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OPPORTUNITIES FOR FINANCING GREEN INVESTMENTS THROUGH COMMERCIAL BANKS

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Abstract
In the article Financing green investments through commercial banks is currently one of the most important directions for ensuring sustainable development. This process includes supporting energy efficiency, renewable energy sources, waste recycling, environmentally friendly transport, and the rational use of water resources. Also, the introduction of ESG principles into the investment policy of banks, the application of tax benefits and innovative financial technologies will increase the effectiveness of this process. The research results show that green investments not only open up new opportunities for the banking system, but also play an important role in ensuring economic stability and environmental security.

Keywords: Green investments, commercial banks, green loans, green bonds, ESG principles, sustainable development, environmental projects, renewable energy, financial innovations, public-private partnership.

Introduction

Climate change and its consequences, which is one of the most important global problems of the 21st century, are prompting countries around the world to search for fundamentally new financial mechanisms for sustainable development. The Paris Climate Agreement signed in 2015 and the decisions of the 2021 Glasgow Summit require countries to attract large-scale green investments to transition to a carbon-neutral economy. The global need for green financing in the amount of $2.4 trillion per year and the fact that currently only 20-30% of this need is covered creates a great opportunity for commercial banks[1]. Climate risks - physical risks (extreme weather events, sea level rise) and transition risks (changes in the energy system, carbon price increases) - are recognized as systemic risks to the stability of the financial system. In this case, commercial banks face the need to restructure their portfolios in a green direction not only for economic purposes, but also from the point of view of global environmental responsibility. Also, the implementation of the Sustainable Development Goals (SDG) program requires financial resources of 5-7 trillion dollars per year, which creates new market opportunities for commercial banks.
In the modern regulatory environment, the ESG (Environmental, Social, Governance) criterion and the tightening of sustainable financial standards make active participation in

the field of green investments a mandatory requirement for commercial banks. European Union legislation such as Sustainable Finance Disclosure Regulation (SFDR), EU Taxonomy, and Corporate Sustainability Reporting Directive (CSRD) impose a requirement for financial institutions to provide mandatory green performance reporting.[2] The stress testing methodologies developed by the Central Bank Network for Greening the Financial System (NGFS) create new standards for climate risk assessment for central banks. The recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) are being widely implemented to increase transparency and accountability in the global financial system. The goal of reducing carbon intensity by 35% by 2030 and the adoption of the Green Economy Strategy by the Government of the Republic of Uzbekistan create new opportunities for local commercial banks in the direction of green financing. Also, concessional loans provided by international financial institutions (IFC, EBRD, ADB) to green projects in Uzbekistan are expanding the possibilities of financing and technical assistance for local banks[3].

The dramatic changes taking place in the global energy sector - the cheapening of renewable energy technologies, the decline in demand for fossil fuels, and the development of energy storage technologies - are creating new investment opportunities for commercial banks. The fact that solar and wind energy became 70% cheaper during 2020-2023, and these technologies have now become the cheapest energy source in many countries, significantly increases the financial attractiveness of green energy projects. According to the International Energy Agency (IEA), the global energy sector will require $1.6 trillion in green investments annually by 2030, 60% of which should come from commercial financing.

In the conditions of Uzbekistan, the potential of solar energy is 51 TWh, and the potential of wind energy is 520 TWh, which makes it possible to turn the country into a regional center of green energy. Large solar power plant projects (with a capacity of 1000 MW) being implemented in Navoi and Jizzakh regions are creating a practical platform for local banks to develop project finance and syndicated lending practices. In addition, the development of distributed energy systems, smart grid technologies, and electric vehicle infrastructure is creating new financing niches for banks.

Innovative financial instruments emerging in the field of green financing - green bonds, sustainability-linked loans, transition bonds, carbon credits, and blended finance mechanisms - create new business models and sources of income for commercial banks. The global green bond market reached $500 billion in 2023, showing an annual growth rate of 15-20%. Sustainability-linked loans account for 30% of the corporate lending segment and provide the possibility of interest rate pricing depending on the ESG performance of borrowers. Innovative tools such as pay-for-success contracts, environmental impact bonds, and catastrophe bonds are creating new approaches for banks in risk sharing and impact measurement. Environmental compliance monitoring using blockchain-based carbon credit tracking, tokenization of environmental assets, and

smart contracts provides new technological capabilities. The creation of Green Development Bank and plans to issue the first local green bonds to the financial market of Uzbekistan create the need for local banks to master new financial instruments. Also, financing green technologies (solar panels, energy-efficient appliances, organic farming) to rural communities through microfinance institutions provides an opportunity for inclusive growth and social impact.

Global experience in the economic efficiency and profitability of green investments shows that sustainable projects have higher returns and lower risks than traditional investments in the long term. According to McKinsey & Company analyses, each dollar invested in the green technology sector creates an average economic impact of 3-4 dollars and creates 2-3 million jobs. Energy efficiency projects guarantee 15-25% annual savings, while renewable energy projects guarantee 20+ years of stable income streams. According to Boston Consulting Group, the cost of capital for ESG-compliant companies is 0.5-1% lower, and the risk of credit default is 20-40% lower. For commercial banks, green portfolio diversification reduces the correlation risk, as green assets have a lower correlation compared to the traditional fossil fuel sector. Climate resilience and adaptation projects (flood protection, drought-resistant agriculture, water management) play an important role in ensuring economic security for climate-vulnerable countries such as Uzbekistan. Also, circular economy models (waste-to-energy, recycling, sustainable packaging) create new value chain financing opportunities for banks.

In the modern risk management paradigm, climate risks - transition risks and physical risks - are recognized as separate categories from traditional financial risks, and green investments are a strategic tool for mitigating these risks. Stranded assets risk - the risk of value loss in the fossil fuel sector - creates the need for portfolio rebalancing for commercial banks. According to the International Monetary Fund (IMF), 80% of global coal reserves and 50% of oil reserves may not be utilized due to carbon budget restrictions. In this case, early transition creates a competitive advantage for banks transitioning to the green sector. Climate stress testing and scenario analysis methods (NGFS scenarios) allow banks to assess portfolio stability under warming scenarios of 1.5°C, 2°C, and 3°C. Green investments are effective not only in climate risk hedging but also in reducing operational risk (water scarcity, supply chain disruption) and reputational risk (environmental scandals, social license concerns). In the context of Uzbekistan, environmental problems such as the Aral Sea ecological crisis, water scarcity, and air pollution create regional environmental risk factors for banks and determine investment in green solutions as a strategic imperative.

Early entry and development of competencies in the field of green financing will allow commercial banks to create a long-term competitive advantage. The first-mover advantage in the green technology sector is manifested through specialized expertise, strong client relationships, and brand recognition. The millennial and Gen Z generations (50%+ of the global population) are inclined towards sustainable values and green consumption, which

creates opportunities for banks to attract new customer segments. ESG reporting requirements for corporate clients and supply chain sustainability requirements allow banks to offer advisory services, ESG consulting, and sustainability-linked financial products. Green branding and environmental leadership increase talent attraction (75% of top graduates prefer sustainable employers), customer loyalty (60% of millennials buy from green brands), and investor confidence (ESG funds' $30 trillion asset under management) for banks. For Uzbekistan's banks, green finance leadership creates opportunities for positioning as a regional hub and becoming an environmental finance competence center in Central Asia. Additionally, strategic partnerships (co-financing, technical assistance, capacity building) with international development banks and green funds expand knowledge transfer and market access opportunities for local banks.

Financing green investments through commercial banks has the potential to become a dominant direction of the financial sector in the future, and the development of research and practice in this area is of strategic importance. According to BloombergNEF forecasts, by 2050, 85% of the global energy system will be based on renewable sources, and $130 trillion in energy investments will be made. Nature-based solutions (reforestation, wetland restoration, sustainable agriculture) will create a $10 trillion market and develop as a new asset class for banks. The application of artificial intelligence and IoT technologies in environmental monitoring and resource optimization will develop smart environmental finance platforms. Automatic green classification and incentive mechanisms will be created through the integration of Central Bank Digital Currencies (CBDCs) and green taxonomy. The goals set in the Uzbekistan 2030 Strategy - increasing energy efficiency by 20%, bringing the share of renewable energy to 25%, and improving environmental quality - create opportunities for local banks to invest $15-20 billion. Cross-border green finance opportunities will be expanded through regional connectivity projects (Central Asia-South Asia energy corridors, green supply chain integration) and international climate finance mechanisms (Green Climate Fund, Adaptation Fund). Therefore, conducting in-depth research on this topic and developing practical solutions is of great importance not only academically, but also practically.

Literature Review

In the process of analyzing the literature on the topic, scientific research on the possibilities of financing green investments through commercial banks was conducted by a number of leading economists and specialists of the world. Among them, N.E. Zhiyanova in her research emphasizes the need for the development of green finance and green investments in Uzbekistan; the need for financing environmental projects through state funds and state-owned banks, as well as government support [4].

The World Bank (the authors of the local analysis) emphasizes in their research that for Uzbekistan, public funds and state-owned banks (EDC, BDB, etc.) have the opportunity to attract green investments through banks, supporting green projects in the agricultural and

energy sectors[5].

In their research, H. Zhang and others empirically analyze the impact of green banking activities on the financing and financial performance of banks' environmental work; they show that green lending, when applied in practice by banks, can be beneficial for the environment and improve the environmental performance of banks[6]. Empirically analyzes the impact of green banking activities on the financing and financial performance of banks' environmental work; shows that green lending can be beneficial for the environment and improve the environmental performance of banks when applied in practice.

In his research, S. Sutrisno provides an empirical analysis of the impact of green loans on bank profitability and stability; in some cases, he confirms that green loans can have a positive impact on bank profitability[7].

D.Faryal in his research analytical articles on the topic "Green Banking and Sustainable Financing"; Discusses green banking services and their control mechanisms in the context of the CIS[8].

Research Methodology

Economic research methods such as analysis of research conducted by world scientists on the possibilities of financing green investments through commercial banks, collection of all data on the topic, comparison, and logical thinking were used.

Analysis and discussion of the results.

In today's world, where climate change and environmental problems are becoming increasingly acute on a global scale, the transition to a green economy is becoming increasingly important not only for environmental protection, but also for economic stability and sustainable development.

Green investments - financial resources directed towards such areas as renewable energy sources, energy efficiency, sustainable agriculture, water resource management, and low-carbon infrastructure - are the primary means of transition. Commercial banks, as the main pillars of the financial system, can play a decisive role in financing green investments. By transitioning from traditional investments to green investments, banks have the opportunity not only to have a positive impact on the environment, but also to take advantage of new market opportunities and increase their resilience.

The relevance of green investments is explained by a number of factors. First, risks associated with climate change (e.g., natural disasters, climate change) have a direct impact on bank portfolios and financial stability. Making investment decisions taking into account climate risks allows banks to reduce potential losses and ensure long-term stability. Secondly, strict environmental policies (such as carbon taxes, green subsidies) adopted by

the international community and national governments encourage banks to focus on green investments. Green financial reporting standards and stress tests introduced by regulators are increasing banks' attention to green investments.

The role of commercial banks in financing green investments includes not only environmental protection, but also opportunities for obtaining economic benefits. Green technologies and sustainable projects provide high profitability and stable sources of income in an increasingly competitive market. For example, renewable energy projects can be cheaper and more reliable in the long term than traditional energy sources. In addition, innovative financial products such as green bonds, green loans, and environmental leasing provide banks with the opportunity to expand their client base and create new revenue streams.

However, commercial banks face a number of difficulties in financing green investments. Firstly, green projects often require high initial costs and long-term depreciation, which can create difficulties for banks' liquidity and capital efficiency. Secondly, the technological and market risks associated with green investments have not yet been fully studied. Thirdly, the standards and criteria for green financing are still not uniform internationally, which creates difficulties for banks in risk assessment and reporting.

It is necessary to take a number of measures to increase the capabilities of commercial banks in financing green investments. Banks can create special departments for green financing, improve staff qualifications, and use modern technologies (such as artificial intelligence and data analysis) to manage new risks. In addition, incentive measures by the state, such as guarantees, subsidies, and tax benefits for green projects, will help reduce the risks of banks. Through cooperation with international financial institutions and intergovernmental organizations, banks will have the opportunity to exchange experience and resources on green financing.

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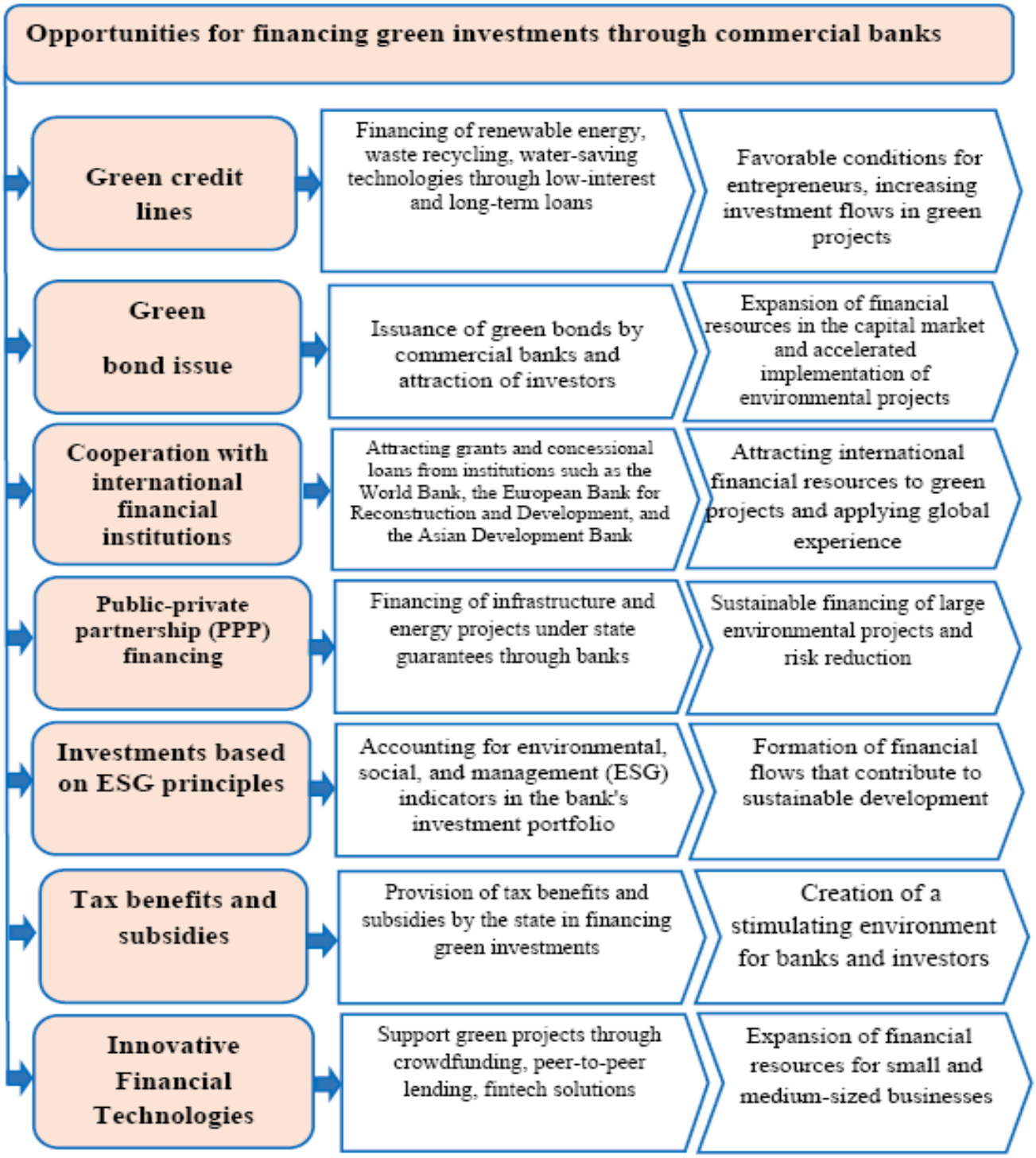

Figure 1.Opportunities for financing green investments through commercial banks[1]

[1] Compiled by the author.

The figure above illustrates the main directions and mechanisms for financing green investments through commercial banks. In particular, green credit lines, green bond issuance, cooperation with international financial institutions, financing based on public-private partnerships, investments based on ESG principles, tax benefits and subsidies, as well as mechanisms for using innovative financial technologies are of great importance. All these areas are aimed at supporting environmental projects through the banking system, expanding financial resources, and creating new opportunities for sustainable development. Also, as a result of their implementation, investment flows in the capital market will increase, international experience will be implemented, and environmental risks will decrease.

In addition, the mechanisms noted in the figure, along with the expansion of the financial activities of commercial banks, serve to form the principles of "green growth" in the economy. For example, tax incentives and subsidies strengthen the stimulating environment for banks and investors, while innovative financial technologies open up new sources of financing for small and medium-sized businesses. Financing large infrastructure projects based on public-private partnerships stimulates ensuring environmental safety and the rational use of resources. Thus, if the mechanisms presented in the table are applied systematically, the processes of financing green investments will become more effective and will make a great contribution to ensuring economic stability and ecological balance.

Financing green investments through commercial banks is important not only for environmental protection, but also for the continuous development of banks and the stability of the economy. Green financing can open up new market opportunities for banks and increase their competitiveness. However, banks may face difficulties on this path, so they need to explore the possibilities of effective financing of green investments through a strategic approach, technological innovations, and cooperation. Support from the state, regulators, and the international community will help accelerate this process.

Conclusions and Proposals

Financing green investments through commercial banks is an important mechanism not only for ensuring environmental sustainability, but also for transitioning to a qualitatively new stage of economic growth. In Uzbekistan, the financial intermediation of commercial banks plays an important role in the implementation of green energy, water conservation, renewable energy sources, and environmentally friendly technologies. Foreign experience shows that the financial base of green projects can be expanded through cooperation with green bonds, special credit lines, and international financial institutions. At the same time, the experience of the CIS countries proves that high efficiency can be achieved through the phased improvement of financing mechanisms, strengthening cooperation between the state and the private sector, and it is advisable to implement the following measures:

It is advisable to create special credit lines and investment funds in commercial banks to support green investments.

It is necessary to strengthen cooperation with international financial institutions (for example, the European Bank for Reconstruction and Development, the Asian Development Bank, the World Bank) in financing green projects.

It is necessary to establish the issuance of green bonds and financial derivatives by banks, as well as to stimulate the interest of local investors in investing in environmental projects.

In the development of green investments, it is possible to introduce tax benefits and subsidies, thereby reducing the financial burden on banks and entrepreneurs.

The widespread implementation of ESG (Environmental, Social, Governance) principles in the activities of commercial banks and the adoption of investment decisions based on environmental safety criteria will increase efficiency.

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