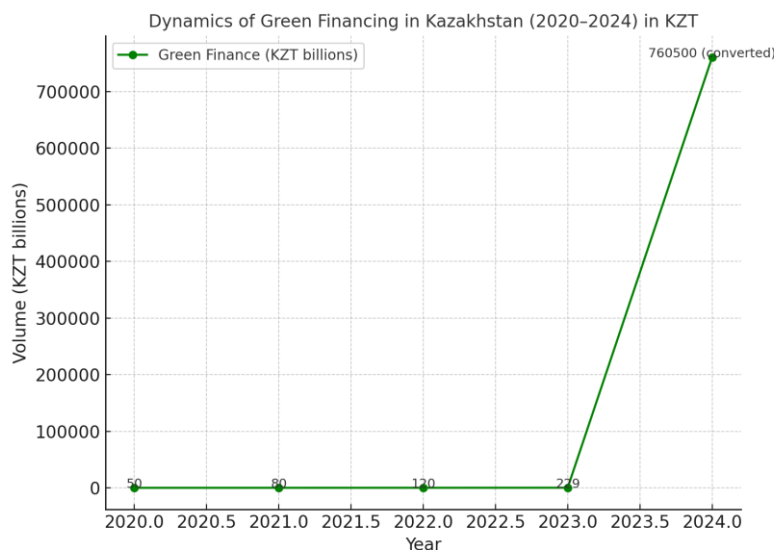
In recent years, Kazakhstan has demonstrated notable progress in developing sustainable finance instruments. According to the AIFC Green Finance Centre, the volume of the green and social bonds market reached 228.9 billion KZT by the end of 2023. Cumulatively, between 2020 and 2023, 236.5 billion KZT worth of green bonds and loans were issued. A significant breakthrough occurred in 2024, when AIFC facilitated the issuance of green and social instruments amounting to USD 1.69 billion, which is more than 3.5 times higher than the 2023 level. This sharp growth underlines the accelerating role of sustainable finance in Kazakhstan's transition to a green economy.

The analysis indicates that while green finance instruments in Kazakhstan showed moderate growth between 2020 and 2023, a dramatic surge was recorded in 2024. This reflects the success of institutional initiatives such as the AIFC Green Finance Centre and increased interest from international investors. The investment and budgetary approach has proven to be a critical driver for mobilizing capital toward sustainable projects, particularly in renewable energy and infrastructure. Nevertheless, challenges remain, including the need for a broader investor base, improved awareness of ESG standards, and stronger alignment between state budget programs and private sector initiatives.



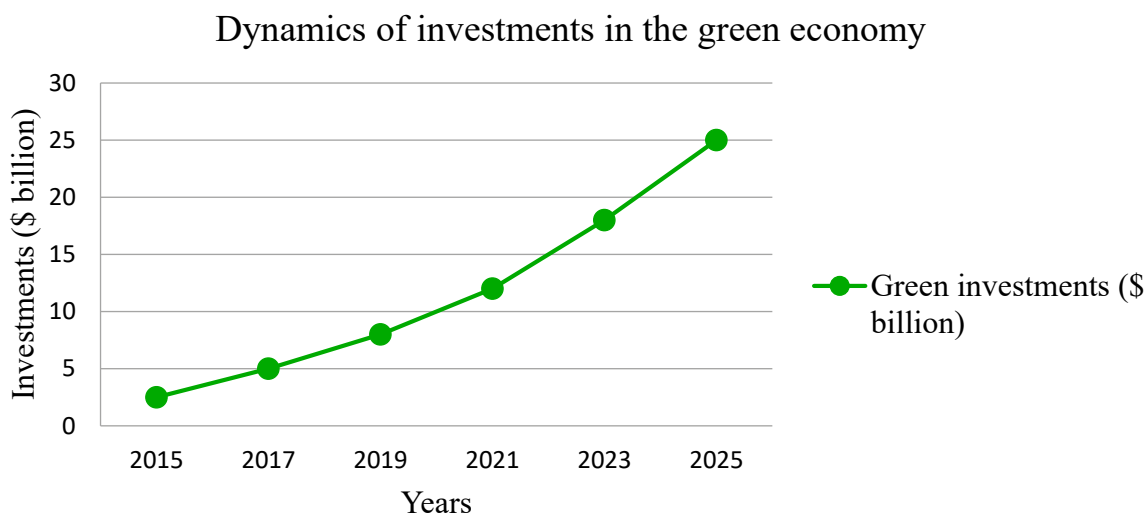
**Figure 1 Dynamics of Green Financing in Kazakhstan (2020-2024).**  
Values for 2024 shown in USD (scaled)

Note: compiled on the basis of data from [29]



**Figure 2 Dynamics of Green Financing in Kazakhstan (2020-2024) in KZT.**  
Values for 2024 converted to KZT using the average rate (1 USD = 450 KZT).

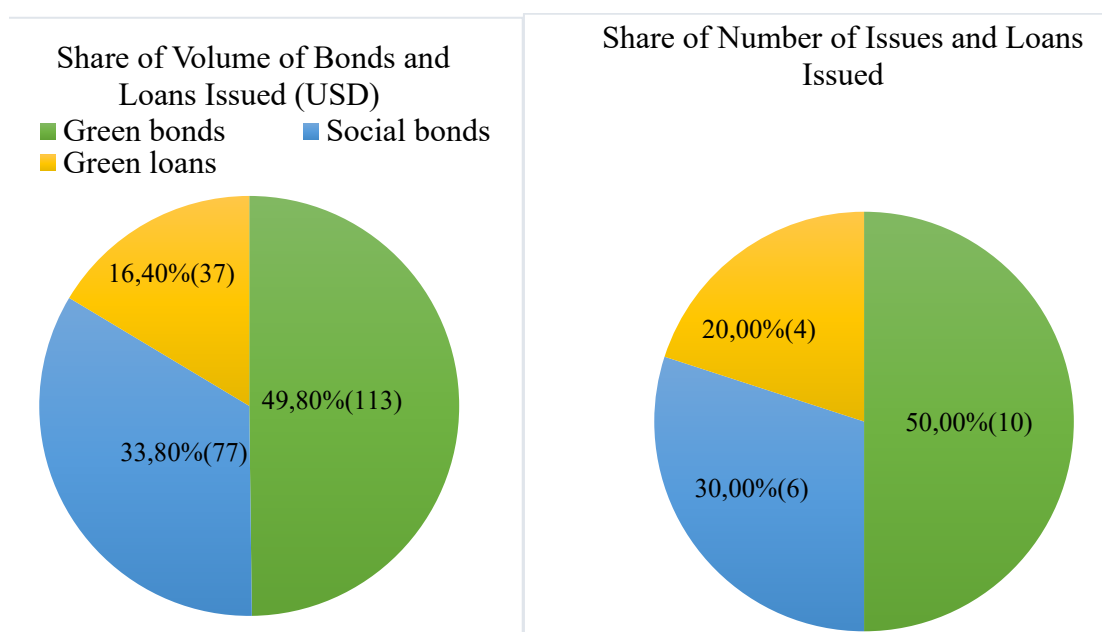
Note: compiled based on data from [29]



**Figure 3 Dynamics of green investments in Kazakhstan (2015-2025), billion US dollars**  
Note: compiled based on data from [29]

The investment and budgetary approach is an important tool for financing "green" projects, as it involves the effective use of both public and private financial resources to achieve environmental sustainability and long-term environmental and economic goals. The analysis of the key advantages and limitations of this approach in Kazakhstan shows that the comprehensive work carried out with the participation of the AIFC has yielded significant results. As of the end of October 2023, bonds were placed and loans were issued in the sustainable financing market totaling more than 226.9 billion tenge. Green-themed instruments, including green bonds and green loans, accounted for 66% of the total

volume (150.2 billion tenge), with green bonds amounting to 112.9 billion tenge, and green loans – 37.3 billion tenge.



**Figure 4 Structure of Kazakhstan's sustainable finance market at the end of October 2023**

Note: compiled based on data from [29]

#### Advantages of the investment-budget approach

1. Mobilization of additional financial resources. The investment-budget approach makes it possible to effectively combine public financing with private and international investments. This is especially important for Kazakhstan, where the state budget is limited and the cost of environmentally sustainable technologies is high.

2. Long-term planning and sustainability. Due to comprehensive budget planning and investments, the state can ensure stable financing of green projects for several years, which is crucial for projects with a long payback period.

3. Integrating green goals into national strategies. The use of an investment-budget approach allows for the organic integration of environmental goals into long-term strategies for the economic development of the country, such as the "Green Economy" concept.

4. Development of innovative and sustainable technologies. This approach accelerates the introduction of new technologies and supports research and development, which is necessary for an accelerated transition to a green economy.

Potential institutional and macroeconomic risks. Despite the availability of external support and political will, the development of green finance may face a number of risks:

Financial instability: caused by commodity market volatility and inflationary expectations, which may limit access to long-term financing.

Resistance from traditional sectors: such as coal power, oil and gas, fearing the redistribution of subsidies and the transformation of value chains.



Scenarios for Green Finance Development in Kazakhstan until 2030. Based on the current dynamics, international benchmarks, and declared policy measures, three development scenarios for green finance in Kazakhstan are proposed.

**Table 4. Green Finance Development Scenarios for Kazakhstan by 2030**

Scenario	Key Characteristics	Share of Green Investment in GDP	Projected Outcome by 2030
Pessimistic	Lack of reforms, continuation of fragmented initiatives, low private sector engagement	$\leq 2\%$	Investment growth remains limited; green bonds remain a niche financial instrument
Baseline	Implementation of taxonomy, pilot renewable energy projects, partial tax incentives, increased role of multilateral financial institutions (MFIs)	$\sim 5\%$	Strengthening of public instruments, increase in the number and volume of projects
Optimistic	Establishment of a national sustainable development fund, scaling up PPPs, integration of ESG reporting, green budgeting	$\geq 10\%$	Kazakhstan becomes a regional hub for sustainable investment

Note: compiled on the basis of data from [28], [29], [33], [35].

Forecast modeling indicates that a shift from the baseline to the optimistic scenario could result in more than a fourfold increase in annual green investment by 2030. Achieving the baseline scenario will require raising the share of green investments from its current 1.7% of total capital investment to 5% through budget planning, direct subsidies, tax incentives, and regulatory support.

## Conclusion

The conducted research provides a comprehensive assessment of the investment and budgetary approach's role in stimulating green financing in Kazakhstan. The analysis showed that despite the positive trend in the volume of green investments, the state remains a key catalyst for the transition to a sustainable economic model. Theoretical provisions on crowding-in, signal theory, and public-private partnership confirm the potential of an active government policy in attracting private capital to "green" projects. The study identified key barriers to the more dynamic development of green finance in Kazakhstan, including the lack of a unified national classification and regulatory gaps. An analysis of the international experience of the EU, China, Scandinavia, and the CIS has revealed valuable lessons applicable to the specifics of Kazakhstan. The proposed investment and budgetary approach, which includes targeted government programs, government guarantees, budget co-financing, and PPP mechanisms, is a comprehensive tool for mobilizing financial resources. Predictive modeling demonstrates the significant growth potential of green investments with a more active government policy.

To realize this potential, it is necessary to consistently implement institutional, regulatory, and educational mechanisms, including the creation of a national platform for sustainable financing and enhanced cooperation with international climate funds. Despite external support and political will, the development of green finance is fraught with potential financial and macroeconomic risks, as well as possible resistance from traditional sectors of the economy. The successful implementation of the proposed measures will require coordinated efforts from the government, business, financial institutions, and society as a whole. Thus, the investment and budget approach can become a systemic tool for transforming Kazakhstan's economic growth model, ensuring a balance between economic development and environmental sustainability.

**Conflict of interest.** The authors declare no conflict of interest.

#### **Authors' contributions.**

**Lazzat Magzumova** – approved the final version of the article for publication and accepted full responsibility for all aspects of the work, including the verification of data accuracy and the integrity of the article as a whole.

**Zhanat Bulakbay** – was responsible for data collection, analysis, and interpretation; drafted the manuscript and conducted a critical review of its content; made a significant contribution to the conceptual development of the study.

**Karlygash Auezova** – developed the theoretical framework and participated in the interpretation of the research findings.

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### **Жасыл қаржыландыруды ынталандырудағы инвестициялық-бюджеттік тәсіл**

**Аңдатпа.** Ғылыми мақалада инвестициялық-бюджеттік тәсіл жаһандық климаттың өзгеруі және тұрақты дамуға сұраныстың артуы жағдайында Қазақстанда жасыл қаржыландыруды ынталандырудың негізгі тетігі ретінде қарастырылады. Ол мемлекеттік инвестициялар мен бюджеттік жіктеулердің жасыл жобаларға жеке капиталды тартуға қалай әсер ететінінің теориялық негіздерін зерттейді, белгілердің толып кету теориясына және мемлекеттік-жекеменшік серіктестік тұжырымдамаларына сүйенеді. Зерттеу барысында Қазақстандағы қолданыстағы жасыл қаржыландыру бағдарламаларының қазіргі жағдайы мен тиімділігі талданып, олардың дамуындағы негізгі шектеулер мен кедергілер анықталды. Жасыл қаржыландыру саласындағы жетекші елдердің озық халықаралық тәжірибелеріне сүйене отырып, авторлар табысты шараларды Қазақстанға бейімдеу бойынша ұсыныстар ұсынады. Жасыл инвестицияларды ынталандыру құралы ретінде мемлекеттік кепілдіктер мен бюджетті бірлесіп қаржыландырудың рөліне ерекше назар аударылады. Қорытындыда, инвестициялық-бюджеттік тәсілдің артықшылықтары мен ықтимал тәуекелдері көрсетілген және 2030 жылға дейін Қазақстанда жасыл қаржыландыруды дамыту сценарийлері қарастырылған. Мақала жасыл экономика мамандарына, зерттеушілерге, мемлекеттік ұйымдарға, қаржы және инвестициялық секторларға, халықаралық ұйымдар мен бизнес өкілдері үшін қажет.

**Түйін сөздер:** инвестициялық-бюджеттік саясат, жасыл қаржыландыру, экологиялық инвестициялар, мемлекеттік шығыстар, орнықты даму, климаттық бастамалар, Қазақстан.

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### **Инвестиционно-бюджетный подход в стимулировании зеленого финансирования**

**Аннотация.** В научной статье исследуется инвестиционно-бюджетный подход как ключевой механизм стимулирования зеленого финансирования в Казахстане в условиях глобального изменения климата и растущего спроса на устойчивое развитие. В нем рассматриваются теоретические основы того, как государственные инвестиции и финансирование влияют на привлечение частного капитала в зеленые проекты, опираясь на теорию сигналов вытеснения и концепции государственно-частного партнерства. В исследовании анализируются текущее состояние и эффективность существующих программ зеленого финансирования в Казахстане, выявляются основные ограничения и барьеры на пути их развития. Основываясь на передовом международном опыте ведущих стран в области зеленого финансирования, авторы предлагают рекомендации по адаптации успешных мер в Казахстане. Особое внимание уделяется роли государственных гарантий и бюджетного софинансирования как инструментов стимулирования зеленых инвестиций. В заключение излагаются преимущества и потенциальные риски инвестиционно-бюджетного подхода и рассматриваются сценарии развития зеленого финансирования в Казахстане до 2030 года. Статья будет интересна специалистам в области зеленой

экономики, исследователям, государственным учреждениям, финансовому и инвестиционному секторам, международным организациям и бизнесу.

**Ключевые слова:** инвестиционно-бюджетная политика, зелёное финансирование, экологические инвестиции, государственные расходы, устойчивое развитие, климатические инициативы, Казахстан.

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