

Analysis of the Implementation of Green Banking Concepts in the Operations of Bank Aceh Syariah (Sisingamaraja Medan Branch) in Support of Sustainable Finance

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ABSTRACT

Purpose: This study examines green banking implementation in the operations and financing processes of Bank Aceh Syariah, Sisingamangaraja Medan Branch, and its potential relationship with sustainable finance.

Research Method: A qualitative descriptive-analytical case-study design was applied. Data were obtained through in-depth interviews with purposively selected branch employees and analyzed through reduction, coding, categorization, and evidence comparison using six Green Coin Rating indicators as a qualitative framework.

Results and Discussion: Paperless operations were partially implemented through mobile banking, while electricity-saving routines represented resource conservation rather than verified carbon-emissions management. Formal green rewards, green-building standards, and reuse, recycling, and refurbishment were not demonstrated. Environmental documentation and financing restrictions indicated environmental risk screening but did not establish an active green-investment portfolio. Consequently, measurable contributions to sustainable finance could not be confirmed.

Implications: The branch should establish resource-consumption baselines, formal environmental policies, circular waste procedures, green-financing criteria, and portfolio monitoring.

Originality: This study provides a branch-level Islamic banking assessment that distinguishes operational efficiency, environmental screening, and active green financing while avoiding unsupported sustainability claims.

Keywords: environmental risk screening; green coin rating; green banking; islamic banking; sustainable finance.

1. Introduction

Many countries face increasingly serious challenges arising from the depletion of energy and natural resources, environmental pollution, climate change, and global warming. The excessive exploitation of non-renewable resources and human behavior that does not prioritize sustainability further intensify environmental degradation and threaten the Earth's capacity to support human well-being (Henderson & Loreau, 2023). Business and industrial expansion can also increase environmental pressures when economic competition is pursued without adequate environmental safeguards. Greenhouse gas emissions contribute to ecosystem imbalances and may generate economic losses across countries (Saputra & Bahagia, 2024). These conditions demonstrate that environmental responsibility cannot be

assigned solely to resource-intensive industries; financial institutions must also consider the environmental consequences of the activities they finance.

The conceptual foundation for addressing these problems can be traced to the 1987 Brundtland Report, *Our Common Future*, which defines sustainable development as meeting present needs without compromising the ability of future generations to meet their own needs. This concept subsequently informed the development of the green economy, which integrates economic, social, and environmental considerations into development activities (Judjianto *et al.*, 2025). The green economy promotes a transition toward a more environmentally responsible economic system, particularly in sectors such as energy, transportation, agriculture, industry, and waste management (Khoirunisa Wahida & Hoirul Uyun, 2023). Because such a transition requires substantial capital allocation, the financial sector occupies a strategic position in directing funding toward activities that are more consistent with sustainability objectives.

The financial sector is no longer viewed merely as a provider of funds but as an actor capable of influencing the direction of development (Madyan & Setiawan, 2025). This role has encouraged the development of green finance, which incorporates environmental and sustainability considerations into financial decisions and transactions (Segara Gustanto & Mawtfiq, 2023). Within the banking sector, these principles are reflected in green banking. Growing environmental awareness has also encouraged banks to integrate social and environmental responsibility into their institutional policies and corporate social responsibility activities (Kontesa *et al.*, 2023). Accordingly, green banking encompasses both internal operational practices—such as reducing paper and improving energy efficiency—and external banking practices related to financing policies and environmental risk considerations.

Green banking is based on the recognition that banking activities may indirectly affect the environment through the projects and sectors receiving financing. It is therefore associated with financial practices intended to support social welfare while reducing exposure to environmental risks (Rehman *et al.*, 2021). In Indonesia, this orientation is supported by Law Number 32 of 2009 concerning Environmental Protection and Management, which provides a legal foundation for incorporating environmental responsibility into economic activities (Jamin, 2022). Practical implementation may include online and mobile banking, paperless administration, energy-efficient operations, and financing for environmentally responsible business activities (Milza *et al.*, 2021). However, operational efficiency measures and environmentally screened financing should not automatically be treated as evidence of reduced emissions or active green investment unless measurable environmental and portfolio data support them. Such initiatives may support sustainable development objectives, but their contribution must be assessed according to the evidence available (Sari & Fasa, 2024).

The regulatory basis was further strengthened through Financial Services Authority Regulation (POJK) Number 51/POJK.03/2017 concerning the Implementation of Sustainable Finance for Financial Services Institutions, Issuers, and Public Companies. The regulation encourages financial institutions, including Islamic banks, to integrate sustainable finance principles into their policies and activities (Fadilah, 2024). Green banking practices may also strengthen institutional reputation and public trust among customers who are concerned about sustainability (Ayu & Fasa, 2025). Nevertheless, regulatory compliance and reputational benefits do not, by themselves, demonstrate environmental or social outcomes. Such outcomes require evidence concerning financing composition, financing value, operational savings, environmental performance, social benefits, or risk reduction.

Evidence from the 2025 Katadata ESG Index indicates that the median sustainability performance score of Indonesia's banking sector was 47.64 on a scale of 0–100. The environmental

dimension recorded a median score of 59.41, whereas the green-economy aspect related to environmentally oriented financing received the lowest median score of 33.17. Green financing practices also remained concentrated among large banks (Databoks Katadata, 2025). These figures indicate that green banking implementation in Indonesia remains uneven, particularly in the financing dimension. Similarly, Fauzan *et al.*, (2024) found that, despite the existence of green banking regulations, implementation continues to face challenges related to oversight and consistency. The practical problem is therefore not simply whether banks claim to apply green banking, but whether specific operational and financing practices can be identified, classified accurately, and supported by empirical evidence.

Previous studies have examined green banking from several perspectives. Khodijah *et al.*, (2023), for example, investigated its implementation at Bank BJB Syariah by focusing on energy efficiency, waste management, and environmental awareness among employees and customers. Zhang *et al.*, (2022) examined the relationship among green banking activities, green finance, and banks' environmental performance, finding that environmentally oriented lending and investment may contribute to environmental performance through green financing. Ojha (2025) similarly associates effective green banking with the broader development of sustainable financial systems. These studies establish the relevance of green banking but also indicate that its contribution to sustainable finance depends on identifiable financing practices and verifiable outcomes. Therefore, findings obtained at the level of a single branch should be interpreted as evidence of implementation practices rather than as proof of bank-wide sustainability impacts.

Although previous studies have discussed green banking in national and institutional contexts, limited empirical attention has been given to how its principles are interpreted and implemented in the routine operations and financing processes of a regional Islamic bank branch. Bank Aceh Syariah occupies a strategic position as a regional Islamic bank because its institutional orientation combines commercial functions with Islamic ethical principles concerning responsibility, public benefit, and the avoidance of harm. However, empirical evidence remains limited regarding the implementation of green banking at Bank Aceh Syariah, particularly at the Sisingamangaraja Medan Branch.

This study addresses three related gaps. First, the empirical gap concerns the scarcity of branch-level qualitative evidence on internal operational practices and financing procedures. Second, the conceptual gap concerns the tendency to classify energy conservation, indoor greenery, sanitation, environmental screening, and green investment as equivalent practices, even though they represent different levels of environmental engagement. Third, the analytical gap concerns the frequent assumption that green banking automatically produces sustainable-finance outcomes without examining financing portfolios, environmental outcomes, social outcomes, operational savings, or risk reductions. To address these gaps, the Green Coin Rating indicators are employed as an analytical lens for organizing the evidence, not as a quantitative score or proof of environmental performance.

Accordingly, this study asks: How are green banking practices implemented in the operational activities and financing processes of Bank Aceh Syariah, Sisingamangaraja Medan Branch, when examined through the Green Coin Rating indicators? The study aims to identify, classify, and critically evaluate the available evidence of green banking implementation and to determine which practices require further institutional strengthening. Its novelty lies in providing a qualitative, branch-level assessment that distinguishes internal resource-efficiency practices, environmental risk screening, and active green financing while avoiding unsupported claims about measurable sustainability outcomes.

The findings are expected to provide a more evidence-based understanding of how green banking principles are operationalized within the specific context of regional Islamic banking.

The remainder of this paper is organized as follows. Section 2 provides a literature review and hypothesis development. Section 3 presents the research method and design. Section 4 provides the results and discussion. Section 5 presents Concluding Remarks and Recommendations.

2. Literature Review and Hypothesis Development

2.1 Sustainable Finance

Sustainable finance refers to the integration of environmental, social, and governance (ESG) considerations into financial decision-making, capital allocation, investment, lending, and risk management to support long-term economic resilience and sustainable development. Unlike conventional finance, which primarily evaluates financial risk and return, sustainable finance considers how financed activities affect society and the environment and how sustainability-related risks influence financial performance. Its scope includes green finance, climate finance, socially responsible investment, impact investment, sustainable banking, and sustainability-linked financial instruments. Financial markets support this framework by mobilizing and allocating capital toward sustainable activities; however, their contribution depends on regulatory arrangements, institutional capacity, and the alignment of financial incentives with sustainability objectives (Maharajabdinul, 2024). The development of this field reflects a shift from ethical investment toward a broader financial framework that incorporates ESG risks, stakeholder interests, and development objectives (Ayaz & Zahid, 2024). Singhania *et al.*, (2024) demonstrate that sustainable finance research has expanded across themes such as green investment, climate risk, corporate sustainability, responsible investment, and financial-system governance. Accordingly, sustainable finance should be understood as an overarching framework. In contrast, green finance represents the part specifically directed toward environmental objectives, including climate mitigation, renewable energy, resource efficiency, and biodiversity protection (Fu *et al.*, 2023).

Financial institutions advance sustainable finance by directing capital toward activities that generate financial returns while supporting environmental and social objectives. Banks may operationalize this responsibility through ESG-based credit assessment, environmental and social risk management, green financing, sustainability-linked products, responsible investment, and transparent sustainability reporting. Internally, financial institutions can strengthen implementation through governance, regulatory compliance, risk management, employee competence, occupational responsibility, green procurement, and resource-efficient operations (Kuo *et al.*, 2023). Digital technology may further support sustainable finance by increasing access, improving ESG data processing, reducing transaction costs, and enabling more transparent financial services (Roy & Vasa, 2025). More broadly, financing mechanisms such as debt financing, venture capital, crowdfunding, and financial technology can facilitate innovation and expand access to capital. However, their effectiveness depends on financial literacy, market conditions, and supportive regulatory frameworks (Nurhayati, 2024). Evidence from China's green digital finance pilot zones indicates that combining green and digital finance may support financial inclusion, energy transition, and industrial transformation. However, its effects differ across regional conditions (Xiao *et al.*, 2024). At the investor level, sustainable finance literacy is also important because individuals require the knowledge and skills to identify and assess the

sustainability characteristics of financial products (Filippini *et al.*, 2024). These mechanisms indicate that sustainable finance depends not only on the availability of funding but also on governance, institutional capacity, reliable information, financial literacy, and technological infrastructure.

Nevertheless, adopting sustainability terminology or implementing isolated environmentally friendly activities does not necessarily demonstrate substantive sustainable-finance performance. Chenguel & Mansour (2023) warn that green finance may remain largely symbolic when definitions, standards, incentives, and accountability mechanisms are inadequate. Similarly, Zetzsche & Anker-Sørensen (2022) identify limited data, inconsistent standards, and insufficient evidence concerning the relationship between sustainability factors and financial outcomes as major regulatory challenges. Sustainable finance may also generate compliance risks, including misleading sustainability claims, information asymmetry, weak verification, and misuse of digitally mediated financing platforms (Teichmann *et al.*, 2023). Therefore, its implementation should be evaluated through evidence concerning financing policies, portfolio composition, financing values, environmental and social risk assessment, measurable outcomes, operational savings, and risk reduction. In this study, sustainable finance functions as the broader outcome-oriented framework within which green banking practices are examined. However, because the analysis is conducted at a single branch and does not measure portfolio-wide environmental or social outcomes, the identified practices are interpreted as indications of institutional implementation rather than conclusive evidence that sustainable finance objectives have been achieved.

2.2 Green Banking

Green banking refers to the integration of environmental considerations into banks' internal operations, lending decisions, investment policies, risk management, product development, and stakeholder engagement. It represents the banking-sector application of sustainable finance, with a more specific emphasis on reducing environmental risks and directing capital toward environmentally responsible activities. Green banking therefore has two interrelated dimensions. The internal dimension includes paper-efficient administration, digital services, energy and water efficiency, responsible procurement, employee environmental training, and waste management. The external dimension covers environmental and social risk assessment, green credit, financing for renewable energy and resource efficiency, and monitoring borrowers' environmental compliance. Chen *et al.*, (2022) position banks as important intermediaries in green economic recovery because their lending decisions influence the direction of business investment. Comparative evidence from Bangladesh and India similarly demonstrates that green banking involves regulatory policies, internal resource efficiency, technological services, and environmentally oriented financing (Rahman *et al.*, 2023). Thus, green banking is broader than reducing paper or electricity consumption because its substantive contribution depends on incorporating environmental considerations into core financial intermediation.

Implementing green banking requires coordinated institutional policies, governance arrangements, technological capacity, employee participation, and financing mechanisms. Sustainable banking initiatives and environmental disclosure may support financial performance, but their effectiveness is influenced by the quality of corporate governance and institutional oversight (Adu, 2022). Rahman *et al.*, (2024) identify sustainable innovation, green investment, and green banking policies as important drivers of green banking operations, indicating that isolated employee practices are insufficient without organizational direction and investment commitments. Digital transformation

can support paperless transactions, expand access to banking services, improve information processing, and increase operational efficiency (Siswanti *et al.*, 2024). Customer awareness, bank reputation, individual innovativeness, and system quality also influence the adoption of green banking technologies (Tanchangya *et al.*, 2025). Nevertheless, digital banking should not automatically be classified as environmentally beneficial because its environmental contribution depends on whether it demonstrably reduces resource consumption or supports environmentally oriented financial activities. On the financing side, Vietnamese banks employ green financing through credit allocation, environmental evaluation, collaboration, and financial products designed for sustainable business activities (Nguyen *et al.*, 2023). Green lending may also affect bank credit risk, although its implications depend on regulatory design, loan quality, and borrowers' environmental performance (Zhou *et al.*, 2022).

Green banking should therefore be evaluated by distinguishing commitments, operational practices, financing processes, and verifiable outcomes. Employee-, management-, operational-, and policy-related practices can strengthen green finance and institutional sustainability performance, but customer-related activities may not always produce significant results (Kumar *et al.*, 2024). Lalon *et al.*, (2025) further show that green banking initiatives can be associated with financial performance; however, their findings do not imply that every green activity produces equivalent economic or environmental benefits. Turning off air conditioners and computers, for example, indicates energy conservation but does not establish carbon-emissions management without energy-use or emissions measurements. Indoor plants cannot independently demonstrate green-building implementation, while sanitation services do not constitute reuse or recycling unless materials are demonstrably recovered and reprocessed. Similarly, environmental screening of financing applications represents environmental risk management, not active green investment unless financing is allocated to projects that satisfy defined environmental criteria. In this study, green banking is consequently treated as a multidimensional institutional practice assessed through evidence of internal resource management, environmental governance, technology-supported services, financing procedures, and green investment. Branch-level practices are interpreted as indications of implementation rather than proof of bank-wide environmental performance, sustainable portfolio composition, or measurable contribution to sustainable finance.

2.3 Bank Aceh Syariah

Bank Aceh Syariah is a regional development bank owned by the Government of Aceh and the regency and municipal governments throughout Aceh. Its institutional history began with the establishment of PT Bank Kesejahteraan Aceh, NV, which obtained its business license on February 2, 1960. Following the enactment of Law Number 13 of 1962 concerning Regional Development Banks, the institution was transformed into the Regional Development Bank of the Special Region of Aceh. This transition was formally completed on August 6, 1973, a date subsequently recognized as the establishment date of the regional development bank.

In 1999, the bank's legal form was changed from a regional government enterprise to a limited liability company in connection with the national banking recapitalization program. It was initially named PT Bank Pembangunan Daerah Istimewa Aceh, subsequently known as PT Bank BPD Aceh. The corporate name was changed to PT Bank Aceh through a shareholders' decision documented in Notarial Deed Number 42 dated August 30, 2003. It was later authorized by the Minister of Law and Human Rights in 2009 and the Governor of Bank Indonesia in 2010. Institutional development established the

legal foundation for the bank's subsequent expansion and transition toward fully Sharia-compliant banking operations.

The bank began providing Sharia banking services after receiving Bank Indonesia Letter Number 6/4/Dpb/BNB dated October 19, 2004, authorizing the establishment of a Sharia branch. Its Sharia banking operations commenced on November 5, 2004. On May 25, 2015, an Extraordinary General Meeting of Shareholders approved the full conversion of the bank's operations from a conventional system to a Sharia banking system. The Financial Services Authority subsequently authorized the conversion through the Decree of the OJK Board of Commissioners Number KEP-44/D.03/2016 dated September 1, 2016. Bank Aceh officially implemented Sharia principles throughout its operational network on September 19, 2016, and thereafter operated as PT Bank Aceh Syariah (Financial Services Authority, 2016). The conversion is relevant to the present study because Bank Aceh Syariah does not operate solely as a regional financial intermediary. As a fully converted Islamic bank, its policies and operations are also expected to reflect Sharia principles concerning responsibility, public benefit (*maslahah*), resource stewardship, and the prevention of harm. Nevertheless, its status as an Islamic bank should not automatically be interpreted as evidence that all its operational and financing activities satisfy green banking or sustainable finance criteria. Such implementation must be evaluated using evidence concerning internal resource efficiency, environmental risk considerations, and the allocation of financing to environmentally responsible activities. The empirical setting of this study is the Bank Aceh Syariah Sisingamangaraja Medan Branch, located at Jalan Sisingamangaraja No. 19D-E, Medan 20215. The official institutional directory identifies the office consistently as the "Sisingamangaraja Medan Branch," thereby resolving the inconsistent use of "Sisingamaraja" and "Sisingamangaraja" in the previous manuscript. As one of Bank Aceh Syariah's branches operating outside Aceh Province, this branch provides a relevant setting for examining how institution-level commitments are translated into daily operational practices and financing procedures at the branch level. The study therefore evaluates practices attributable to this branch. It does not treat branch-level evidence as representative of the environmental performance or financing portfolio of Bank Aceh Syariah as a whole.

3. Research Method

This study employed a qualitative method with a descriptive-analytical case-study approach to examine green banking implementation at Bank Aceh Syariah, Sisingamangaraja Medan Branch. Qualitative research enables an in-depth examination of field phenomena through reflective analysis of interviews, documents, and supporting evidence presented in descriptive narratives and direct quotations (Erickson, 1986). This approach was selected because the study sought to describe existing practices, interpret the meanings assigned to those practices by branch employees, and explain how green banking principles were implemented within the branch context (Pahleviannur *et al.*, 2022). The branch constituted the unit of analysis; therefore, the findings were not intended to represent the implementation or environmental performance of Bank Aceh Syariah as a whole. The study used primary and secondary data. Primary data were collected through face-to-face, in-depth interviews with employees of Bank Aceh Syariah, Sisingamangaraja Medan Branch. Informants were selected purposively based on their involvement in policy implementation, financing processes, or branch operations relevant to green banking. The interviews followed a flexible and communicative format to allow informants to describe their knowledge, experiences, and views in their own words. Secondary

data were obtained from Bank Aceh Syariah's annual reports, sustainability reports, reference books, scholarly articles, previous research, and relevant electronic sources. These materials were used to contextualize the interview evidence and identify whether the reported practices were reflected in institutional documents. Only documents relevant to the study's green banking indicators and branch-level context were included in the analysis.

Data analysis comprised data reduction, data display, and conclusion drawing. During data reduction, interview statements and documentary evidence relevant to green banking were selected and grouped according to the six Green Coin Rating indicators used in the study. The framework functioned as a qualitative analytical lens rather than a numerical rating instrument. Evidence was coded by identifying the reported activity, its implementation context, and the supporting interview or documentary source. The codes were then organized into categories and compared across sources before being developed into indicator-based findings. Data were displayed through narrative explanations, informant quotations, and references to supporting documents. The strength of an indicator was not determined by the number of statements alone but by the specificity, consistency, and convergence of the available evidence. Activities were classified according to their demonstrated function: energy-saving practices were not treated as emissions management without emissions data; environmental screening was distinguished from actual green investment; and general sanitation or indoor plants were not automatically classified as recycling or green-building implementation. Conclusions were drawn cautiously and limited to practices supported by the available branch-level evidence.

4. Results and Discussion

4.1 Analysis Results

Tabel 1. Summary of Evidence Based on the Green Coin Rating Indicators

GCR indicator	Available evidence	Conceptual classification	Evidence status
Carbon emissions	Air conditioners and computers are turned off after working hours; energy- and water-saving campaigns are conducted.	Energy and resource conservation	Limited; carbon management not demonstrated
Green rewards	No formal environmental incentives; employee environmental awareness was reported	Informal employee behavior	Not implemented formally
Green building	Indoor plants are maintained and replaced regularly	Indoor greening and workplace arrangement	Green-building implementation not demonstrated
Reuse, recycling, and refurbishment.	Solid and liquid waste is handled through sanitation and treatment services.	Waste handling or disposal	Reuse, recycling, and refurbishment not demonstrated
Paperless operations	Mobile banking reduces transactional paper use, but paper remains widely used.	Partial operational digitalization	Partially implemented
Green investment	Environmental documents and screening are required; environmentally harmful activities may be rejected.	Environmental and social risk screening	Active green investment not demonstrated

The findings indicate that green banking implementation at Bank Aceh Syariah, Sisingamangaraja Medan Branch, is uneven across the six Green Coin Rating (GCR) indicators. The GCR framework was used as a qualitative classification tool rather than a numerical rating system. Evidence was assessed according to its specificity, consistency with the conceptual meaning of each indicator, and availability of supporting interview or documentary evidence. The strongest evidence was found for partially paperless operations and environmental screening in financing. However, the available evidence did not establish carbon-emissions management, a formal green-reward system, green-building implementation, reuse or recycling activities, or an identifiable green-investment portfolio. Accordingly, the findings describe branch-level practices and should not be interpreted as proof of measurable environmental outcomes or bank-wide sustainable-finance performance.

4.1.1 Carbon Emissions

Evidence associated with the carbon-emissions indicator was limited to energy-conservation practices in branch operations. The Head of the Operations Section explained, "At the end of the workday, air conditioning units must be turned off, and all computers must be double-checked." This statement indicates an internal practice intended to prevent unnecessary electricity consumption after working hours. The interview evidence also referred to continuing reminders concerning efficient electricity and water use as part of employees' daily routines. These practices demonstrate attention to operational resource efficiency and employee discipline in energy use. Nevertheless, turning off air conditioners and computers cannot be classified as carbon-emissions management on its own. The available evidence did not include an emissions inventory, electricity-consumption records, baseline measurements, reduction targets, renewable-energy use, or calculations of Scope 1, Scope 2, or Scope 3 emissions. It was therefore impossible to determine whether the reported practice produced a measurable reduction in greenhouse gas emissions. For analytical accuracy, this finding was classified as energy conservation rather than carbon-emissions management. The carbon-emissions indicator was consequently assessed as having limited supporting evidence and was not considered fully demonstrated.

4.1.2 Green Rewards

Interview findings did not identify a formal green-reward program for employees or customers. No specific monetary incentive, non-monetary recognition, performance indicator, award, promotion criterion, or customer benefit was reported as being linked to environmentally responsible behavior. Therefore, the formal component of the green-reward indicator was not implemented at the branch based on the available evidence. An Operations Staff member nevertheless reported that "employee awareness regarding the adoption of eco-friendly behaviors is very high." One example was the practice of bringing meals from home, which the informant understood as helping to reduce dependence on single-use plastic packaging and maintain workplace cleanliness. This evidence reflects voluntary and informal environmental behavior among employees. However, environmental awareness and personal habits are conceptually different from a green-reward mechanism because they do not involve an institutional incentive or recognition system. Thus, the evidence indicates the presence of informal pro-environmental awareness but does not establish implementation of the green-reward indicator. No contradictory evidence showing the existence of a formal reward policy was identified in the material available for analysis.

4.1.3 Green Building

The evidence categorized initially under green building concerned the presence and maintenance of plants inside the branch office. An Operations Staff member stated, "There are also green plants in the office that are replaced every Friday." This practice indicates an effort to improve the appearance and comfort of the indoor workplace and demonstrates attention to maintaining indoor greenery. However, indoor plants alone do not constitute green-building implementation. A green building ordinarily requires evidence related to building design, energy and water efficiency, environmentally responsible construction materials, natural lighting and ventilation, waste infrastructure, indoor environmental quality, or recognized green-building standards and certification. The available data did not provide information on these elements. There was also no evidence of an energy audit, water-efficiency assessment, green-building certification, or physical building modification designed to improve environmental performance. Consequently, the reported activity was reclassified as indoor greening or workplace environmental arrangement. The green-building indicator could not be considered demonstrated based on the available interview quotation.

4.1.4 Reuse, Recycling, and Refurbishment

The findings show that waste generated from branch activities, including used paper and food waste, was handled through sanitation services. In contrast, liquid waste was managed through the available disposal or treatment system. This evidence indicates that the branch has arrangements for routine waste handling. However, the interviews did not identify a specific mechanism for reusing materials, separating recyclable waste, transferring waste to certified recyclers, processing paper waste, composting organic waste, or refurbishing office equipment and furniture. Waste collection and sanitation services should be distinguished from reuse, recycling, and refurbishment. Reuse requires an item to be used again without substantial reprocessing; recycling requires discarded material to be processed into usable material or products; and refurbishment requires used assets to be repaired or restored for continued use. None of these processes was documented in the available evidence. Therefore, the indicator was classified as not demonstrated. The finding does not imply that the branch has no sanitation system; rather, it indicates that sanitation and disposal practices cannot be treated as evidence of circular material management without proof that materials are recovered, processed, or returned to use.

4.1.5 Paperless Operations

The paperless-operations indicator received clearer, although still partial, support. An Operations Staff member stated that "the advent of mobile banking has reduced paper usage through digitalization." Mobile banking allows customers to conduct selected transactions without completing conventional paper-based processes at the branch, thereby creating a plausible mechanism through which transactional paper use may be reduced. This finding shows that service digitalization has altered certain operational and customer transaction processes. The same informant also acknowledged an important limitation: "Indonesia cannot yet fully move away from paper... paper usage remains high, though it is now beginning to decrease." This constitutes contradictory or qualifying evidence because it shows that digital services coexist with continued paper dependence. The available data did not include paper-purchasing records, the volume of printed documents, the proportion of digital transactions, or

comparative paper consumption before and after mobile-banking implementation. Therefore, the magnitude of paper reduction could not be measured. The indicator was classified as partially implemented: digital banking supports reduced paper dependence in some activities, but fully paperless branch operations have not been achieved or empirically demonstrated.

4.1.6 Green Investment

In the financing process, the available evidence indicates that environmental considerations are incorporated into the assessment of certain applications. A Financing Staff member stated, "Bank Aceh requires an environmental impact analysis when granting financing." The informant further explained that "any loan application involving activities that damage the environment is automatically denied." Environmental documents mentioned in the interviews included the Environmental Impact Assessment (Analisis Mengenai Dampak Lingkungan—AMDAL) and Environmental Management and Monitoring Efforts (Upaya Pengelolaan Lingkungan dan Upaya Pemantauan Lingkungan—UKL-UPL). The findings also referred to monitoring transactions potentially associated with illegal logging and environmental pollution. These practices indicate an environmental risk-screening function intended to prevent financing from being allocated to activities that violate environmental requirements. Nevertheless, environmental screening and the rejection of environmentally harmful applications are not equivalent to active green investment. Active green investment would require evidence that financing was deliberately allocated to eligible environmental activities, such as renewable energy, energy efficiency, pollution prevention, sustainable transportation, certified green buildings, or responsible waste management. The available data did not specify a green-financing product, eligibility taxonomy, number of financed projects, financing value, portfolio proportion, environmental targets, or verified project outcomes. Consequently, the branch-level evidence supports the existence of environmental and legal screening in financing but does not establish an active green-investment portfolio. The green-investment indicator was therefore classified as not fully demonstrated.

4.2 Discussion

4.2.1 Implementation of Green Banking at Bank Aceh Syariah, Sisingamangaraja Medan Branch

The findings demonstrate that green banking implementation at Bank Aceh Syariah, Sisingamangaraja Medan Branch, is selective rather than comprehensive. The six Green Coin Rating (GCR) indicators produced different levels of evidence: paperless operations were partially supported, environmental screening was identified in the financing process, whereas carbon-emissions management, formal green rewards, green-building implementation, reuse–recycling–refurbishment, and active green investment were not fully demonstrated. This interpretation differs from the initial claim that all GCR indicators had been implemented. The GCR framework is therefore useful as a qualitative diagnostic lens for identifying gaps between reported activities and the conceptual requirements of each indicator. However, it should not be treated as a validated quantitative rating or proof of environmental performance at the branch level.

The activities initially classified under the carbon-emissions indicator are more accurately understood as energy-conservation practices. Turning off air conditioners and computers may reduce electricity consumption by preventing unnecessary use, which is consistent with the development of resource-efficient operational routines (Mbunai *et al.*, 2024). Such routines can help establish employee discipline and an environmentally conscious organizational culture. However, electricity conservation

cannot be equated directly with carbon emissions management because the branch did not present electricity baselines, emissions inventories, reduction targets, or verified emissions calculations. Chen *et al.*, (2022) explain that green banking involves financial institutions supporting environmental recovery through substantive operational and financing mechanisms. From this perspective, the branch has established a plausible operational mechanism for conserving energy, but the environmental outcome of that mechanism remains unmeasured. The finding therefore supports a limited claim of operational efficiency rather than a claim of reduced carbon emissions.

Table 2. Analytical Synthesis of Green Banking Implementation

GCR indicator	Processed empirical evidence	Analytical interpretation	Implementation status
Carbon emissions	Air conditioners and computers are turned off after working hours; employees are encouraged to conserve electricity and water.	Operational resource conservation without emissions measurement	Limited
Green rewards	Environmental behavior arises from employee awareness; no formal incentives were identified.	Informal behavior without an institutional reward mechanism	Not formally implemented
Green building	Indoor plants are maintained periodically	Workplace greening rather than green-building implementation	Not demonstrated
Reuse, recycling, and refurbishment.	Solid and liquid waste is handled through sanitation or treatment services.	Waste handling without evidence of material recovery or recirculation	Not demonstrated
Paperless operations	Mobile banking reduces selected paper-based transactions, but paper remains widely used.	Partial digital transition without quantified paper reduction	Partially implemented
Green investment	Environmental documents are examined, and environmentally harmful activities may be rejected.	Environmental risk screening rather than verified allocation of green financing	Not fully demonstrated

The absence of formal green rewards reveals a gap between individual awareness and institutionalized environmental management. Employees reportedly reduce single-use plastics and bring meals from home, but these behaviors depend on personal initiative. They are not reinforced through performance indicators, monetary incentives, recognition programs, or customer benefits. Rahman *et al.*, (2025) identify green policy, green investment, and sustainable innovation as organizational drivers of green banking operations. This suggests that voluntary employee behavior is more likely to become consistent when formal policy and management systems support it. At the Sisingamangaraja Medan Branch, environmental awareness constitutes a potential cultural resource, but it cannot yet be classified as a green-reward system. The finding therefore indicates an institutionalization gap: environmental values are visible in individual conduct but have not been translated into a formal mechanism for directing collective behavior.

A similar conceptual distinction applies to the green-building indicator. The presence of indoor plants may contribute to workplace aesthetics and perceived comfort, but it does not demonstrate that the office meets green-building principles. Such principles ordinarily require evidence concerning energy-efficient design, water management, environmentally responsible materials, natural ventilation, indoor environmental quality, waste infrastructure, or recognized building standards. Wahyu Ningsih *et*

al., (2020) associate green buildings with broader structural and resource-efficiency characteristics rather than decorative greenery alone. Consequently, the plants maintained by the branch should be classified as indoor greening. This practice may have workplace value, but the available evidence is insufficient to infer improvements in building-level environmental performance.

The findings concerning reuse, recycling, and refurbishment also require narrower interpretation. Sanitation services and liquid-waste treatment indicate that the branch has mechanisms for handling waste after it is generated. However, they do not show that materials are reused, processed into recyclable inputs, or restored for continued use. This distinction is important because disposal-oriented sanitation and circular material management operate through different mechanisms. Reuse extends the usable life of an item, recycling returns material to a production cycle, and refurbishment restores an asset for further utilization. The absence of waste separation, paper-reuse procedures, recycling partnerships, composting, or asset-refurbishment records indicates that the branch's current approach is primarily reactive. Thus, cleanliness and waste removal should not be interpreted as evidence that the three circular practices have been implemented.

Paperless operations represent the clearest internal green banking practice, although implementation remains partial. Mobile banking reduces the need for selected physical forms and branch-based transactions, thereby creating a plausible pathway for lowering paper use. This is consistent with Siswanti *et al.*, (2024), who show that digital transformation can support green banking by improving operational efficiency. Tanchangya *et al.*, (2025) similarly emphasize that green banking technology can facilitate more environmentally sustainable transactions when it is supported by customer awareness, system quality, and institutional credibility. Nevertheless, the branch continues to rely on physical documents, and no data were available on paper purchases, printing volumes, or the proportion of transactions completed digitally. Digitalization should therefore be interpreted as an enabling mechanism rather than direct evidence of environmental improvement. Its contribution to paper reduction remains plausible but unquantified.

The financing indicator also needs to be interpreted more cautiously than in the initial discussion. The requirement for AMDAL or UKL-UPL documents and the rejection of environmentally harmful activities demonstrate environmental and legal screening in financing decisions. Such screening is relevant to environmental risk management because it can prevent the bank from financing activities that fail to satisfy applicable requirements. However, it does not establish active green investment. Nguyen *et al.*, (2023) show that green financing requires deliberate capital allocation to activities with defined environmental objectives, while Zhou *et al.*, (2022) demonstrate that green lending involves identifiable credit allocation and may affect bank risk. The branch-level evidence did not disclose a green-financing product, eligibility taxonomy, financing value, portfolio proportion, project category, or verified environmental outcome. Environmental screening must therefore be distinguished from affirmative financing of renewable energy, energy efficiency, pollution prevention, sustainable transportation, or comparable green activities.

The initial discussion also associated Anti-Money Laundering and Countering the Financing of Terrorism (APU-PPT) with environmental risk mitigation. This relationship must be limited conceptually. APU-PPT procedures are primarily intended to identify suspicious financial transactions and prevent money laundering and terrorism financing. They may detect transactions associated with illegal logging or environmental crime when the proceeds enter the financial system. However, they are not substitutes for environmental credit assessment or green-investment policies. Therefore, APU-PPT can provide an

indirect compliance safeguard, while AMDAL, UKL-UPL, sectoral restrictions, and project eligibility criteria constitute the more relevant mechanisms for environmental screening.

Overall, the branch is better characterized as being at an early and fragmented stage of green banking implementation. This finding is consistent with Rahman *et al.*, (2023), who demonstrate that green banking development in emerging economies often varies across regulation, internal operations, technology, and financing. However, the present findings do not support the earlier conclusion that green investment is the dominant indicator. What appears strongest is the presence of environmental screening, not evidence of a dedicated green-financing portfolio. The distinction is analytically important because avoiding environmentally harmful financing and actively allocating funds to environmentally beneficial activities are related but separate institutional functions.

4.2.2 Relationship Between Green Banking and Sustainable Finance

The relationship between the identified green banking practices and sustainable finance should be interpreted as a set of potential pathways rather than an empirically established impact. Sustainable finance requires environmental, social, and governance considerations to influence capital allocation, risk management, and long-term financial decisions. Green banking can function as an operational and financial mechanism within this broader framework, but isolated branch practices do not prove that sustainable-finance outcomes have been achieved. The study did not measure environmental outcomes, social outcomes, green-financing values, portfolio composition, operational savings, or reductions in financing risk. Therefore, statements that green banking positively contributes to sustainable finance must be qualified according to the evidence available.

Energy conservation may potentially support the environmental dimension of sustainable finance by reducing operational resource use. Similarly, digital banking may improve service efficiency and reduce dependence on paper. However, the present evidence establishes only that these practices occur, not the extent of their environmental effects. No comparison of electricity, water, paper, operating costs, or emissions was available. Adu (2022) demonstrates that sustainable banking initiatives can be associated with environmental disclosure and financial performance, but this relationship is affected by governance quality and the availability of institutional information. Applied to the present case, operational practices would need to be documented, measured, and reported before their contribution to sustainable finance could be evaluated.

Environmental screening in financing represents the most direct conceptual link with sustainable finance because it incorporates non-financial considerations into credit decisions. This practice is consistent with the preventive orientation of POJK Number 51/POJK.03/2017, which requires financial services institutions to integrate sustainable-finance principles into their policies and activities. Nevertheless, regulatory alignment at the procedural level does not demonstrate financing outcomes. Kumar (2024) finds that management-, employee-, operational-, and policy-related green banking practices can strengthen green finance and institutional sustainability performance. In the present study, however, the absence of financing amounts, sectoral allocations, project outcomes, and portfolio data prevents a comparable conclusion. The finding supports the existence of an environmental screening procedure, but not a claim that the branch has generated measurable green-financing outcomes.

The indicators for green rewards, green building, and reuse–recycling–refurbishment currently provide little evidentiary basis for a relationship with sustainable finance. This does not mean these practices are irrelevant. Formal environmental incentives can strengthen employee participation; green

buildings can reduce long-term energy and water demand; and circular practices can reduce material consumption and waste. However, these mechanisms were not institutionally demonstrated at the branch. Lalon *et al.*, (2025) report that green banking initiatives may be associated with bank performance, but their effects depend on the scope and consistency of implementation. The limited practices identified in this study cannot be assumed to produce comparable outcomes.

From an Islamic banking perspective, preventing environmental harm and using resources responsibly are compatible with the principles of stewardship, public benefit, and accountability. Environmental screening may therefore reinforce both regulatory compliance and the ethical orientation of Islamic finance. However, the Islamic identity of Bank Aceh Syariah does not automatically establish superior environmental performance. The distinctive implication lies in the potential to integrate environmental responsibility with Sharia governance and financing decisions. Demonstrating this integration would require evidence that environmental criteria are formally incorporated into policies, product design, financing approval, monitoring, and institutional reporting.

Accordingly, the study identifies three different levels of connection between green banking and sustainable finance. First, energy conservation and digitalization constitute potential operational-efficiency mechanisms. Second, environmental documentation and financing restrictions constitute environmental risk-screening mechanisms. Third, active sustainable-finance outcomes would require verified capital allocation and measurable environmental or social results. The available evidence supports the first two levels only partially and does not establish the third. Green banking at the Sisingamangaraja Medan Branch should therefore be described as an emerging institutional process that may provide a foundation for sustainable finance, rather than as evidence that economic, social, and environmental objectives have already been achieved in a balanced manner.

5. Concluding Remarks and Recommendation

This qualitative descriptive-analytical case study examined how green banking practices are implemented in the operations and financing processes of Bank Aceh Syariah, Sisingamangaraja Medan Branch, using the six Green Coin Rating indicators as a qualitative analytical framework. The findings show that implementation remains selective and uneven. Mobile banking provides partial support for paperless operations, while switching off air conditioners and computers reflects energy conservation rather than verified carbon-emissions management. A formal green-reward system has not supported employee environmental behavior; indoor plants represent workplace greening rather than green-building implementation; and sanitation services do not demonstrate reuse, recycling, or refurbishment. Environmental documentation and the rejection of environmentally harmful financing applications indicate environmental risk screening, but the available evidence does not establish a dedicated green-investment portfolio.

The study contributes by distinguishing operational resource efficiency, environmental risk screening, and active green financing, which should not be treated as equivalent forms of green banking. At the practical level, the branch should establish measurable energy, water, and paper-consumption baselines; formalize environmental incentives; introduce waste separation and material-recovery procedures; and develop verifiable green-financing criteria. At the institutional and policy levels, environmental screening should be connected to financing classifications, portfolio monitoring, financing values, and project outcomes. For Islamic banking, these measures provide an opportunity to

translate the principles of stewardship, public benefit, accountability, and prevention of harm into documented operational and financing practices. Nevertheless, this study does not conclude that the branch has balanced economic, social, and environmental outcomes or positively contributed to sustainable finance because such outcomes were not measured.

The study is limited by its focus on a single branch, the small amount of interview evidence available for each indicator, and the absence of measurable data on emissions, resource consumption, operational savings, environmental outcomes, social outcomes, financing values, risk reduction, and green-portfolio composition. The annual and sustainability reports identified as secondary sources were not supported by specific extracts or branch-level records in the evidence analyzed; consequently, documentary triangulation could not be fully established. Future studies should involve a broader and more diverse group of informants, document interview and coding procedures transparently, compare multiple branches, and integrate qualitative evidence with energy records, paper-consumption data, financing portfolios, environmental-risk assessments, and verified project outcomes. Such evidence is required to determine whether green banking practices progress beyond procedural adoption and produce measurable sustainable-finance outcomes.

Statement of Use of Generative AI

During the preparation of this work, the author used generative artificial intelligence tools to support the scientific writing process. Grammarly was used to check grammar, refine writing style, and improve clarity in scientific writing. All interpretations, analyses, and conclusions presented in this study are the sole responsibility of the author.

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