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Original Article

Green Banking Status and Role of Central Bank in Bangladesh: A Recent Trend

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Abstract: Almost all banks established green banking units in time, though there is a lack of seriousness in implementing green banking policies set by Bangladesh Bank. The aim of the study is to examine the green banking status and the role of central bank in Bangladesh. This study finds 22 banks achieved green finance (GF) target where UCB PLC stood in the top position at 36.21%, next to Jamuna Bank PLC at 29.85%, IBB PLC at 22.42%, and Bank Asia stood at the end at 5.47%. On the other hand, 17 commercial banks fulfill the sustainable financing (SF) target of the total term loan disbursement set by Bangladesh Bank. It is observed that in Q4, 2023, 17 banks out of 61 had exposure to green finance, where 16 banks were Private Commercial Banks (PCBs). One and only The Bangladesh Krishi Bank (Specialized Bank) occupied the top position, accounting for 56.48% of sustainable finance next to NRB Bank PLC 42.86%, BRAC Bank PLC 41.32%, etc., and Jamuna Bank PLC stood last position at 21.57%. The study also found the total target achieved by banks was 9.09% in GF and 27.24% in SF, which exceeded the target set by the Bangladesh bank and it is a milestone to achieve SDGs set by the UN by 2030. This study explores the basic concepts of green banking and green financing movement, present status, and their impact on bank performance in Bangladesh. In this study, secondary data is used, which were collected from related published articles, Bangladesh Bank annual reports, quarterly reports, sustainability reports, other commercial banks' reports, World Bank reports, and newspaper reports from 2014 to 2023.

Keywords: Central Bank; Bangladesh Bank (BB); Green Banking (GB); Green Financing (GF); Refinancing

1. Introduction

Bangladesh, an emerging country, is one of the most polluted countries in the universe. To protect our severely affected country and the next generation, we need to take some initiatives, such as creating pressure on the international community to reduce CO_2 emissions and take decisive steps against our internal polluters. Bangladesh is considered a developing economy**;** managing its environment requires focusing on the business fraternity, especially in the banking sector (Hossain & Rana, 2024)**.** This sector needs to address ecological and social hazards linked with funding exercises which is must in prevailing credit rating support. Green and acceptable interferences are vital for producing future growth more endurable. Financial organizations can alter the trends of a hygienic planet to a large extent. Banks can take steps to implement

a go-green strategy to inspire clients to accept hygienic know-how. This strategy expects a favorable firm that cuts costs and encourages entry to new marketplaces.

All FIs should manage carbon footprint of their customers or ventures to confirm their ultimate existence in the long run. Financial sectors back to ecological erosion via financing in several contaminant factories, so we must assume corrective measures against all wrong activities. Bangladesh Bank should force all financial institutions to establish green banking guidelines to curb their environmental pollution, providing loans to atmosphere-responsive schemes. The word green has a broad sense of usage, which covers the social responsibility of the planet's inhabitants, where banks are treated as corporate citizens in modern society. Go green strategy in banking activities usually plays a decisive part in implementing maintainable progress of banks and green economy. Generally, green funding refers to lending practices that substitute ecologically accountable funding and inside banking activities that minimize carbon and conservatory gas releases. Green financing is also called ecosystem-supportive, naturally welcoming, and ethical financing, which is used to stop environmental pollution and keep the only earth in the universe habitable. Green banking is a new concept that leads people to earn profit and save the planet without compromising on environmental pollution. Every bank should play a proactive role in going green and trying to induce businesses to move for environment-friendly funding and use modern technology. Ullah (2012) mentioned green banking works like a wheel as a linked chain as shown in Figure 1.

Figure 1. Relationship among Bank, Customers and Environment

Green banking may come in many ways such as providing innovative green products, using online banking activities, paying utility bills online, purchasing green mortgages, issuing green credit cards, debit cards, etc. The banking sectors of Bangladesh play a pivotal role by initiating green banking activities, creating a green economy, and saving the environment. Homo sapiens cannot alter the emission of gases such as carbon dioxide or the globe's trajectory near the sun. However, they can hold the inflated portion of carbonic acid gas and their influence on the climate. In the last century, carbonic acid gas engagement has grown alarmingly in the air, and human beings are liable for this. The leading reason for increased carbonic acid tiers in the air is the burning of fossil energies. Industrial activities rose rapidly from the end of the 19th century, and many plants were built. These plants demanded power, which was fulfilled through the blast of coal. Excluding coal, other power bases, such as oil and natural gas, were ignited to heat our houses, run automobiles and aircraft, and beget power supply. At present, nearly 85 million barrels of natural oil are steamed every day. Every time a fossil raw material is burned, it emits CO_2 into the air. Thus, it is evident that human beings are causing more conservatory gases like CO_2 worldwide. Besides, we also support the conservatory effect by intentionally unclogging forests, which implies cutting down trees.

Each year, people consume massive woodland to get wood, make thin rooms for mining, and make habitats (Alam & Islam, 2023; Rabiul Islam & Hossain, 2018). This loss of woodlands causes double concerns, such as fumed-up trees emitting significant volumes of CO_2 into the air. On the other hand, as forests absorb much CO_2 from the air and deliver Oxygen instead, we also eliminate an essential storehouse of Oxygen when we empty woodlands. Green financing which also called environment-responsive financing can solve this big problem. The concept of green banking was founded in 2009 in the state of Florida, USA. In 2009, Chris Van Hollen, a congressman, introduced the "Green Bank Act" to offer financial support increasing energy usage efficiency and reduce carbon emissions under the ownership of the U.S. government. In May 2012 first GB's persistent actions was granted membership to the Global Alliance for Banking on Values (GABV). In the complex financial environment where 1st GB opened and functioned, it attained outstanding profitability in 19 months, with current assets of about 252 million dollars as of December 2013.

A pollution-free green planet is required for the healthy living of human beings and the survival of other species. The world faces severe pollution problems like air, water, soil, noise, etc. And at the same time, in the name of environmental change, various types of adverse effects, such as seal level rise, global warming, biodiversity damaged, imbalanced ecosystems, non-curable diseases, mental depression, earthquakes, cyclones, floods, drought, extreme heat wave, cold wave, corona, flu, thundering, tide etc. started unexpectedly. Bangladesh is not out of the mentioned adverse situation. Bangladesh is an emerging economy and dreams of being an upper-middle income country by 2030 and a high-income country by 2041, which is only possible with sustainable banking. According to BBS reports, the

contribution of banking sectors to the Bangladesh economy regarding GDP from 2017 to 2020 was 9.95%, 8.51%, 7.38%, and 4.19%, respectively, which indicates a decreasing trend. Not only that, credit conditions, classified loans, profitability, sustainability, etc., also declined over the years. However, commercial banks should invest their funds in indirect green and sustainable finance to survive in the competitive market and increase profitability. Three multifaceted approaches are involved in making our planet green: economic, environmental, and social. By addressing the following factors holistically, we can efficiently work towards going green and ensuring a sustainable, more resilient, and healthier future for the next generation.

The population growth rate in Bangladesh is 1.1% per annum, while the commercial energy demand will increase by 400% by 2038 compared to 2018. Bangladesh is the most fossil fuel-dependent country in Asia far behind other countries in decarburization progress. Bangladesh is suffering from an energy crisis that is negatively affected by climate change. As of 2022, Bangladesh depends on fossil fuels for about 98% of total electricity demand. The energy mix comprises 59% natural gas, 24% fossil fuel, and 15% coal (Ember). The remaining 2% includes solar, biofuel, wind, and water. Instead of increases, Bangladesh decreased its non-fossil fuel electricity production from 3% to 2% between 2015 and 2022. However, the rest of the Asian countries increased it from 24% to 32% during that period. So, Bangladesh is the bottommost in Southeast Asia and at the back of Pakistan (43%) and India (23%). According to The Daily Star report, natural gas will run out in 9 to 11 years.

According to the Integrated Energy and Power Master Plan (IEPMP), draft gas consumption will grow 160% to 360% to generate 30% of power by 2050. About 50% of its required financing will go to the natural gas sector. They estimate Bangladesh may import 49 million tons of LNG by 2050. According to the IEEFA, coal and oil plants in Bangladesh are just a single exception and run on imported fuels. Intergovernmental Panel on Climate Change guesses that climate alteration may cost 2-9% of its GDP by 2050 (The Daily Financial Express.bd). Bangladesh is in dire need of a power plant that prioritizes de-carbonization and energy independence. We need a framework designed to solve the energy poverty problem. Bangladesh must focus on removing the fossil fuel subsidies, straining the budget, and dis-incentivizing investment in renewables. Studies show that complete fossil fuel removal will increase GDP by up to 2.3%. Utilizing just one-third of the 1500 Km2 fishpond area can confirm 15 GW of floating photovoltaic (FPV). The low-water areas and large ponds can offer up to 45 GW of solar power.

Regarding wind power, Bangladesh has a territory of 20000 km^2 with wind speediness of up to 7.75 m/s, apposite for 30 GW of capacity. Research found that utilizing just 4% of the country's territory would ensure enough capacity for a 100% renewable energy-powered system. Starting with small steps would guarantee immediate results. They identified that just 2 GW of installations would be sufficient for Bangladesh to save $ 1.1 billion per year from fossil import costs. Experts note that Bangladesh could exploit its vast geothermal resources by utilizing gas drilling infrastructure. The IEEFA estimates the Leveled Cost of Electricity (LCOF) from rooftop and utility-scale solar at around $0.05/KWh and $0.072/KWh, respectively, compared to $0.084/KWh during the fiscal year 2021-22.

According to Ember, if Bangladesh had prioritized solar power between 2022 and 2024, it could have reduced LNG imports by 25% and saved $2.7 billion. For reference, in the first half of 2022, solar power saved $ 34 billion, or around 9% of the total fossil fuel expenditures of China, Japan, South Korea, Vietnam, the Philippines, and Thailand. Solar power could have reduced Bangladesh's spot LNG purchased by 25% and saved $2.7 billion by 2024. The IEEFA estimates that the country would need between $1.53 and $1.71 billion annually in financing between 2024 and 2041 to achieve its 40% clean energy target. Factories need power that is shaped by the burning of fossil fuels and increases the temperature of the Earth. Studies found that nearly 85 million drums of unpolished oil are burned every day in Bangladesh. Fossil fuel is scorched as raw material and constantly releases CO_2 into the air. Therefore, we generate substantial greenhouse gases all over the world.

2. Literature Review

Green finance has gained increasing attention in recent years for its role in addressing environmental challenges and promoting sustainable development. Several studies have examined the impact of green finance on environmental quality. Zeng et al. (2022) in China analyzed the relationship between green finance and urban haze pollution using regression methods on data from 639 observations over four years. They found a negative correlation between green finance and pollution levels, indicating that green finance enhances environmental quality through the adoption of modern technologies. Similarly, Akomea et al. (2022) conducted a meta-analysis of 46 studies and identified various green finance products such as green bonds, green credit, and green insurance as pivotal tools for climate change mitigation and environmental protection.

The contribution of green banking to financial performance has also been widely studied. Hasan et al. (2020) explored the effect of green banking practices on ROA, ROE, and market value (MV) of 14 banks in Bangladesh. Their findings revealed that factors such as green cost, bank size, and risk management positively influenced financial performance, whereas high operating costs had a negative impact. Supporting this, Jatana and Jain (2020) in India reported a strong positive correlation between bank performance and the volume of electronic transactions, including card use, RTGS, and online clearing. Likewise, Walzer et al. (2024) in Indonesia investigated how green banking disclosure and financial ratios influence profitability. They found that while capital adequacy and efficiency negatively affected profitability, non-performing loans and the loan-to-deposit ratio had a positive effect.

Other studies focused on green technology and innovation. Fang and Shao (2022) in China emphasized the role of green finance in driving green technological advancements. Using primary data, they demonstrated a significant positive relationship between environmental regulations—both command-and-control and market-based—and green technological innovation. These findings suggest that well-designed regulatory frameworks, coupled with green finance initiatives, can accelerate technological transformation. Research has also investigated the role of governance and green disclosure in shaping sustainability outcomes. Ikram and Akhtar (2021) examined green banking disclosure practices, firm value, and governance mechanisms across SAARC countries using panel data. Their findings indicated that institutional ownership and board independence were negatively associated with firm value, suggesting the need for better alignment of corporate governance with environmental goals. Similarly, Talika et al. (2022) in India explored the impact of board meetings and governance committees on bank performance but found no significant relationship with ROA.

In the context of Bangladesh, several studies examined the implementation and adoption of green banking guidelines. Akhter et al. (2021) analyzed green banking policy compliance and financial outcomes among DSE-listed banks, finding that green banking practices positively influenced financial performance, though many banks had not fully reported their green financing activities. Karim (2020) provided a descriptive analysis of green investment trends in Bangladesh, noting an upward trajectory up to 2017. In addition, Khatun et al. (2021) found that most private and foreign commercial banks had adopted green banking policies, with private banks disbursing the highest proportion of loans to environmentally friendly projects. Zheng et al. (2021a) explored the mediating role of green finance in corporate sustainability and reported that the economic, social, and environmental dimensions of green finance significantly improved sustainability performance in Bangladeshi financial institutions.

Guang-Wen and Siddik (2022) further reinforced this by revealing that CSR practices—including economic, social, and environmental initiatives—had a positive impact on the environmental performance of Bangladeshi banks. Similarly, Zheng et al. (2021b) confirmed that nearly 95% of bankers recognized green finance as crucial to both short- and long-term development goals, particularly among private commercial banks, which led in total green finance disbursements. Azad et al. (2022) assessed recent trends in green and sustainable finance among banks and NBFIs and found that while Bangladesh Bank has made notable progress through various initiatives, green finance (3.16%) and sustainable finance (9.32%) achievements still fall short of SDG targets.

Lastly, conceptual studies have contributed valuable insights into the strategic role of green banking in sustainability. Sharma and Choubey (2021) proposed a conceptual model involving green brand image and green bond trust, though their case studies indicated that the intended targets were not fully met. Mir and Bhat (2022) emphasized the role of banks in advancing low-carbon economies and sustainable development goals (SDGs), noting that green banking benefits financial institutions, industries, and the environment alike. Thus, this study aims to explore the current landscape of green banking practices among financial institutions in Bangladesh. Specifically, it seeks to assess the present status of green financing initiatives within the country

Table 1. Summary of Literature Review

Author, Year, and Country	Objectives	Methods	Variables	Findings
Zeng et al. (2022), China	To analyze green finance and urban haze pollution	Ex- post facto and correlation, regression research designed, the	The independent variable was: i. urban green bond ii. annual average concentration of fine	i. A negative correlation between green finance and urban haze pollution ii.

		sample size was 639, four years of data were collected.	particles. Control variables were size, growth and profitability	Green finance increased environment quality with modern technology.
Fang and Shao (2022), China	i. to investigate the influence of green finance on green technology innovation.	In the cross-sectional survey, primary data was used.	The independent variable was - i. Command, control and environmental regulation ii. Marketing incentives environmental regulation iii. GF	i. a positive significant correlation between command, control, environment regulation and green technology innovation ii. a positive correlation between market incentives, environment regulation and green technology.
Hasan et al. (2020), Bangladesh	i.to find out the effects of GB on ROA, ROE and MV	Ex post facto association research design, sample size is 14 banks, secondary data was used.	The independent variable was - green banking consisting of a volume of risk management committees. The dependent variable was i. ROA ii. ROE iii. MV	i. The green cost, size of bank, and risk management positively affect ROA, ROE, and MV ii. Operating cost negatively affects ROA, ROE, and MV
Jatana, R., & Jain, H. (2020), India	i. to investigate the effect of GB on bank performance.	Secondary data was used.	The independent variable was - i. total card transaction. ii. total retail online clearing iii. RTGS iv. No. of cards transaction.	i. Highly positive correlation between performance and total card transactions, total retail electronic clearing, and RTGS
Akhter, I., Yasmin, S., & Faria, N. (2021), Bangladesh	i. To examine the status of green banking policy guidelines ii. To explore the effect of GB on financial performance of banks.	DSE-listed commercial banks are sampled, and secondary data are analyzed. SPSS software was used for data interpretation.	The independent variable was - i. green initiative scores ii. Green finance ratio	i. Nine banks out of 30 DSE-listed commercial banks did not report green financing information, while I bank started disclosing green financing data in 2017.

				ii. green banking practices positively influence bank performance.
Karim, R. (2020), Bangladesh	i. To examine the status of adopting GB practices by banks.	Descriptive methods and secondary data were used. MS-excel software was applied.	He identified nine green investment areas.	i. The entire green investment is an upward trend up to 2017.
Sharma, M., & Choubey, A. (2021), India	i. Conceptual model was applied in GB initiatives. ii. To show the 3 green banking indicators' impacts on 2 possible outcomes.	Exploratory and qualitative methods based on multiple case studies. They used primary and secondary data.	Three independent variables were – i. green banking initiatives ii. green brand image iii. green bond trust.	i. The set target was not achieved.
Guang-Wen & Siddik (2022), Bangladesh	i.to examine CSR practices and GF on environmental performance in Bangladesh	It was a cross-sectional survey, Sample size was 388 bank employees, and used inferential statistics	The IV was: i. economic ii. social iii. environmental and iv. CSR dimensions.	i. Economic, social, environmental, and CSR practices positively and significantly affect the environmental performance of PCBs in Bangladesh
Zheng et al (2021a), Bangladesh	i. To investigate the mediating role of green finance on corporate sustainability performance of FIs in Bangladesh	Cross-sectional survey research design, convenience sampling methods, structured questionnaire. They used SEM to analyze data.	The independent variable was - i. Economic ii. Social and iii. environmental dimensions.	i. The economic dimension has positive and significant impact on the sustainability performance of PCBs. ii. The social dimensions positively and significantly impact on sustainability performance of PCBs. iii. The environmental dimension have positive and significant impact on the

				sustainability performance of PCBs.
Ikram, I. and Akhtar, S. (2021), Pakistan	i. to shed light and explore dynamic relations among green banking disclosure practices, firm value, and corporate governance mechanisms in SAARC countries.	Panel data set (2010-2019) is analyzed using STATA 14.2 They used econometric model	The independent variable was - i. board size ii. investors iii. Green banking disclosure iv. institutional ownership and dependent variable was - i. Tobin's Q	i. Institutional ownership and board independence has significant negative impact on market value
Akomea, F, I., Adeabah, D., Ofosu, D., & Tenakwah, E. J. (2022), China.	i.to analyze green finance, environmental protection, climate change	A review of forty-six relevant papers. They used meta-analysis	The independent variable was - green finance products.	i. green bonds ii. green investments iii. climate finance iv. carbon finance v. green insurance vi. green credit and vii. green bonds are part of green finance products of banks.
Mir, A. A., & Bhat, A. A. (2022), India	i. to study GB practices, methods etc. ii. the contribution of banks in environmental sustainability and SDGs.	The study was conceptual in nature. It was conducted based on literature review.	The independent variable was: Environmentally sustainable. The dependent variable was: i. green banking initiatives	i. People have to deal with banks which play a crucial role in the environment by developing robust and successful low-carbon economics. ii. green banking undoubtedly benefits banks, industries, and the environment to some extent.
Khatun, M. N., Sarker, M. N. I., & Mitra, S. (2021) Bangladesh	i.to explore the pattern adopted by green banking activities in Bangladeshi banks.	The research was based on secondary data between (2014-2019). Quantitative method was adopted to interpret data.	The independent variable was - various green banking initiatives and dependent variable was - sustainable development.	i. Most of the PCBs and FCBs adopted green banking policies ii. PCBs disbursed the highest loans to environmentally convenient projects followed by FCBs and SOCBs.

				i. The PCBs accounted for the highest GF of total green finance in Bangladesh.
Zheng, G. W., Siddik, A. B., Masukujjaman, M., & Fatema, N. (2021), Bangladesh	i. to investigate the dimensions of GF and effects on the sustainability performance of FIs in Bangladesh.	They used SEM techniques to analyze collected data.	The IV was: the performance of FIs and dependent variable was - the Green finance dimensions of social, environmental, and economic.	ii. The dimensions of GF- social, environmental, and economic – have a positive effect on the sustainability performance of banks. iii. About 95% of bankers thought GF is an important element in banking sectors' short-term and long-term development.
Azad, M. A. K et., al. (2022), Bangladesh	i. the recent trends of GF and SF of banks and NBFIs.	Primarily descriptive and secondary data, four quarters of the year 2021. They used Excel 2016 and SPSS 26 in data analysis.	The independent variable was - the performance of GF and SF. The dependent variable was - green finance initiatives and policies developed by BB.	i. Bangladesh Bank made a significant performance to green the financial system by implementing various green projects. ii. the total target achieved 3.16% in the GF and 9.32% in the SF which is still far behind the SDGs.
Talika, S., Verma, S., & Sharma, J. (2022), India	i. to examine the impact of the frequency of board meetings on the bank's performance.	Secondary data from 2015 to 2019, panel regression is analyzed.	The independent variable was - is ROA and IV is i. audit committee ii. board meetings iii.no. of committee iv. Assets	There is no significant effect of any governance variables on ROA of the banks.
Walzer, M.,Tamimi, A. H. A., & Firmansyah, A. (2024), Indonesia.	i. to examine how banking financial performance and GB disclosure affect profitability.	Secondary data from 2018-2022 from 30 sample banks. They used panel data and applied regression analysis.	The DV was - Bank performance. The independent variable was - i. the capital adequacy ratio ii. the efficiency ratio iii. non-performing loans iv. the loan to deposit ratio	The capital adequacy ratio and efficiency ratio negatively impacted bank profitability. Non-performing loans and the loan-to-deposit ratio

positively affect bank profit.

3. Results

3.1. Present Status of Green Financing: Bangladesh Context

Bangladesh is a low-lying country on the Ganges-Brahmaputra Delta, and about 75% of its territory lies less than 10 meters above sea level. The geographical location, dense population, climate vulnerability, and riverine landscape are the characteristics that make a strong case for green financing to support sustainable development. Mainstreaming green financing in renewable energy and climate-resilient is thus a significant policy challenge for Bangladesh. The GDP growth of over 6% in the last decades has accelerated the energy demand in Bangladesh. According to (IEA, 2015), at present, the primary source of energy is natural gas (56%), then biofuels (24%), crude oil (13%), coal (6%), and renewable energy (1%). The Bangladesh government has set 10% of the total power demand from renewable energy sources by 2020. The government also explores other energy sources such as renewable energy technology, nuclear power, solar, hydro, etc. The solar home system project is one of them, providing about 20 million people with access to solar electricity. Thus, it is essential to identify the policy barriers and find alternative solutions for green financing to ensure sustainable and reliable energy sources for Bangladesh.

For the information, Bangladesh has already adopted some green financing projects, and Bangladesh Bank has declared some guidelines for banks and non-bank financial institutions to follow. There is a need to develop green financing instruments such as green investment trust funds, green loans, and green bonds. This study aims to investigate green financing in renewable energy sectors, its impact, and future trends. As commercial banks are reluctant to invest in green projects due to risks and return on investment, the government has established two flagship green funds, namely Bangladesh Climate Change Trust Fund and Bangladesh Climate Change Resilience Fund, which are now the primary sources of green finance in our country. The initial allocation was tk.700 crore in 2010, but this trend has declined. Bangladesh Bank prepared a policy guideline for green banking to form a climate risk fund. It directed the banks to allocate at least 10% of their corporate social responsibility budget by providing direct grants or a reduced interest rate. They also instructed the banks and other financial institutions to provide green finance for specific green projects in 2016. So far, all commercial banks have formed their green banking policy, green banking high-level committee, green banking unit, and green financing initiatives etc. Almost all banks follow and maintain the BB reporting structure and submit it quarterly basis.

3.2. Refinance Initiatives of Bangladesh Bank at the end of Q_1, 2024

Bangladesh Bank created Tk. 200 crore refinancing scheme in 2009 for ETP, biogas, and solar energy. These funds increased from Tk. 200 crore to Tk. 400 crore to meet the increased demand for funding environmentally friendly projects. Bangladesh Bank introduced a refinancing scheme of Tk. 400 crore to offer refinance facilities to promote smooth financing in green projects (SFD circular No. 04, 24 July 2022 by BB consisting of VII articles).

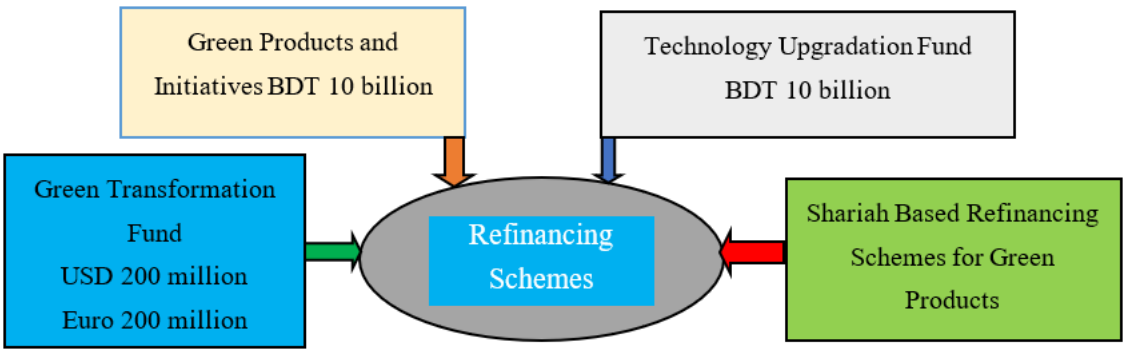

Figure 2. BB Refinancing Initiatives up to Q_1, 2024.

3.3. Category-wise Disbursement of BB's Refinance Scheme (in million BDT)

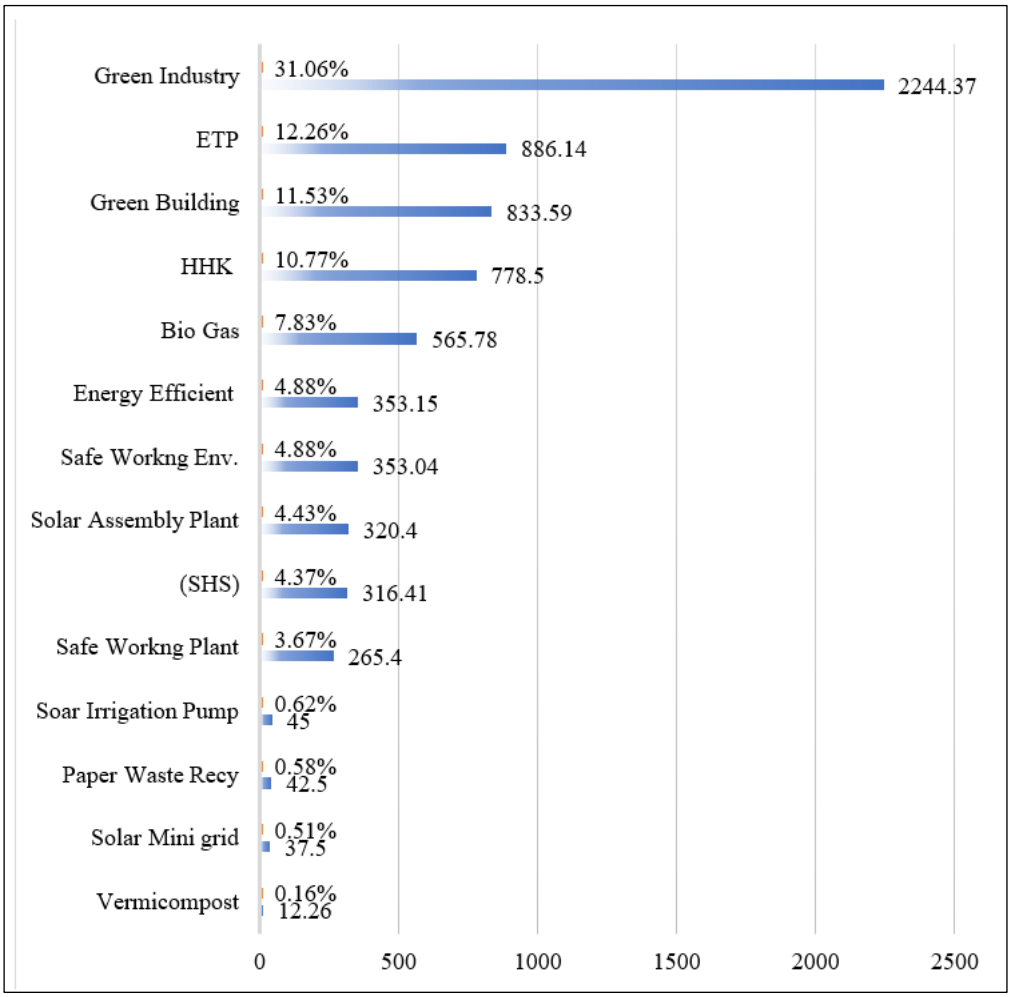

Figure 3. The Bangladesh bank Refinance Scheme for the Green Initiatives from 2013 to 2023

Figure 3 shows 14 products of BB's refinance fund allotment for the commercial banks in Bangladesh. It shows 11 years grand total of loan disbursement where green industry holds first position accounting Tk. 2244.37 million (31.06%) of total term loan and vermicomposting belongs to the last position accounting Tk. 12.26 million (0.16%) of total term loan.

3.4. Status of GF in Bangladesh based on bank types

To date, 43 commercial banks are functioning under Bangladesh Bank's jurisdiction. Among the four types of banks, PCBs are the highest contributors to Green Finance accounting for 40.01% of the total green finance, followed by FCBs 16.99%, SOCBs (6.10%), and SDBs (18.88%).

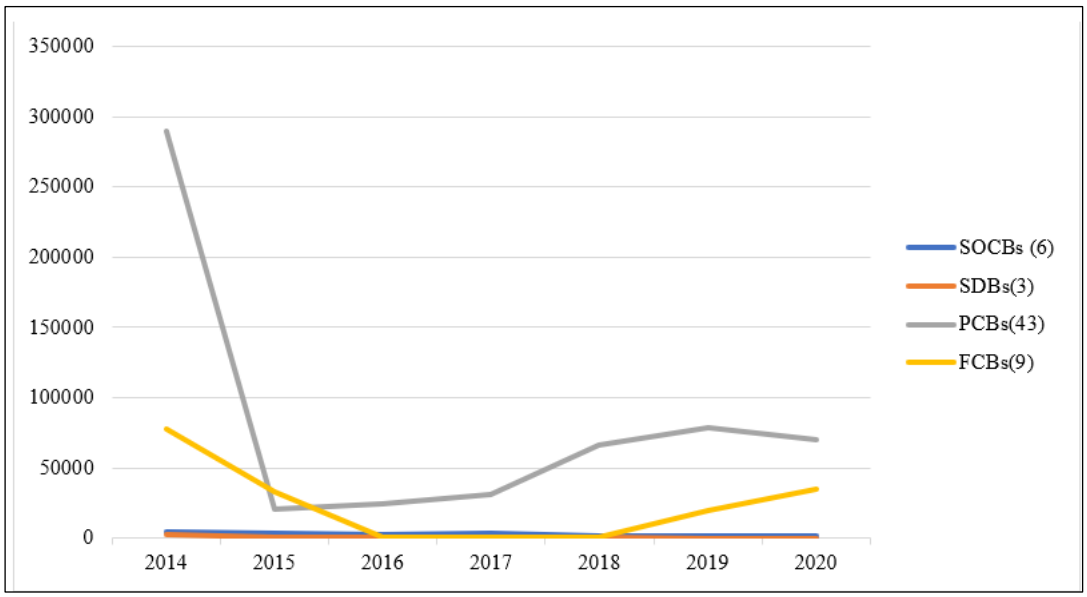

Figure 4. Green Finance trend line

Figure 4 shows the banks' GF trend over the last seven years. PCBs show a positive upward growth trend from 2015 to 2019 but a slight downward trend in 2020, whereas FCBs show an upward trend in 2019 and 2020. So, it can be said that Private Commercial Banks (PCBs) play a significant role in GF by investing in green projects.

3.5. Overview of Sustainable Finance (SF) and Green Finance (GF) by Banks

This study investigates the loan disbursement by banks in SF and GF for Q4, 2023, separately and exhibits a summary for the whole year 2023. Charts Nos. 9 and 10 show a glimpse of SF and GF by banks from January to December 2023. Target Attainment is Disbursement in SF ≥ 20% of total loan disbursement

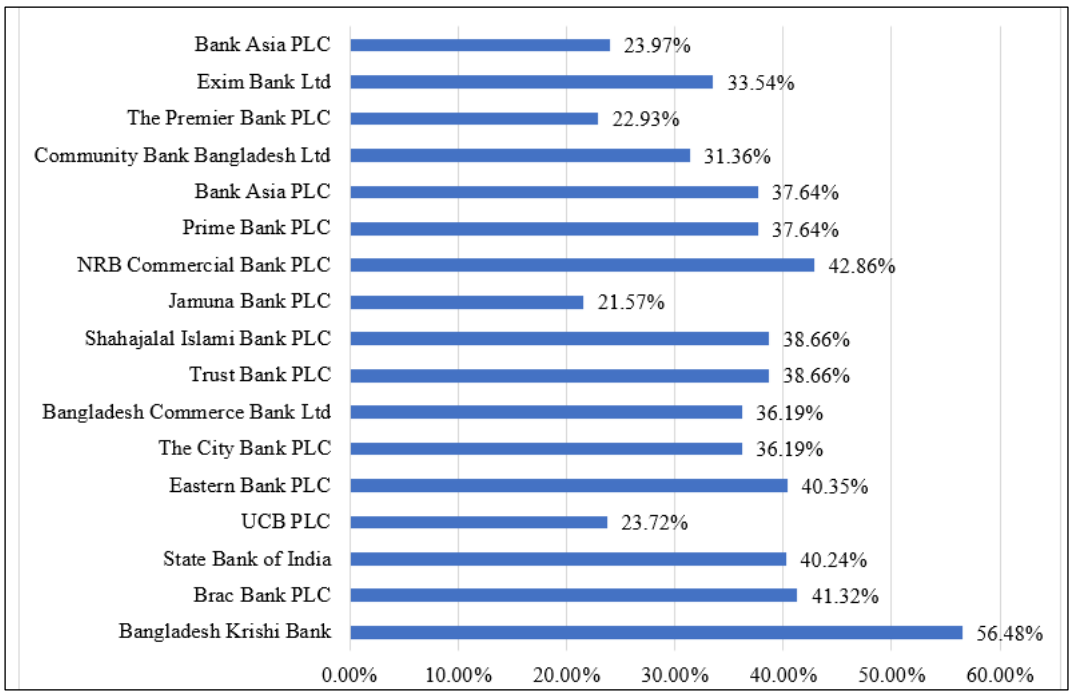

Figure 5. Sustainable Finance of Q4, 2023 of different commercial banks

Figure 5 shows that only 17 commercial banks fulfil the sustainable financing target SF ≥20% of total term loan disbursement set by Bangladesh Bank. The chart shows that in Q4, 2023, 17 banks out of 61 had exposure to green finance, where 16 PCBs were seen. Among them, Bangladesh Krishi Bank stood in the top position at 56.48%, next to NRB Commercial Bank PLC at 42.86%, BRAC Bank PLC at 41.32%, and Jamuna Bank PLC stood last at 21.57%.

3.6. Target Attainment green finance Up to Q4, 2023

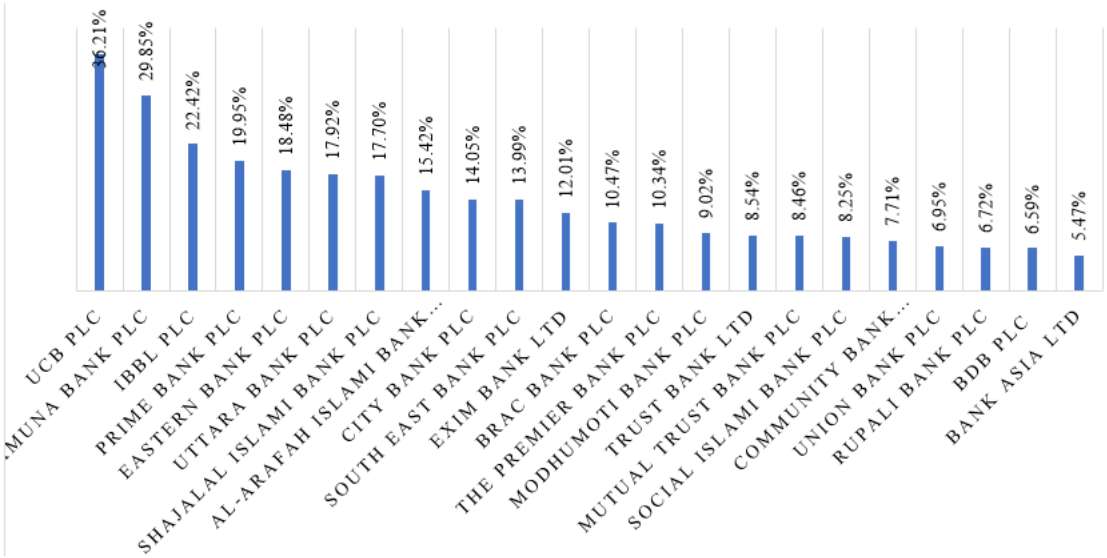

Figure 6. Green Finance of Q4, 2023 of different commercial banks

Figure 6 shows that only 22 commercial banks fulfil the GF ≥5% of the total term loan disbursement set by Bangladesh Bank. The chart shows that in Q4, 2023, 22 banks out of 61 had exposure to green finance, where only PCBs were seen. UCB PLC held the top position, holding 36.21%, followed by Jamuna Bank PLC at 29.85%, IBBL PLC at 22.42%, and Bank Asia stood last at 5.47%.

Table 2. Category-wise GF (in million BDT) in 2023

Green Finance (IV)	SOCBs(06)	SDBs(03)	PCBs(43)	FCBs(09)
1. Renewable Energy (RE)	2.9	9.04	473.84	0
2. Energy Efficiency (EE)	1,78	0	15379.29	751
3. Alternative Energy (AE)	0	0	2	0
4. Liquid Waste Management (LWM)	0	0	727.7	0
5. Solid Waste Management (SWM)	0	0	0	0
6. Recycling & Manufacturing of Recycling Goods RMRG)	10.23	0	3441.18	3.42
7.Environment-friendly Brick Production (EFP)	691.56	0	409.99	0
8. Green Environment Friendly Establishments (GEFE)	0	0	10009..1	0
9. Green Agriculture	374.1	1.71	632.29	0.1
10. Green CMSME	622	0	1058.11	0
11. Green SRF	820.31	0	12414.02	465.33

Table 2 shows that SOCBs invest highest in Green SRF 820.31, SDBs in renewable energy 9.04, PCBs in Energy efficiency 15379.29 and FCBs in green SRF 465.33 million BDT respectfully.

3.7. Digital Payment by Banks (Billion in BDT) in Bangladesh

Table 3. Banking sector performance (by digital payment)

Item	FY-2021	FY-2022	FY-2023
ATM Transaction	1585.7	2985.5	4332.1
POS Transaction	171.9	226.6	296.4
E-Commerce Transaction	77.6	88	130.6
Internet Banking Fund Transfer (IBFT)	98.6	335.4	880.3
BEFTN (Debit)	631.5	974	1312.6
BEFTN (Credit)	3774.4	4954.1	5568.6

Table 3 shows last three-year digital payment by banks where every digital payment grows upper trend. The findings of this study indicates that only 22 commercial banks fulfill the GF ≥5% of total term loan disbursement set by Bangladesh Bank. The chart shows that in Q4, 2023, 22 banks out of 61 had exposure to green finance. Among them, UCB PLC held the top position, at 36.21%, followed by Jamuna Bank PLC at 29.85%, IBBL PLC at 22.42%, and Bank Asia in the last position at 5.47%. b) On the other hand, only 17 commercial banks fulfill the sustainable financing target SF ≥20% of the total term loan disbursement set by Bangladesh Bank. In Q4, 2023, 17 banks out of 61 had exposure to green finance, whereas 16 banks were PCBs. Only Bangladesh Krishi Bank (SDBs) occupied the top position, accounting for 56.48% of sustainable finance. Next to NRB Commercial Bank PLC 42.86%, BRAC Bank PLC 41.32%, etc., and Jamuna Bank PLC stood last position at 21.57%. c) The study also found the total target achieved by banks was 9.09% in GF of the total loan disbursement and 27.24% in SF, which exceeded the target set by the central bank of Bangladesh, and it is a milestone to achieve SDGs set by the UN by 2030.

4. Conclusions

Bangladesh remains highly vulnerable to the risks associated with environmental transformation. To address these challenges effectively, it is imperative for the country to integrate green financing initiatives into its conventional investment frameworks. Encouragingly, Bangladesh Bank (BB) has taken a leadership role in embedding green financing within the domestic financial market, driven by a clear vision of promoting green banking (GB) across the monetary sector. BB has also introduced a range of policy options aimed at ensuring social, economic, and environmental safeguards, which financial institutions are expected to follow when disbursing loans. The nation is currently grappling with acute environmental degradation, stemming from the destruction of water bodies, depletion of soil nutrients, extensive air and water pollution, indiscriminate deforestation, improper disposal of industrial effluents, medical waste, household garbage, loss of biodiversity, and the reduction of green spaces. As part of their corporate social responsibility, commercial banks have a vital role to play in supporting government efforts to combat environmental pollution. Financial institutions are now expected not only to avoid investments in ecologically harmful projects but also to minimize legal, credit, and reputational risks while striving for sustainable profitability.

Bangladesh Bank has also promoted a set of green banking slogans to reinforce environmentally responsible practices, including: (i) "Kick the habit, be paperless," (ii) "Save paper, save trees," (iii) "Save energy, save natural resources," (iv) "Pay your bills online," (v) "Always use cloth bags, avoid polythene," (vi) "Reduce, reuse, recycle," and (vii) "Digitize yourself." Following the successful implementation of the "Digital Bangladesh" initiative by 2021, the country is now advancing toward a new national vision—"SMART Bangladesh"—founded on four pillars: SMART Citizens, SMART Economy, SMART Government, and SMART Society. Aligned with Vision 2021, the nation has entered the era of SMART banking, which integrates digital innovation with the principles of green finance and the triple bottom line: People, Planet, and Profit. The increasing use of smartphones, e-wallets, and QR code-based services illustrates the modern banking technologies made available by financial institutions. A bank's prominence is now increasingly influenced by its capacity to adapt to digital transformation and demonstrate strong financial and environmental performance.

Since 2011, Bangladesh Bank has taken formal steps to green the financial system, issuing various circulars, guidelines, and policy directives as the regulatory authority for the economic sector. However, the study found that not all banks have shown adequate awareness of green banking practices, and many have failed to report their green financing activities in accordance with BB's guidelines. From the perspective of the entity concept, banks are considered global citizens, and it is believed that even small green initiatives

taken by financial institutions can contribute to building a greener, more sustainable planet for present and future generations.

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