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Improving The Strategy For The Formation And Management Of Green Loan Portfolios In Commercial Banks

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Abstract

This study aims to examine strategies for improving the formation and management of green loan portfolios in commercial banks, focusing on the integration of environmental objectives with financial sustainability. The study employs a conceptual analytical approach to identify key challenges and strategic measures in green lending, particularly in the context of Uzbekistan. The analysis highlights several priority directions, including the development of a clear green lending policy, the establishment of transparent project eligibility criteria, the integration of environmental and climate-related risks into credit assessment, portfolio diversification, funding optimization, and the implementation of digital monitoring systems. The findings indicate that effective green loan portfolio management requires a comprehensive assessment of borrowers' creditworthiness, project financial viability, environmental compliance, and measurable sustainability outcomes. Furthermore, diversifying lending across economic sectors, borrower categories, and geographical areas can reduce concentration risks and strengthen portfolio resilience. The study also emphasizes the importance of mobilizing long-term funding, developing partnerships with international financial institutions, and utilizing digital technologies to improve data quality, transparency, and environmental performance monitoring. The proposed approach suggests that green loan portfolio development should prioritize not only lending volume but also credit quality, profitability, risk management, and verified environmental benefits. Integrating these elements can strengthen the sustainability of banking operations and support environmentally responsible economic development in Uzbekistan.

Keywords: *green loan portfolio, commercial banks, green lending, environmental risk management, portfolio diversification, sustainable finance, Uzbekistan.*

1. Introduction

In the context of global climate change, environmental degradation, and the transition toward sustainable economic development, green finance has become an increasingly important component of the modern banking system. Commercial banks play a significant role in mobilizing financial resources and directing them toward economic activities that support environmental protection, energy efficiency, renewable energy development, and the rational use of natural resources. In this

regard, improving the strategy for the formation and management of green loan portfolios represents an important direction for strengthening the sustainability of banking operations, enhancing the quality of credit allocation, and supporting the transition to a low-carbon economy.[1]

Green lending refers to the provision of financial resources for projects and activities that generate measurable environmental benefits. Such projects may include the installation of solar and wind power facilities, energy-efficient production technologies, environmentally sustainable construction, water-saving irrigation systems, waste recycling, clean transportation, and the modernization of industrial infrastructure. Unlike conventional lending, green lending requires banks to consider not only the borrower's financial condition and repayment capacity but also the environmental characteristics of the financed project, its expected contribution to sustainability objectives, and the potential environmental risks associated with its implementation.

The formation of an effective green loan portfolio requires a comprehensive strategic approach that integrates environmental priorities into the bank's credit policy, risk management framework, investment planning, and performance evaluation system. In conventional portfolio management, the primary emphasis is generally placed on profitability, liquidity, creditworthiness, and the diversification of borrowers and economic sectors. However, the growing significance of environmental risks requires commercial banks to expand these traditional criteria by incorporating climate-related risks, environmental compliance, resource efficiency, and the long-term sustainability of financed activities. Consequently, green loan portfolio management should be viewed not as an isolated lending activity but as an integral component of a bank's overall development strategy.[2]

One of the main challenges in developing green loan portfolios is the difficulty of identifying and classifying eligible projects. In the absence of clear eligibility criteria, banks may finance projects that claim to be environmentally beneficial without producing substantial or verifiable environmental improvements. This situation creates the risk of greenwashing, which can undermine public confidence, reduce the credibility of sustainability initiatives, and expose financial institutions to reputational and regulatory risks. Therefore, the implementation of transparent project-selection criteria, standardized environmental assessment procedures, and reliable monitoring mechanisms is essential for ensuring the integrity of green lending activities.

Another important challenge concerns the relationship between environmental benefits and financial performance. Green projects frequently require substantial initial investments, specialized technologies, and relatively long payback periods. Their economic outcomes may also depend on energy prices, government incentives, technological developments, regulatory requirements, and changes in market demand. For commercial banks, these characteristics create the need to develop appropriate credit assessment models that account for project-specific cash flows, collateral quality, debt-servicing capacity, technological risks, and environmental performance. An effective green loan portfolio strategy must therefore balance environmental objectives with the principles of financial sustainability and prudent credit risk management.[3]

The strategic importance of green lending is particularly relevant for emerging economies, where the modernization of production facilities, expansion of renewable energy capacity, improvement of water-use efficiency, and reduction of energy intensity require significant financial resources. Commercial banks can contribute to these processes by developing specialized green credit products, establishing partnerships with international financial institutions, mobilizing concessional funding, and providing differentiated financing conditions for environmentally sustainable projects.

At the same time, the effectiveness of these measures depends on the institutional capacity of banks, the availability of reliable environmental data, the financial literacy of borrowers, and the development of an appropriate regulatory environment.[4]

For commercial banks operating in Uzbekistan, the improvement of green loan portfolio management is associated with the country's broader objectives of increasing energy efficiency, developing renewable energy sources, modernizing industrial production, and improving the sustainable use of water and land resources. Financing these priorities requires banking institutions to develop sector-specific lending approaches that reflect the characteristics of local enterprises, agricultural producers, households, and infrastructure projects. In particular, banks need to distinguish between projects with clearly measurable environmental benefits and projects whose sustainability outcomes remain uncertain or insufficiently documented. This distinction is essential for improving the allocation of financial resources and reducing the probability of financing environmentally inefficient activities.

The formation of green loan portfolios also requires a systematic approach to diversification. Excessive concentration in a single sector, technology, geographical area, or category of borrower may increase the portfolio's vulnerability to changes in regulation, technology, market conditions, or environmental circumstances. For example, a portfolio concentrated in one renewable energy technology may be exposed to changes in equipment costs, maintenance requirements, or government support mechanisms. Similarly, lending to agricultural enterprises may be affected by water scarcity, drought, soil degradation, and other climate-related factors. Accordingly, portfolio diversification should consider both conventional financial risks and the interdependence of environmental and climate-related risks across sectors.[5]

The effectiveness of green loan portfolio management further depends on the integration of environmental, social, and governance considerations into the lending cycle. At the initial stage, banks should identify eligible projects and assess their environmental relevance. During credit evaluation, they should examine financial viability, borrower creditworthiness, environmental compliance, and the potential impact of climate-related factors on repayment capacity. Following loan disbursement, banks should monitor the use of funds, project implementation, financial performance, and achievement of the expected environmental outcomes. This continuous process enables financial institutions to identify emerging risks, improve the quality of portfolio information, and ensure that green financing objectives remain consistent with actual project performance.

2. Methodology

The purpose of this study is to examine the principal directions for improving the strategy for the formation and management of green loan portfolios in commercial banks and to develop an integrated approach to combining environmental effectiveness with financial sustainability. The study focuses on the identification of eligible green projects, the improvement of borrower and project assessment procedures, the integration of environmental risks into credit portfolio management, the diversification of green lending, and the development of monitoring and performance evaluation mechanisms.[6]

The scientific significance of the research lies in the consideration of green loan portfolio management as a multidimensional process that combines financial, environmental, institutional, and strategic factors. The proposed approach emphasizes that the effectiveness of green lending

should not be evaluated exclusively through the volume of loans issued or the growth rate of the green credit portfolio. Instead, it should be assessed through a combination of financial indicators, credit risk measures, environmental outcomes, and the long-term resilience of financed projects. Such an approach can contribute to the development of more transparent, risk-sensitive, and economically sustainable green financing mechanisms in commercial banks.[7]

3. Result And Discussion

The analysis of green loan portfolio formation and management indicates that the effectiveness of green lending depends on the coordinated implementation of several strategic components. These include the development of a clear green lending policy, the establishment of standardized project eligibility criteria, the integration of environmental risks into credit assessment, the diversification of the portfolio, the mobilization of appropriate funding sources, and the introduction of continuous monitoring mechanisms. The interaction of these components determines whether green lending can generate measurable environmental benefits while maintaining acceptable levels of profitability, liquidity, and credit quality.

The first priority for improving green loan portfolio management is the development of a clearly defined strategic framework. A commercial bank should establish specific objectives for green lending that are consistent with its overall business strategy, risk appetite, funding capacity, and environmental commitments. These objectives should identify the priority sectors, eligible project categories, target borrower groups, expected portfolio composition, and procedures for evaluating environmental outcomes.[8]

A green lending strategy should also define the relationship between environmental objectives and the bank's conventional credit policy. Green projects should not automatically be considered financially sound simply because they contribute to environmental protection. Each project must satisfy appropriate standards of creditworthiness, financial feasibility, repayment capacity, and regulatory compliance. At the same time, environmental benefits should be incorporated into the assessment process so that projects with credible sustainability outcomes can be identified and financed under suitable conditions.

The strategic framework should include measurable targets for the development of the green loan portfolio. These targets may relate to the proportion of green loans in total lending, the volume of financing allocated to renewable energy, the number of energy-efficiency projects financed, the geographical distribution of green loans, and the reduction of environmental risks associated with the bank's credit exposure. However, quantitative targets should be accompanied by qualitative requirements to prevent the pursuit of portfolio growth at the expense of project quality.[9]

For example, a bank may increase the share of green loans while simultaneously experiencing a deterioration in repayment performance or financing projects whose environmental benefits are not adequately verified. Therefore, portfolio expansion should be linked to clear eligibility criteria, financial performance requirements, and post-disbursement monitoring procedures. The principal objective should be the development of a high-quality and diversified green loan portfolio rather than the achievement of a predetermined lending volume alone.

Physical climate risks, including droughts, floods, extreme temperatures, and other environmental hazards, may directly affect borrowers' operations. These risks are particularly relevant for agriculture, water-intensive industries, energy infrastructure, and businesses whose production facilities are located in environmentally vulnerable areas. Transition risks may arise from changes in

environmental regulation, carbon pricing, technological innovation, consumer preferences, and the market shift toward low-emission production.[10]

For example, a manufacturing enterprise that relies on outdated and energy-intensive equipment may face increasing operating costs and additional investment requirements as environmental standards become more stringent. These developments can weaken profitability and increase the probability of loan default. By contrast, a company that invests in energy-efficient technologies may reduce its exposure to energy price fluctuations and improve its long-term financial resilience.

Commercial banks should therefore integrate environmental risk indicators into borrower evaluation models, sectoral risk assessments, and credit approval procedures. The assessment should consider the borrower's financial statements, debt-servicing capacity, cash-flow projections, collateral, environmental compliance, exposure to physical climate hazards, and capacity to adapt to changing market and regulatory conditions.[11]

The following table 1. summarizes the principal strategic components that can be incorporated into green loan portfolio management.

Table 1. Strategic Components for Improving Green Loan Portfolio Management[12]

Strategic component	Main instruments	Expected outcome
Green lending policy	Environmental priorities, portfolio targets, sectoral guidelines	Greater consistency between lending decisions and sustainability objectives
Project classification	Green taxonomy, eligibility criteria, environmental documentation	Improved transparency and reduced risk of greenwashing
Credit risk assessment	Financial analysis, climate-risk screening, borrower evaluation	Improved loan quality and risk identification
Portfolio diversification	Sectoral limits, borrower concentration monitoring, geographical analysis	Lower concentration risk and greater portfolio resilience
Funding optimization	Green bonds, concessional credit lines, international financial partnerships	Improved access to long-term funding
Environmental monitoring	Project reporting, performance indicators, independent verification	More reliable measurement of environmental outcomes
Digital management	Data platforms, automated reporting, analytical tools	Faster decision-making and improved information quality

The table demonstrates that green lending requires a coordinated management system rather than a collection of separate financial products. Each component supports a specific stage of portfolio development, while their integration contributes to stronger risk management and more reliable environmental performance.

Portfolio diversification represents another essential direction for strengthening the stability of green lending. Although environmentally sustainable projects may create long-term economic benefits, they are not immune to financial, technological, market, and regulatory risks. Concentration in a single industry or technology may expose the bank to correlated losses if adverse developments affect several borrowers simultaneously.[13]

For example, a portfolio concentrated in solar energy projects may be affected by changes in equipment prices, grid connection conditions, electricity purchase arrangements, or regulatory incentives. A portfolio focused heavily on agricultural borrowers may be exposed to drought, water

scarcity, fluctuations in agricultural prices, and seasonal income instability. Such risks may be intensified when borrowers operate in the same geographical area or depend on similar infrastructure.

To reduce these vulnerabilities, banks should establish sectoral and borrower concentration limits and evaluate the interdependence of risks across financed activities. Diversification can be achieved by allocating resources among renewable energy, industrial energy efficiency, sustainable construction, water management, waste processing, clean transportation, and environmentally responsible agriculture.

Nevertheless, diversification should not be interpreted as the equal distribution of lending among all sectors. The allocation of financial resources should reflect the bank's risk appetite, available expertise, market demand, expected project cash flows, and the environmental priorities of the economy. Some sectors may require more specialized technical assessment, while others may offer more predictable revenue streams or stronger collateral arrangements.[14]

Commercial banks should also assess the concentration of green lending by borrower size and type. Financing large infrastructure projects may generate substantial environmental benefits, but excessive reliance on a small number of borrowers can increase the potential impact of individual defaults. Supporting small and medium-sized enterprises can broaden the portfolio and promote the adoption of energy-efficient technologies across the economy. However, this approach may require standardized loan products, simplified application procedures, technical assistance, and appropriate risk-sharing mechanisms.

An effective diversification strategy should therefore combine sectoral allocation, borrower segmentation, geographical risk analysis, and continuous monitoring of correlated exposures. This approach can help banks balance the environmental objectives of green lending with the need to maintain portfolio stability.

The ability of commercial banks to expand green lending depends partly on the availability, cost, and maturity of funding. Green projects may require significant initial expenditure, while their revenues and financial benefits are often realized over an extended period. A mismatch between the maturity of bank funding and the repayment structure of green loans may create liquidity pressures and limit the bank's capacity to finance long-term investments.

One strategic direction is the diversification of funding sources. In addition to conventional deposits and wholesale funding, banks may consider green bonds, sustainability-linked funding arrangements, concessional credit lines, credit facilities from international financial institutions, and other funding instruments permitted by the applicable legal and regulatory framework. Such resources may help banks expand lending capacity and offer financing terms that better correspond to the economic characteristics of eligible projects.

Partnerships with international financial institutions can also contribute to the development of green lending expertise, environmental assessment procedures, and portfolio monitoring systems. Technical assistance may be particularly valuable for projects requiring specialized engineering knowledge or environmental impact assessment.

However, the availability of external funding does not eliminate the need for prudent credit analysis. Concessional resources should be allocated to projects that satisfy established eligibility requirements and demonstrate adequate financial viability. Banks must also consider currency risk, interest-rate risk, refinancing conditions, and the costs associated with reporting and verification.

Financial incentives may improve the attractiveness of green lending for eligible borrowers.

Depending on the bank's funding costs and risk assessment, these incentives may include preferential interest rates, longer repayment periods, grace periods, reduced administrative fees, or financing structures linked to verified project performance. Such benefits should be supported by a transparent economic rationale and should not undermine the bank's financial sustainability.

An important distinction must be made between green loans and sustainability-linked loans. Green loans finance projects or activities with specified environmental purposes, while sustainability-linked loans generally link the financial terms to the borrower's achievement of predetermined sustainability performance targets. Both instruments can contribute to environmental objectives, but their eligibility requirements, monitoring procedures, and reporting obligations should be clearly distinguished.

The effective management of green loan portfolios requires reliable information about both financial performance and environmental outcomes. Traditional credit monitoring systems primarily focus on repayment schedules, overdue loans, collateral values, and changes in borrowers' financial conditions. Green lending requires additional information concerning the use of funds, project implementation, energy savings, emissions reductions, water consumption, waste management, and compliance with environmental requirements.

Digital technologies can improve the collection, processing, and analysis of such information. Commercial banks may use centralized data platforms to register eligible projects, maintain environmental documentation, monitor loan utilization, and generate reports on portfolio performance. Automated analytical tools can support the identification of unusual changes in borrower performance and help prioritize projects requiring further review.

Where appropriate, banks may integrate borrower reporting with energy-consumption records, production data, engineering assessments, and other reliable sources of project information. Remote monitoring technologies can also provide useful evidence of project implementation, particularly for geographically dispersed renewable energy installations or agricultural water-efficiency initiatives. However, the reliability and legal acceptability of such data should be assessed before they are used in credit decisions or formal sustainability reporting.

Digitalization can also improve the consistency of green project classification. A standardized information system can require each financed project to have a documented environmental objective, a defined baseline, measurable indicators, and an assigned monitoring schedule. Such a system would make it easier to compare projects, identify missing information, and evaluate whether the intended environmental outcomes are being achieved.[15]

4. Conclusion

Finally, the development of green lending should be accompanied by regular evaluation of financial sustainability. Preferential financing conditions and ambitious portfolio targets should be introduced only where they are consistent with the bank's funding structure, risk appetite, and long-term financial objectives. The success of a green loan portfolio depends on its ability to combine credible environmental benefits with sound credit quality and sustainable profitability.

In summary, improving the strategy for the formation and management of green loan portfolios requires the integration of strategic planning, transparent project classification, comprehensive risk assessment, diversification, funding optimization, digital monitoring, and balanced performance measurement. The implementation of these measures can strengthen the role of commercial banks in financing environmentally sustainable economic development while improving the quality and

resilience of their loan portfolios. The proposed approach provides a conceptual basis for further empirical research into the relationship between green lending, financial performance, credit risk, and measurable environmental outcomes in commercial banking.

REFERENCES:

- [1] United Nations Environment Programme Finance Initiative (UNEP FI), Principles for Responsible Banking. Geneva, Switzerland: UNEP FI, 2019, pp. 1–20.
- [2] International Finance Corporation (IFC), Green Finance: A Bottom-Up Approach to Track Existing Flows. Washington, DC, USA: World Bank Group, 2017, pp. 1–45.
- [3] International Finance Corporation, Green Bond Handbook: A Step-by-Step Guide to Issuing Green Bonds. Washington, DC, USA: IFC, 2016, pp. 1–60.
- [4] International Capital Market Association (ICMA), Green Bond Principles: Voluntary Process Guidelines for Issuing Green Bonds. Zurich, Switzerland: ICMA, 2025, pp. 1–10.
- [5] Loan Market Association, Asia Pacific Loan Market Association, and Loan Syndications and Trading Association, Green Loan Principles. London, U.K.: LMA, 2025, pp. 1–8.
- [6] Basel Committee on Banking Supervision, Climate-Related Financial Risks: Measurement Methodologies. Basel, Switzerland: Bank for International Settlements, 2021, pp. 1–38.
- [7] Basel Committee on Banking Supervision, Principles for the Effective Management and Supervision of Climate-Related Financial Risks. Basel, Switzerland: Bank for International Settlements, 2022, pp. 1–24.
- [8] Network for Greening the Financial System (NGFS), Guide for Supervisors: Integrating Climate-Related and Environmental Risks into Prudential Supervision. Paris, France: NGFS, 2020, pp. 1–49.
- [9] Organisation for Economic Co-operation and Development (OECD), Financing Climate Futures: Rethinking Infrastructure. Paris, France: OECD Publishing, 2018, pp. 1–120.
- [10] International Energy Agency (IEA), World Energy Investment 2024. Paris, France: IEA, 2024, pp. 1–210.
- [11] European Banking Authority (EBA), Report on Management and Supervision of ESG Risks for Credit Institutions and Investment Firms. Paris, France: EBA, 2021, pp. 1–90.
- [12] International Finance Corporation, Performance Standards on Environmental and Social Sustainability. Washington, DC, USA: World Bank Group, 2012, pp. 1–58.
- [13] International Organization for Standardization, ISO 14001:2015—Environmental Management Systems: Requirements with Guidance for Use. Geneva, Switzerland: ISO, 2015, pp. 1–35.
- [14] International Monetary Fund, Global Financial Stability Report: Financial Stability in the New Climate. Washington, DC, USA: IMF, 2020, pp. 1–100.
- [15] Central Bank of the Republic of Uzbekistan, Financial Stability Review. Tashkent, Uzbekistan: Central Bank of Uzbekistan, 2024.