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Harmonizing Knowledge for Innovation: A Multidisciplinary Approach to Technology and Business Integration

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ABSTRACT
Bangladesh is the 7th most vulnerable country regarding climate risk index in the world, though it's minimal contribution to the problem. This study aims to examine a multidisciplinary approach to technology and business integration regarding green banking initiatives taken by the central bank of Bangladesh. This study finds only 30 banks out of 61 had exposure to green finance where NCC Bank PLC were seen in the top position accounting for 51.91% followed by Rupali bank PLC 45.21%, Pubali Bank PLC 44.88% and Mercantile Bank PLC stood last at 5.03%. On the other hand, 31 banks had exposure to sustainable finance where BRAC Bank was seen in the top position at 93.81% next to Pubali bank PLC at 93.19%, City Bank PLC at 92.05% and The Hong Kong and Shanghai Banking Corporation Ltd. stood last at 21.57%. The study also finds the total target achieved by commercial banks was 9.09% in green finance and 27.24% in sustainable finance and itis a milestone to achieve SDGs-2030.This entire study is conducted on the basis of secondary data collected from Bangladesh bank sustainable finance department, related published articles, annual reports, national and international daily papers etc. This paper reflects an assessment of the efforts made by commercial banks addressing people, planet and profit using modern technology.

KEYWORDS
Status, green banking, green financing, environment, innovation, technology.

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1. Introduction

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.

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 financing 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 CO2 into the air. Thus, it is evident that human beings are causing more conservatory gases like CO2 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 CO2 into the air. On the other hand, as forests absorb much CO2 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 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 sea 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. According to Hasnat et al. (2018), Bangladesh might lose 15 percent of its land if the sea level increases by 1 meter and 30 million people migrate. World Bank report (2018) published that the highest 28% of people died in 2015 because of environmental pollution-related diseases in the world. They are realizing that environmental issues have become a burning question in Bangladesh. The overall ecological situation in our country is alarming enough. Different studies have found Dhaka is one of the most densely populated megacities in the world. According to WHO reports, noise pollution occupies the third position next to air and water pollution. According to the World Economic Forum's Golden Report 2018, Bangladesh ranked 10th among all the world's plastic-polluting countries. Though heavy industries are responsible for these adverse effects, they should take the liabilities first (Rana & Hossain, 2023). Now is the time to examine, evaluate and take the correct initiatives to protect environmental pollution. 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 direct green finance and sustainable finance to survive in the competitive market and increase profitability. Three multifaceted approaches are involved in making our planet green such as economic approach, environmental approach, and social approach. 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.

After introducing green banking guidelines in 2011 by Bangladesh Bank a lot of research works have been conducted throughout the year. Some researchers tried to show green banking policy implementation status, some other studies tried to find out the relationship between green financing and bank profitability in private commercial banks only, and some studies find out the factors affecting sustainability performance. Julia and Kassim (2019) made a comparison between Islamic banks and conventional banks regarding green banking performance. Akhter, I., Yasmin, S., & Faria, N. (2021) examined 30 DSE-listed commercial banks where 90% of the banks implemented above 60% of the green banking policy guidelines in the period (2016-2018). Still, none has attempted to depict the present situation of green financing and the impact of the selected green financing factors on bank performance. So, the present situation demands complete research to reflect a total scenario of green financing and sustainable financing and its recent trend in Bangladesh.

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: i) Bangladesh Climate Change Trust Fund and ii) 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.

2. Review of Literature

The study reviewed several related prior research to check the relationship between green financing and sustainability of banks in Bangladesh. Some literature showed private commercial banks status some examined state owned banks scenario regarding green banking development. A good number of authors found positive impact on sustainable performance at the same time they proved a negative connection on bank performance. The relationship between green financing and sustainability is still new concept in Bangladesh perspective.

Akther, S., & Tariq, J. (2021), used Nudge Theory and examined the impact of banks' inventiveness on monetary behavior of customers in Bangladesh.

According to Zheng et al., (2022), there is a negative correlation between green financing and urban haze pollution. They also found green finance increased environment quality with modern technology.

Fang and Shao (2022), investigated the influence of green finance on green technology innovation and found a positive significant correlation between command, control, environment regulation and green technology innovation a positive correlation between market incentives, environment regulation and green technology.

Hasan et al. (2020), identified the green cost, size of bank, and risk management positively affect ROA, ROE, and MV in Bangladesh. They proved operating cost negatively affects ROA, ROE, and MV also.

Jatana, R., & Jain, H. (2020), investigated the effect of GB on bank performance in India and proved a positive correlation between performance and total card transactions, total retail electronic clearing, and RTGS.

Akhter, I., Yasmin, S., & Faria, N. (2021), examined the status of green banking policy guidelines and explore the effect of GB on financial performance of banks. Karim, R. (2020), examined the status of adopting GB practices by banks and found the entire green investment is an upward trend.

Sharma, M., & Choubey, A. (2021), developed a conceptual model in GB initiatives. They showed three green banking indicators' impact on two possible outcomes.

Guang-Wen & Siddik (2022), examined economic, social, environmental, and CSR practices positively and significantly affect the environmental performance of PCBs in Bangladesh.

Islam, M. A., Avi, M. R., & Ashanuzzaman, M. (2022), identified aforementioned liquidity ratio of banks would escalate the ROA in terms of profitability in Bangladesh.

Zheng et al (2021a), investigated the mediating role of green finance on corporate sustainability performance of FIs in Bangladesh and found the economic dimension has positive and significant impact on the sustainability performance of PCBs, the social dimensions positively and significantly impact on sustainability performance of PCBs and the environmental dimension have positive and significant impact on the sustainability performance of PCBs.

Zheng et al (2021b), examined the bankers' perceptions of green finance development of PCBs in Bangladesh.

Islam, M. S., Faruque, O., & Ahmed, Z. (2021), proved there is a long-run equilibrium relationship among IT, FD and growth of economy in Bangladesh.

Khatun, M. N., Sarker, M. N. I., & Mitra, S. (2021), explored the pattern adopted by green banking activities in Bangladesh and found most of the PCBs and FCBs adopted green banking policies.PCBs disbursed the highest loans to environmentally convenient projects followed by FCBs and SOCBs.

Zheng, G. W., Siddik, A. B., Masukujjaman, M., & Fatema, N. (2021), investigated the dimensions of GF and effects on the sustainability performance of FIs in Bangladesh. They proved the PCBs accounted for the highest GF of total green finance in Bangladesh. The dimensions of GF such as social, environmental, and economic have a positive effect on the sustainability performance of banks. 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), explored Bangladesh bank made a significant performance to green the financial system by implementing various green projects and the total target achieved 3.16% in the GF and 9.32% in the SF which is still far behind the SDGs.

Shahriar, A. H. M., Alam, M.J., Biswas, A. A., Rumaly, N., & Golder, U. (2021), revealed ROA, EPS, asset structure, investment structure etc. influence the capital structure of banks in Bangladesh.

Alam, M.A. (2024) examines the status of green banking initiatives taken by Bangladesh bank and its implementation from 2014 to 2023. The study found only 31 banks fill-up the green banking target set by the central bank.

After reviewing the previous literatures, it is clear that they revealed a heterogeneous findings relating to green financing scenario which influenced to a new investigation mentioning updated information.

3. Methodology

The study is designed and conducted on the basis of secondary data collected from Bangladesh bank sustainable finance department website published up-to 2024, related published articles, annual reports etc. A total of 61 banks are functioning right now in four categories such as PCBs (43), SOCBs (06), FCBs (09) and SDBs (03). All banks are supposed to use updated technology, innovation and submit quarterly basis report to Bangladesh bank and also declare their own website as per BB instructions. So, the study also

attempted to collect related quantitative data from other banks' website, published articles covering green financing and sustainable financing initiatives and used MS-Excel software 2016 for tabulating, measuring and interpreting the dataset. The dataset covers almost all scheduled banks and exclude non-bank financial institutions due to time constraints and insufficient fund.

4. Results and Analysis

4.1 Refinance Initiatives of Bangladesh Bank

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). Only term loan is considered for refinance facility under this scheme. Financial institutions need funds to facilitate green financing. After that, they will finance several green sectors. To provide required funds and accelerate green banking activities, BB has introduced refinance schemes for renewable energy and eco-friendly sectors to facilitate banks and non-bank financial institutions to offer credit at a 1% interest rate and easy terms and conditions. Bangladesh bank created BDT 200 crores of funds for refinancing schemes. The following figure 1 shows the four main sectors and fund allotment. Besides, another ten sectors of refinance are: i) Solar mini-grid ii) LED bulb production plant iii) Preparation of organic manure from slurry iv) Solar battery reprocessing plant v) Medium-size biogas plant vi) PET bottle reprocessing plant vii) Replacement of conventional lime kiln into energy-efficient kiln viii) Hydropower plant (Pico, micro, mini) based on the production capacity ix) Production of vermicomposting fertilizer with the purchase of 2 (two) cows and x) Production of vermicomposting fertilizer without the purchase of 2 (two) cows.

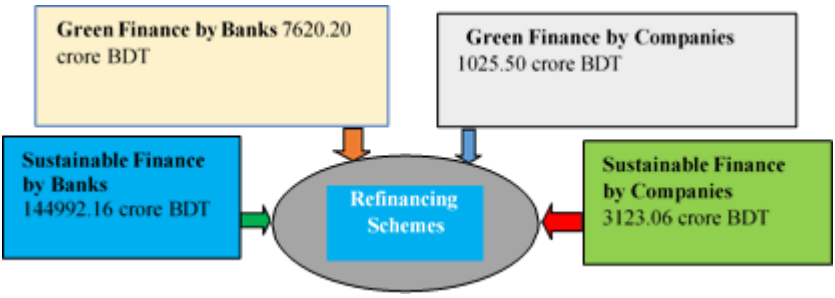


Figure 1: Bangladesh Bank Refinancing Schemes from October 1 to December 31, 2024.

This report provides information regarding all policy initiatives and operational approaches related to sustainable finance undertaken by Bangladesh bank and all financial institutions from the last quarter of 2024. The figure shows green investment by 61 commercial banks and 34 finance companies under the refinance schemes.

4.2 Commercial Banks' Green Finance and Sustainable Finance

Table 1: Green Finance and Sustainable Finance

Issues	Q1	Q2	Q3	Q4
Sustainable Finance	353879	351961.04	322964	8,78,268
Green Finance	27759	31441	36044	64088
Sustainable Linked Finance	326120	320519	286920	8,14,180

Table 1 shows that in Q4, 2023 period, banks' contribution to green finance was BDT 64088 million, which was BDT 36044 million greater than the Q3, 2023 period. In Q4, 2023 banks' contribution to sustainable finance was BDT 878268 million, which was BDT 322964 million in the Q3, 2023 period. Both types of financing are in an upward mode. Sustainable finance is the summation of green finance and sustainable linked finance in this table.

4.3 The Status of GF in Different Schemes

To date, 61 banks are functioning under Bangladesh Bank's jurisdiction. Chart 1 depicts green financing status of 11 green financing schemes in

Bangladesh. Out of 11 financial projects they invest highest in energy efficiency 1967.27 million BDT in 2024 first quarter, next to green SRF 59.25 million BDT and renewable energy 10 million.

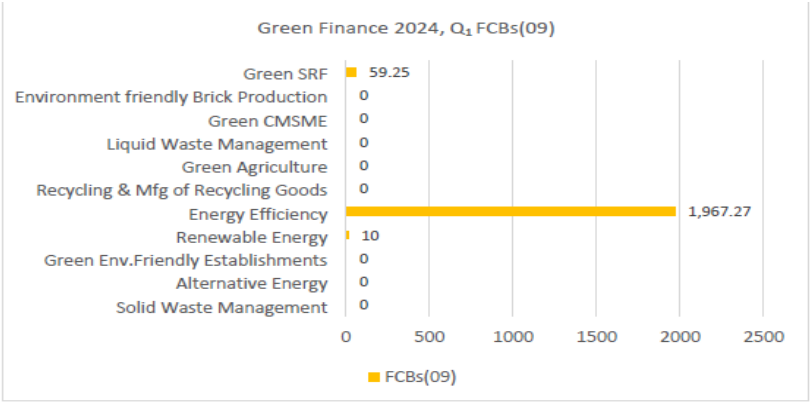


Chart 1: Sectors of Green Finance regarding Foreign Commercial Banks

Chart 2 displays six state-owned bank's green finance status where green SRF accounted 1552.01 million BDT, next to environment friendly brick production 703.76, green CMSME 156.02, liquid waste management 74.37 million BDT.

Chart 2: Sectors of Green Finance regarding State Owned Commercial Banks

In chart 3 three specialized development bank discloses their green financing status in 11 sectors. They invest only two projects where renewable energy accounted 5.48 million BDT and green agriculture 0.73 million BDT only.

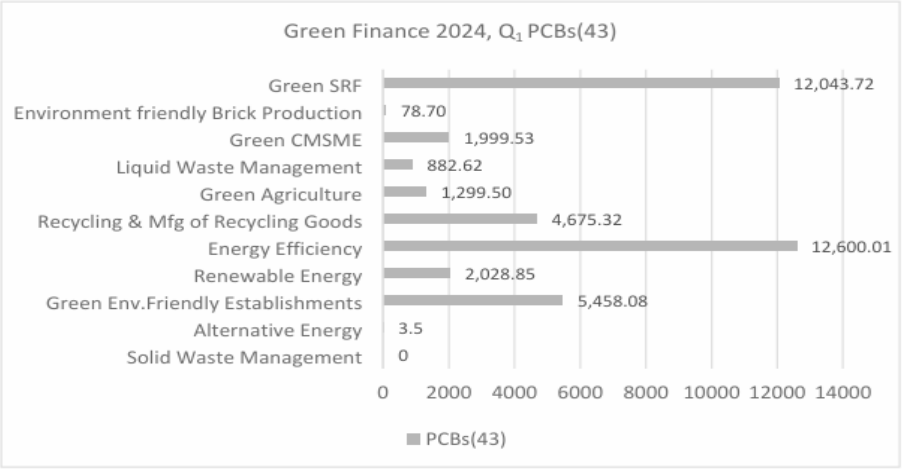


Chart 3: Sectors of Green Finance regarding Specialized Development Banks

In chart 4, Private Commercial Banks shows their green finance scenario among 11 projects. They invest highest 12600.01 million BDT in energy efficiency next to green SRF 12043.72, green environment friendly establishments 5458.08, recycling and mfg. of recycling goods 4675.32 million BDT etc.

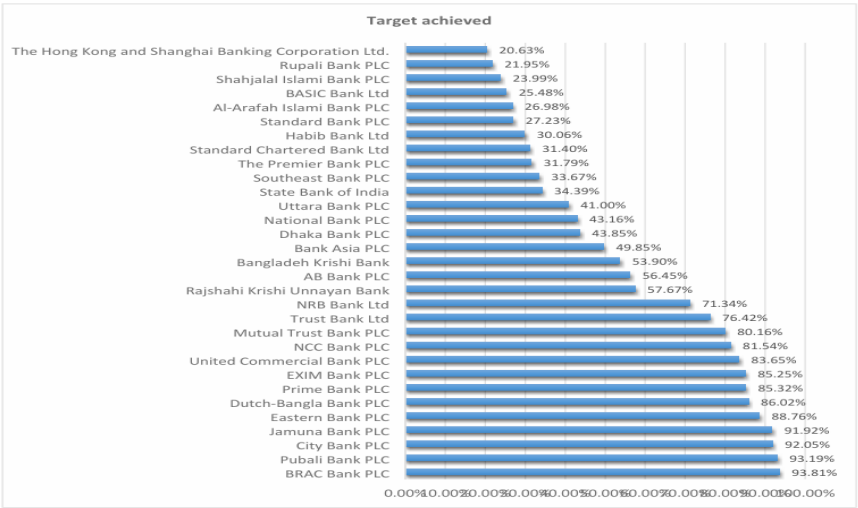


Chart 5: Sustainable finance of Q_3, 2024 of different commercial banks

Chart 5 shows that only 31 commercial banks fulfil the sustainable financing target SF ≥20% of total term loan disbursement set by Bangladesh Bank. The chart shows that in Q3, 2024, 31 banks out of 61 had exposure to sustainable finance, where BRAC Bank was seen in the top position at 93.81%, next to Pubali bank PLC at 93.19%, City Bank PLC at 92.05% and The Hong Kong and Shanghai Banking Corporation Ltd. stood last at 21.57%. Target attainment is disbursement in SF

≥ 20% of the total term loan disbursement set by Bangladesh.

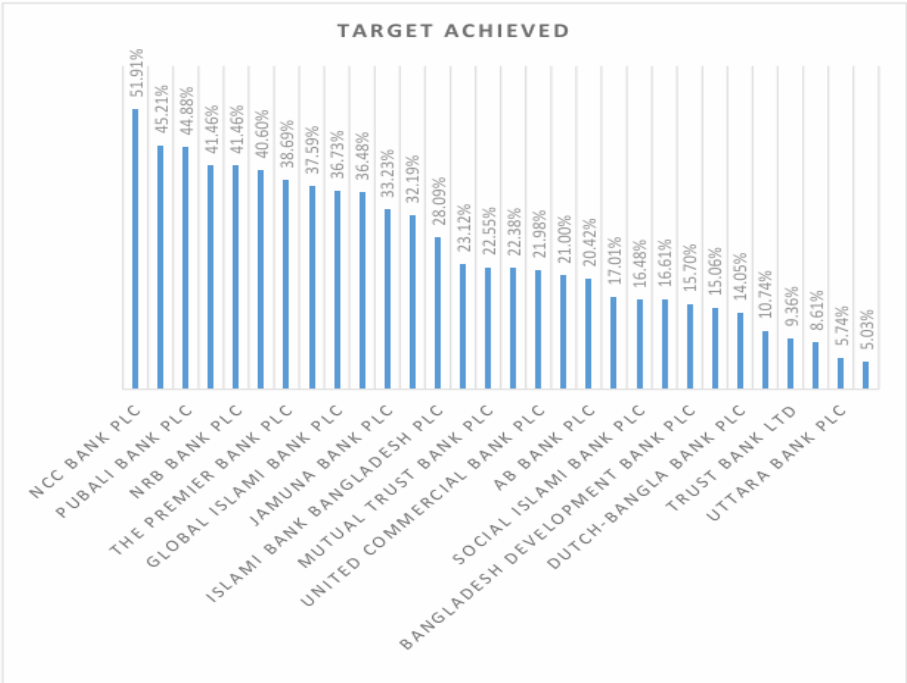


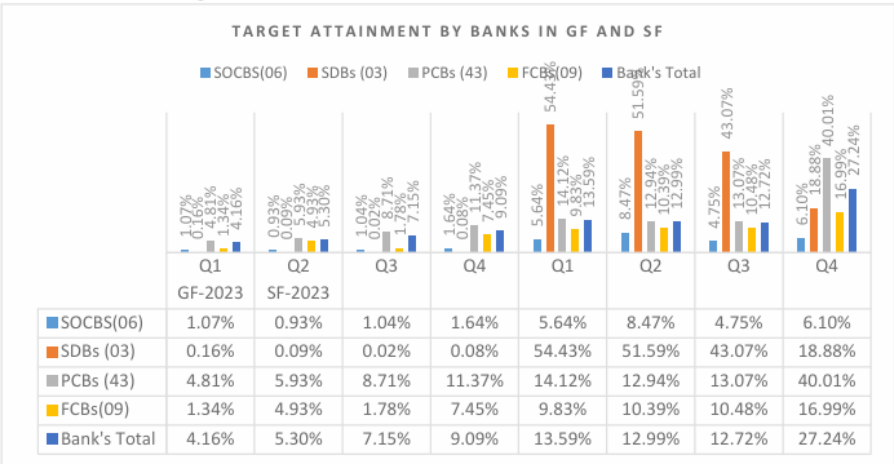
Chart 6: Green Finance of different commercial banks Chart 6 shows that only 30 commercial banks fulfil the GF ≥5% of the total term loan disbursement set by Bangladesh bank in third quartile 2024. The chart shows that in Q3, 2024 only 30 banks out of 61 had exposure to green finance, where NCC Bank PLC were seen in the top position accounting for 51.91%. UCB target attainment in green finance, followed by Rupali bank PLC 45.21%, Pubali Bank PLC 44.88% and Mercantile Bank PLC stood last at 5.03%.

4.5 Comparison of GF and SF among commercial banks categorically Table 2: Comparison table of GF and SF (in %) for the year 2023

	GF2023				SF 2023			
Banks	Q_1	Q_2	Q_3	Q_4	Q_1	Q_2	Q_3	Q_4
SOCBs (06)	1.07	0.93	1.04	1.64	5.64	8.47	4.75	6.10
SDBs (03)	0.16	0.09	0.02	0.08	54.43	51.59	43.07	18.88
PCBs (43)	4.81	5.93	8.71	11.37	14.12	12.94	13.07	40.01
FCBs (09)	1.34	4.93	1.78	7.45	9.83	10.39	10.48	16.99
Bank's Total	4.16	5.30	7.15	9.09	13.59	12.99	12.72	27.24

Table 2 indicates a complete bank's target attainment in 2023 regarding green finance and sustainable finance regarding bank types. The table shows that Q4 target attainment was 9.09% in GF, while SF was 27.24%. PCBs were the highest at 11.37%, and SOCBs were the lowest at 1.64% in GF, while in SF, PCBs also achieved the highest at 40.01% and the weakest SOCBs at 6.10%.

4.6 Bank-wise target achieved in GF and SF



	Q1 GF-2023	Q2 SF-2023	Q3	Q4	Q1	Q2	Q3	Q4
SOCBS(06)	1.07%	0.93%	1.04%	1.64%	5.64%	8.47%	4.75%	6.10%
SDBs (03)	0.16%	0.09%	0.02%	0.08%	54.43%	51.59%	43.07%	18.88%
PCBs (43)	4.81%	5.93%	8.71%	11.37%	14.12%	12.94%	13.07%	40.01%
FCBs(09)	1.34%	4.93%	1.78%	7.45%	9.83%	10.39%	10.48%	16.99%
Bank's Total	4.16%	5.30%	7.15%	9.09%	13.59%	12.99%	12.72%	27.24%

Chart 7: Target achieved by banks in GF and SF categorically in 2023

The chart 7 indicates 61 banks' exposure to green finance and sustainable finance in 2023 at a glance where PCBs green finance is 11.37% and sustainable finance is 40.01% hold the highest position in Q4.

4.7 Sector-wise green finance by banks

Table 3: Sector-wise GF by banks in 2023 (in million Tk.)

Sub Category/Product Name	Q_1	Q_2	Q_3	Q_4
1. Establishment of Green Industry	0	0	0	9.93
2. Solar Home System (SHS)	0	0	1.67	1.13
3. Integrated Cow Rearing and Setting Up of Bio-gas Plant	0	0	0	0.8
4. Production of Vermicomposting	0	0	0.94	1.74
5. Establishment of Certified Green Building	255	0	0	0
6. Safety and working Environment of Factory related	7.03	16.08	7.03	8.8
7. Combination of Biological and Chemical ETP	0	7.1	14.13	4.47
8. Foam Concrete Brick	0	150	0	0
9. Compressed Block Brick	0	0	0	0
10. PET Bottle Recycling Plant	0	0	0	0
11. Installation of Machineries (Energy Auditor Certified)	0	0	176.99	289.34
12. Energy Efficiency Technology	0	0	0	110.23
13. Environment-Friendly/Brick Kiln Project	0	0	319	0

Table 3 shows, Installation of Machineries (Energy Auditor Certified) is 289.34 million BDT the highest investment, next to Energy Efficiency Technology is 110.23, Establishment of Green Industry is 9.93, Safety and working Environment of Factory related is 8.8 and Combination of Biological and Chemical ETP is 4.47 respectively.

Sub Category/Product Name	Q_1	Q_2	Q_3	Q_4
1. Establishment of Green Industry	0	0	0	9.93
2. Solar Home System (SHS)	0	0	1.67	1.13
3. Integrated Cow Rearing and Setting Up of Bio-gas Plant	0	0	0	0.8
4. Production of Vermicomposting	0	0	0.94	1.74
5. Establishment of Certified Green Building	255	0	0	0
6. Safety and working Environment of Factory related	7.03	16.08	7.03	8.8
7. Combination of Biological and Chemical ETP	0	7.1	14.13	4.47
8. Foam Concrete Brick	0	150	0	0
9. Compressed Block Brick	0	0	0	0
10. PET Bottle Recycling Plant	0	0	0	0
11. Installation of Machineries (Energy Auditor Certified)	0	0	176.99	289.34
12. Energy Efficiency Technology	0	0	0	110.23
13. Environment-Friendly/Brick Kiln Project	0	0	319	0

4.8 Sustainability Ranking of Banks

Bangladesh Bank declared sustainable banks based on four indicators in the Sustainable Ratings of 2020, 2021, and 2022, such as i) SF, ii) GF, iii) CSR activities, and iv) Core banking sustainability. In 2022 the 3rd time BB announced bank sustainability ratings. Now, BRAC bank follows impact-

based funding instead of conventional financing to achieve the SDG-2030 goals in Bangladesh said Hussain, CEO of BRAC bank. He also noted that as a founding member of the global alliance for Banking on Values, we use 360-degree banking services to provide an endurable monetary, environmental, and social transition. "As one of the founding members of the Global Alliance for Banking on Values, we are utilizing 360-degree banking services to deliver sustainable economic, social, and environmental development. Our corporate social initiatives are also focused heavily on agendas that have an ongoing influence on the environment, society, and its people," Hussain remarked. "On the principles of sustainability, BRAC Bank seeks to employ the guiding regulations of Bangladesh bank and set sustainable growth priorities in our future strategy. We are honored that Bangladesh bank has named us one of the Top Ten Sustainable Banks for 2021," he added. Executive director and spokesperson of Bangladesh bank, Md. Serajul Islam said that the top 10 banks in the sustainability rating list were published to motivate the banks to uphold good governance, integrity, and social responsibility. Asked about the indicators and the views of some central bank divisions in assembling the list, he told Dhaka Tribune: "Sustainability ratings are founded on several indicators, including CSR spending, GF, core banking moves, and default rate. “Hopefully, this rating will boost the formation of virtue and good governance in the actions of banks and FIs. In addition, Islam added that CSR will play a more pioneering role in spending and GF. The top 10 sustainable banks were reported for the first time in 2020. https://www.dhakatribune.com/273013.

4.9 In-House Year-wise GB Initiatives by Banks in Bangladesh Table 4: In-house green banking activities

	Q_4	2023			
Activities	SOCBs	SDBs	PCBs	FCBs	Total
1. Number of Branches	3835	1541	4217	69	9662
2.No.of branches powered by solar energy	80	0	339	8	427
3.No.of br. with rainwater harvest.	0	0	4	1	5
4.No.of branches with waste mgt.	0	0	1395	6	1401
5. Number of ATM Booths	451	9	6680	88	7228
6. No. booths powered by solar energy	571	0	142	4	717
7. Number of Agent Outlets	793	0	19721	0	20514
8.No. of solar powered outlets	0	0	30	0	30
9.No.of a/c using i-banking	181019	439032	3310700	313759	4244510
10.No.of a/c using smart Phone	335164	437042	19507461	199279	20478946
11. No. of Online Branches	3835	1421	4139	56	9451
12. Total N0. of MFS Accounts	0	0	124981224	0	124981224

Source: Researcher accumulation from sustainable development report.

Table 4 shows that out of 9662 branches PCBs owned the highest 4217 branches followed by SOCBs 2835, SDBs 1541, and FCBs 69 branches functioning in Bangladesh. But unfortunately, SDBs have no branches powered by solar energy. PCBs have the highest 339, SOCBs have 80 and FCBs have only 8 branches powered by solar energy. In respect of ATM booths, SOCBs have the highest 571, followed by PCBs have 142, FCBs have 4 and SDBs have 0 ATM booths powered by solar energy. In respect of the Number of Accounts using Internet Banking PCBs have the highest 3310700, followed by SDBs have 439032, FCBs have 313759, and SOCBs have 181019. In the same way, the smartphone users owned 19507461 accounts in PCBs, next to 437042 in SDBs, 335164 in SOCBs, and 199279 in FCBs respectively. PCBs are also in the highest position holding 4139 branches operating full-fledged online transactions, followed by SOCBs 3835, SDBs 1421, and FCBs 56 branches. Finally, PCBs have 124981224 MFS accounts whereas other banks have none.

4.10 Training, Awareness, and Capacity Building

Till 2023 Quarter 3, About 45 banks and 8 financial institutions arranged training & awareness programs concerning sustainable and green financing activities. A snapshot of the Q3, 2023 period on the topic is given below:

Table 5: Training, Awareness, and Capacity Building of Green Banking Activities

2023			
Types of Banks	No. of Programs	No. of Employees	No. of Customers
SOCBs	59	1108	0
SDBs	1	40	0
PCBs	149	5886	61
FCBs	46	973	10
Total	255	8007	71

Source: Researcher accumulation from sustainable development report of Bangladesh Bank. Table 5 shows banks' in-house training, awareness, and capacity-building arrangement on green banking activities in Q3, 2023. SOCBs arranged 59 programs; 1108 staff attended, and no clients attended. SDBs arranged only one program participated, 40 employees, and no customers attended. PCBs arranged the highest number of 149 programs, with 5886 employees and had the highest number of 61 clients. Finally, FCB arranged 46 programs that delegated 973 and 10 customers.

5. Findings

a) Out of 61 only 30 banks fulfill the GF ≥5% target of total term loan disbursement set by Bangladesh Bank. Among them in Q3, 2024 NCC bank PLC hold the top position at 51.91% followed by Rupali Bank PLC at 45.21%, Pubali bank PLC at 44.88% and Mercantile bank PLC in the last position at 5.03%.

b)On the other hand, only 31 banks fulfill the sustainable financing target SF ≥20% of the total term loan disbursement set by Bangladesh Bank. In Q3, 2024, 31 banks out of 61 had exposure to green finance. Among them BRAC bank PLC hold the top position at 93.81% followed by Pubali Bank PLC at 93.19%, City bank PLC at 92.05% and HSBC in the last position at 20.63%.

c)The study also found FCB (09) invest the highest in energy efficiency amount 1967.27 million BDT, SOCBs (06) in green SRF 1552.01 million BDT, SDBs (03) in renewable energy 5.48 million BDT and PCBs (43) in

energy efficiency 12600.01 million BDT. respectively where private commercial banks invest 12600.01 million BDT in energy efficiency projects the highest compare to other three types of banks.

d)The status of PCBs (43) green finance is 11.37% and sustainable finance is 40.01% hold the highest position in 2023 compare to other banks. (Chart 7)

e) Table 4 shows that out of 9662 branches PCBs owned the highest 4217 branches followed by SOCBs 2835, SDBs 1541, and FCBs 69 branches functioning in Bangladesh. But unfortunately, SDBs have no branches powered by solar energy. PCBs have the highest 339, SOCBs have 80 and FCBs have only 8 branches powered by solar energy. In respect of ATM booths, SOCBs have the highest 571, followed by PCBs have 142, FCBs have four and SDBs have zero ATM booths powered by solar energy.

f) Table 3 shows, Installation of Machineries (Energy Auditor Certified) is 289.34 million BDT the highest investment, next to Energy Efficiency Technology is 110.23, Establishment of Green Industry is 9.93, Safety and working Environment of Factory is 8.8 and Combination of Biological and Chemical ETP is 4.47 respectively.

g) The table 2 shows that in 2023, Q4 Bank's total target attainment was 9.09% in GF, while SF was 27.24%. PCBs were the highest at 11.37%, and SOCBs were the lowest at 1.64% in GF, while in SF, PCBs also achieved the highest at 40.01% and the weakest SOCBs at 6.10%.

6. Conclusion and Implication

The principal goal of the study was to depict the status of green financing as well as sustainable financing of financial institutions in Bangladesh. The results found almost all banks established sustainable finance unit in their own arena and about 50% banks fulfill the SF and GF target set by Bangladesh bank. Bangladesh is a defenseless country regarding environmental transformation risk, so it should move onward by integrating green financing projects into conventional investment. BB has also familiarized itself with several policy choices for social, economic, and environmental safeguards for financial institutions to follow while disbursing

loans. Bangladesh is facing severe environmental degradation due to the destruction of water bodies, exhaustion of soil nutrients, massive air and water pollution, indiscriminate cutting of trees, improper dumping of business effluent, medical left-over, household garbage, damage of biodiversity, decrease of sweeping spaces, etc. as corporate citizenship commercial banks have a unique part and social concern in enhancing government endeavors towards environmental pollution. The motto of financial institutions is to minimize legal risk, credit risk, and reputation risk, and maximize profit. Though this study has some limitation but the findings have several policy implications in banking sectors as well as state level. The policy planners realized that green financing is a concept which is significant for human civilization and protect the only earth. It can play a robust role to include mainstream investment for sustainable development of financial institution in Bangladesh.

7.Significance of the Study

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 km2 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. 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. This figure is lower than the power sector's FY 2021-22 subsidy burden of $2.82 billion. Humans cannot change the natural system, such as the sun's radiation or the Earth's orbit around the sun. Nevertheless, they can switch GHG effects on the atmosphere, reduce environmental pollution, etc. Over the last century, CO2 absorption has increased alarmingly in the troposphere. Among many other causes, burning fossil fuel is the main one. Industrial activities have increased so fast since the beginning of the 20th century, giving rise to many factories. 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 CO2 into the air. Therefore, we generate substantial greenhouse gases all over the world.

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