

# The Impact of COVID-19 on the Green Banking of Financial Institutions in an Emerging Economy: Implications for the Green Economic Recovery

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## Abstract

This study aims to identify the COVID-19 impact on the green banking activities including green financing of banks and non-bank financial institutions (NBFIs) during the pandemic. Besides, this study also reveals the in-house environmental management of banks and NBFIs during the COVID-19 outbreak. To analyze the impact of the pandemic on green banking activities, secondary data were obtained from the quarterly and annual reports of Bangladesh Bank (BB) on green banking activities, annual reports and websites of the sample banks and NBFIs in Bangladesh for the period 2020–2019. The study utilized descriptive statistics, relative percentage changes, and varying tables and graphs to analyze the obtained secondary data. Consequently, the empirical findings revealed that, compared to the pre-pandemic period, banks' total green financing rose by 7.26% during the pandemic, while total green financing of NBFIs plummeted by 18.53% during the same period. In addition, the category-wise results indicate that green financing of the private commercial banks (PCBs) decreased by 11% during the COVID-19 pandemic, contrasting the 56.54% increase witnessed by the state-owned commercial banks (SOCBs) during the same period. Interestingly, our findings showed that green financing of foreign-owned commercial banks (FCBs) during the pandemic increased by 78.69% in 2020 compared to 2019. During the same period, BB refinancing scheme for green products/initiatives of banks and NBFIs grew by 76.97%. The results further showed that the PCBs and FCBs' in-house environmental management expanded during the outbreak except for the number of solar-powered ATM booths, which dropped by 68.25% for PCBs and 9.09% for FCBs. On the other hand, SOCBs' in-house environmental management grew during the pandemic. Furthermore, the results indicate that the Bangladeshi banks' automation towards green banking were satisfactory during the pandemic. Therefore, major policy implications for the green economic recovery of the government, BB, and managers of the banks and financial institutions in emerging economies like Bangladesh were discussed.

**Keywords:** COVID-19; green banking; green financing; green economic recovery; Bangladesh.

## 1. Introduction

Undoubtedly, the COVID-19 pandemic wreaked havoc on the global economy and finance, constituting the greatest challenge for financial structures since the 2008–09 global financial crises. The Asian Development Bank (ADB) forecasts the cost of the COVID-19 pandemic to range between 5.8 and 8.8 trillion dollars, representing about 6.4–9.7% of world GDP (Barua & Barua, 2021; Park et al., 2020). Thus, this outbreak has the potential of inducing a huge economic recession, which will further exacerbate the problem of unemployment, reduce saving and

investment, increase default rates, lower credit and investment growth, reduce interest income and raise bankruptcy (Ghosh & Saima, 2021; Goodell, 2020; Mahmud, 2020). Furthermore, developing countries with poor governance systems, poorly developed capital markets and the bureaucracy of policy wording will struggle to recover rapidly from the Pandemic shocks (Gorg et al., 2020). Recently, Korzeb & Niedziolka, (2020) studied how the industry structure of the credit portfolio affects the resistance of Polish commercial banks to the pandemic crisis. The study revealed that Poland's largest banks were the most resilient to the effects of the pandemic. On the other hand, the outcome of Barua & Barua's (2021) study in Bangladesh suggested that larger banks were more vulnerable during the pandemic.

Adaptation of technology to the banking systems is essential to the management of COVID-19 complications to ensure business continuity. Similarly, online training and development systems for continuous capacity growth initiatives is required to minimize the costs of banks and reduce the risks of contamination (Rashid, 2020). He said that customers do not need banks as they need banking. As such, it is high time financial institutions introduce green banking systems including online banking, online payments, and technological innovations to meet customer's need and also minimize the effect of crisis such as the COVID-19 pandemic. Green banking (GB) is a type of bank operation aimed at protecting the environment (natural resources), society and economy (Khairunnessa et al., 2021; Zheng et al., 2021). In 2011, Bangladesh Bank (BB), the central bank of Bangladesh, released the green banking and environmental risk management guidelines for banks in a struggle to ensure sustainable growth of the country. The BB is considered the world's frontline central bank in promoting GB activities to combat climate change, increase greenhouse gas and reduce air pollution in the world (Zhixia et al., 2018). To reduce the impact of the COVID-19 pandemic on the banks and NBFIs in Bangladesh, BB had initiated several green recovery measures, such as green refinance scheme for pandemic-affected marginal people through banks, regulatory responses against the outbreak to strengthen the GB, and other policy initiatives to cushion the effect of the pandemic on the banking sector. On the other hand, the PCBs, SOCBs, FCBs and NBFIs undertook various initiatives such as donating to the governments fund to support their struggle against the adverse effects of the deadly pandemic in Bangladesh (see Table 1).

Numerous studies have reported the possible devastating consequence of the pandemic on economies, due to its effects on different macroeconomic indicators such as aggregate demand, output, supply, trade flows, savings, investment and employment, which could increase poverty and cause potential recession or depression (Agrawala et al., 2020; Barua & Barua, 2021; Chen et al., 2020; Coibion et al., 2020; Shafi et al., 2020). Unfortunately, banking and financial sector in Bangladesh were not spared the adverse consequences of the pandemic, which impedes the growth of the sustainable economic development of the country. Among the challenges encountered by the Bangladeshi banking system during the pandemic are high level of non-performing loans (NPLs) (Barua & Barua, 2021; Ghosh & Saima, 2021; Mahmud, 2020), liquidity crisis (Ghosh & Saima, 2021; Mahmud, 2020) and credit risk (Mahmud, 2020). In addition, the COVID-19 epidemic reduces bank's profitability due to the excessive deposit withdrawal of customers during the crisis. However, GB offers promising and sustainable measures for banks to improve their profit via various ecofriendly projects (Akter et al., 2018; Zheng et al., 2021). Therefore, there exists a limited study in the direction of the impact of COVID-19 pandemic on the green banking activities including green financing of banks around the world, particularly in emerging countries like Bangladesh.

Furthermore, this paper attempts to discuss the above-mentioned research gaps in the following ways: First, this study presents the current status of green banking activities of banks and NBFIs during the COVID-19 pandemic. Second, this study explores the major steps taken by the banks and NBFIs to lessen the effects of the pandemic on the country's economy. Third, this study shows the in-house environmental management method undertaken by the banks and NBFIs towards green banking during the pandemic. Fourth, we identify the major sources of green financing of banks and NBFIs during the pandemic. Finally, this study attempts to identify the impact of the outbreak on the overall green banking activities of banks and NBFIs in Bangladesh. Hence, the main purpose of the study is to identify the impact of COVID-19 on the green banking activities including the green financing of banks and NBFIs during the pandemic based on the secondary data. Besides, this study also presents the in-house environmental management measures undertaken by the banks and NBFIs during the outbreak. To achieve the aforementioned goals, our analysis was aimed at addressing the following three questions: What is the current status of green banking of banks and NBFIs in Bangladesh during this pandemic? What are the major steps taken by the banks and NBFIs to mitigate the adverse effects of the pandemic in Bangladesh? What are the impacts of the COVID-19 pandemic on green banking activities of banks and NBFIs in Bangladesh?

This paper contributes to the current literature, especially on green banking and financing during the COVID-19 period in the following ways. First, the COVID-19 impact on the green banking and financing of banks and financial institutions in Bangladesh during the pandemic was analyzed in this study, as it could provide vital insights for other emerging economies, especially with similar financial and economic system. Second, the study showed the status of green banking activities of the banks and NBFIs in Bangladesh during the pandemic, which could aid other emerging economies to respond effectively to crises via green recovery. Third, the study also considered the major in-house environmental management steps taken by the banks and NBFIs during the COVID-19 pandemic to improve their environmental performance as well as reduce the adverse effects of the outbreak.

The reminder of the paper is organized as follows: Section two outlines the literature review on banking sector and the COVID-19 pandemic, BB's initiatives against the pandemic and major initiatives undertaken by banks and NBFIs to reduce the impact of COVID-19. Section three and four present the research methodology and the findings of the study respectively, followed by the discussion, conclusion, implications, limitations and future research of the study in the section 5.

## **2. Literature Review and Banks' Initiatives Against the COVID-19 Pandemic**

### **2.1 Banking Sector and the COVID-19 Pandemic**

Undoubtedly, the COVID-19 pandemic disrupts the global economy, especially the financial markets and institutions (Barua & Barua, 2021; Ghosh & Saima, 2021). In particular, the pandemic creates multifaceted crises for banks, resulting in higher banks' failure rates and could get worse, especially in emerging economies where financial market development is weak (Barua & Barua, 2021; Mahmud, 2020). As a result, the banking sector in Bangladesh had already recorded a high level of non-performing loans (NPLs), which is likely to escalate the effect of the viral outbreak. Moreover, the economic depression triggered by COVID-19 reduced the income of the various organizations, resulting in the drop in personal incomes, remittance flow, purchasing power and ultimately the bank's daily inflow of funds (Mahmud, 2020; Rashid, 2020). In addition, the depositors withdraw their existing deposits to cushion the effect of the financial crisis. Also, the

pandemic and the resulting lockdown of many sectors of the country had serious effect on different risks of the banking sectors such as credit risk, liquidity risk and NPLs, all of which are very concerning for the economy (Mahmud, 2020).

Numerous studies have shown that the COVID-19 outbreak took a toll on the economies, affecting several macro-economic factors such as total demand, production, supply, trade flows, savings, investment and jobs, which could lead to rise in poverty level and possible recession or depression (Agrawala et al., 2020; Barua & Barua, 2021; Chen et al., 2020; Coibion et al., 2020; Shafi et al., 2020). Therefore, pandemic or post-pandemic environment could be hostile to the survival and viability of banks and financial institutions in every country—emerging or developed in terms of financial stability, security and regulation discipline (Agrawala et al., 2020; Barua & Barua, 2021; Ghosh & Saima, 2021). This is evident from impact of the recent pandemic on banking and financial sector in Bangladesh, which impedes the growth of the sustainable economic development of the country. As such, Bangladeshi banking system is faced with severe problems, such as high level of NPLs (Barua & Barua, 2021; Ghosh & Saima, 2021; Mahmud, 2020), liquidity crisis (Ghosh & Saima, 2021; Mahmud, 2020), and credit risk (Mahmud, 2020) due to the pandemic. In addition, the banking sector in Bangladesh is susceptible to low profitability due to the withdrawal of deposits by depositors to mitigate the effect of the crisis. Furthermore, banks experienced reduced deposits from customers due to the limited operation of several companies during the lockdown in Bangladesh, resulting in the late receipt of their income.

Ghosh & Saima (2021) examined the financial sustainability and resilience of Bangladeshi commercial banks against the negative effects of COVID-19 pandemic using MCDM-based techniques. The study declared the Eastern Bank Limited (EBL) and Dutch-Bangla Bank Limited (DBBL) to be the most resilient banks in Bangladesh towards the COVID-19 pandemic, while ONEBANK Limited was the least resilient. Furthermore, the study suggested that banks with lower liquidity, capital adequacy, and performance as well as greater NPLs are more susceptible to the aftermath of the pandemic. Therefore, it can be said that the lower liquidity and higher NPLs induced by the COVID-19 pandemic directly affect the profitability, sustainable growth and survival of the banking sectors in Bangladesh.

## **2.2 Initiatives of BB against the COVID-19 Pandemic**

During the pandemic, the BB had advised the banks to limit their operation to two hours per day, from 10:00 a.m. to 12:00 p.m., consequent to the initial declaration of the 'lockdown' from 26 March to 4 April 2020 (Bangladesh Bank, 2021). The major steps taken by the BB to lessen the impact of COVID-19 outbreak on the banks and financial institutions that are facing a huge liquidity crisis are as follows (Barua & Barua, 2021):

- **Refinance Scheme for COVID-19–Affected Marginal People through Banks**

On the 20<sup>th</sup> April 2020, the BB proposed a refinancing scheme of BDT 30 billion to address the negative effect of COVID-19 on the marginalized people. The aim is to provide the poor with easy access to loans offered by the Microfinance Institutions (MFI). Under this scheme, individuals can borrow up to BDT 75,000, while group of people can obtain a maximum loan of BDT 3 lakhs. Also, small businesses and a group of small businesses can assess a maximum loan amount of BDT 10 and BDT 30 lakhs respectively. Forty-two commercial banks express their support for the program and subsequently disburse the fund (under the scheme) to the MFIs with eligibility

certificates from the Microfinance regulatory authority (MRA). Consequently, the refinance plan improved the livelihoods of marginal citizens during the COVID-19 pandemic.

- **Regulatory Responses Towards the COVID-19 Pandemic**

The BB undertook several initiatives during the pandemic, including the following:

- Increment of the transaction cap and charges exemption for digital financial services in various sectors;
- Disbursement of salary, wage and government social safety net benefits through the bank account or mobile wallets of employees/customers;
- Disbursement of government support to the affected community through the cash assistance of Mobile Financial Services (MFS) and allocation of BDT 10 accounts to the five million poor families who lost their profession during the pandemic;
- Establishment of BDT 30 billion initial fund to sustain the refinancing scheme in order to provide loans and ensure social inclusion;
- Establishment of the financial assistance program for the Cottage, Micro, Small and Medium Businesses (CMSME) and allocation of BDT 100 billion capital loan/investment facilities for CMSME sector financing.

- **Other initiatives**

Other initiatives of the BB against the COVID-19 pandemic are stated below:

- In order to support companies during the pandemic, BB loosened foreign exchange rules for trade dealings and extended its facilities until 30th September 2020;
- The BB also promised to provide cash support to banks, if necessary, by directly buying treasury bonds and market-price bills to reduce the risk of panic withdrawal resulting from lockdown measures of the COVID-19 pandemic;
- Also, the BB raised the export development fund to USD 5 billion from USD 3 billion and reduced interest rates to 2 percent. As a result, companies from various sectors like garments can access loans from the fund for a maximum of 360 days.

### **2.3 Major Steps Taken by the Banking Sectors to Lessen the Impact of COVID-19**

Table 1 shows the major steps undertaken by the banks and NBFIs in Bangladesh to reduce the impact of the pandemic. In this regards, 36 PCBs donated US\$ 16.13 million (approx. BDT 137 crore) to the Prime Minister's Relief and Welfare Fund (PMRWF) to support the government<sup>1</sup> (The Financial Express, 2020). Also, four SOCBs contributed a total of US\$ 0.59 million (approx. BDT 5 crore) to the fund. The following table presents the major initiatives undertaken by the other banks and financial institutions to mitigate the effects of the pandemic.

<sup>1</sup> <https://thefinancialexpress.com.bd/trade/coronavirus-care-incepta-ceases-reconil-export-1586226388>



**Table 1:** Major Initiatives of Banks and NBFIs During the COVID-19 Pandemic

<b>Name of Banks and FIs</b>	<b>Initiatives</b>
Al-Arafah Islami Bank Limited (AIBL)	In an attempt to reduce the effects of the novel coronavirus, AIBL contributed US\$0.59 million (BDT 5 crore) to the Prime Minister's Relief and Welfare Fund (PMRWF). In addition, all AIBL staffs also supported the PMRWF with a-day income of their salary, which amount to a total of \$0.10 million (BDT 83.18 lakh).
IDLC Finance Limited	On April 2020, the IDLC Finance Limited initiated the donation of essential foodstuffs to low-income and daily wage earners. This program was implemented by five well-recognized local development and volunteer organizations. Ovizatrick Foundation, Sajeda Foundation, CSR Window Bangladesh and Shomvabona & Alokito Shishu are affiliate organizations, covering a total of 12 districts that have been neglected, including several slums in Dhaka & Chittagong.
Meghna Bank Limited (MBL)	Workers of the MBL expressed their support to those affected by the COVID-19 pandemic by taking of them and their families. The staff of the Bank also allocated a day pay of their salary to support those impacted by the outbreak.
Mutual Trust Bank Ltd. (MTB)	The MTB contributed US\$ 0.59 million (BDT 50 million) to the PMRWF to help combat the COVID-19 pandemic.
Mercantile Bank Limited (MBL)	The MBL donated a total amount of US\$ 0.59 million (BDT 50 million) to the PMRWF against the COVID-19 outbreak.
BRAC Bank Limited (BBL)	The BBL donated a check of US\$ 0.59 million (BDT 50 million) to the PMRWF through the Bangladesh Bank Association to support the government struggle against the deadly virus.
Eastern Bank Ltd (EBL)	The EBL contributed US\$ 0.59 million (BDT 50 million) to the PMRWF to help fight the pandemic.
Premier Bank Limited (PBL)	The PBL offered US\$ 0.59 million (BDT 5 crore) to the PMRWF to curb the spread of the coronavirus.
United Commercial Bank Limited (UCBL)	The UCBL contributed US\$ 0.59 million (BDT 5 crore) to the PMRWF to aid the battle against the viral outbreak.
NRB Commercial Bank Limited (NRBCBL)	The NRBCBL donated US\$ 23,548 (BDT 20 lakh) to the PMRWF and also set up a US\$0.32 million (BDT 2.75 crore) fund to support the poor, destitute and frontline workers during the crisis.
EXIM Bank Limited	The bank supplied personal protection equipment (PPE), testing/respiratory equipment to the health care industry and provided financial support to the needy and the COVID-19 patients. In addition, EXIM Bank donated US\$ 0.59 million (BDT 50 million) to PMRWF.
Agrani Bank Limited (ABL)	In order to fight the COVID-19 pandemic, ABL donated \$0.15 million (BDT 1.25 crore) to the PMRWF. Besides, the bank also supported the same relief and welfare fund with 5,000 pieces of PPE.

Sonali, Rupali, and Janata Bank Limited	In response to the government's campaign against the deadly coronavirus, Sonali, Rupali, and Janata jointly donated US\$ 0.44 million (BDT 3.75 crore) to the PMRWF.
The IFIC Bank Limited (IFICBL)	In support of the effort to curb the spread of the COVID-19 virus, the IFIC Bank donated US\$ 0.59 million (BDT 50 million) to PMRWF.
HSBC	The HSBC announced a range of actions to help its customers in textiles and clothing industries overcome the economic impact of the pandemic. The bank offered a special short-term credit of up to one year with a four-month moratorium to be utilized to cover payroll bills and payments of utilities. According to an HSBC Bangladesh press release, the Bank also allowed three months of moratorium on current term loans from textile and garment companies. During the period, the customer is not obliged to pay any installments, while the lender is also not allowed to demand any repayment. The Bank of Bangladesh had encouraged other banks to emulate similar initiative to fund companies.
The Standard Chartered Bangladesh (SCB)	The SCB agreed to support its customers with a range of measures to help them cope with the pandemic periods. Bangladesh (Covid-19). As a measure, the bank gave the general customers a three-month payment break, while the company's customer received their loans within 30 days. The bank also promised to waive the customers' penalty interest, late payment charges as well as the company's late payment fee via credit card.
Source: Bank Websites, (2021)	

### 3. Research Materials and Methods

The present study is descriptive in nature and primarily based on the secondary data. The major advantage of this review process is the prior availability of adequate and accurate data (Goodwin, 2012). Majorly, this study aims to identify the impact of COVID-19 on the green banking activities of banks and NBFIs during the pandemic using a secondary data. Besides, this study also shows the in-house environmental management of the banks and NBFIs during the COVID-19 outbreak. To achieve our research objectives, secondary data were obtained from the quarterly and annual published reports of BB on green banking activities, annual reports, and websites of the sample banks and NBFIs in Bangladesh for the period 2019–2020. Subsequently, the study utilized descriptive statistics, percentage changes, and different graphs to analyze the obtained secondary data. The scope of this study is limited to banks and NBFIs in Bangladesh, as indicated in Table 2.

**Table 2:** Samples of the Study

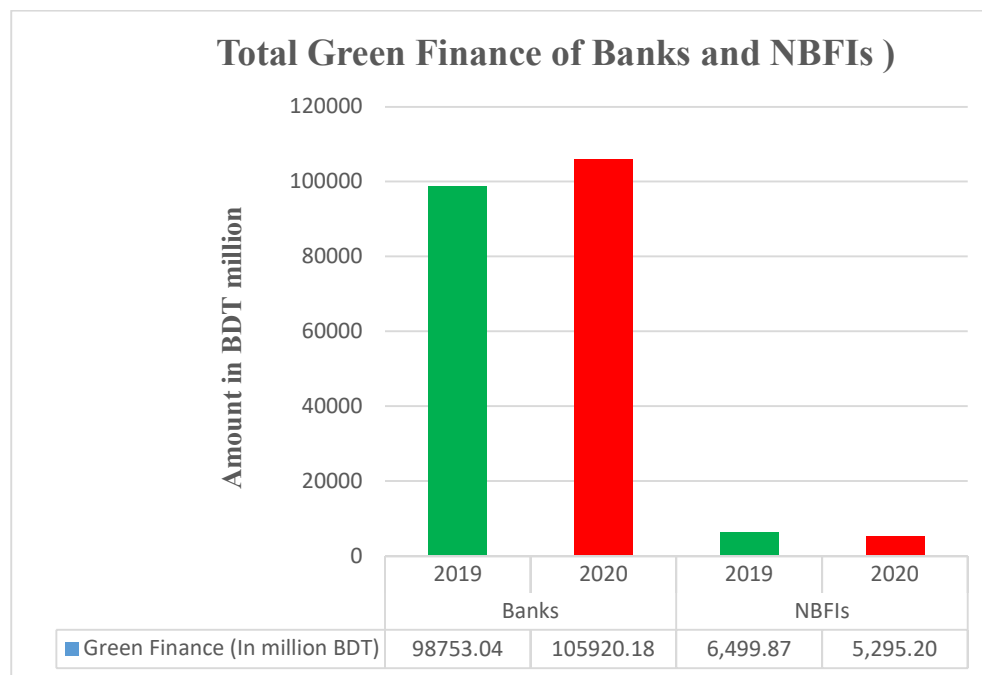
SL	Banks and NBFIs	Abbreviation	Frequency
1	State-Owned Commercial Banks	SOCBs	6
2	Foreign-Owned Commercial Banks	FCBs	9
3	Private Commercial Banks	PCBs	40
<b>Total</b>			<b>55</b>
1	Non-Bank Financial Institutions	NBFIs	33
<b>Total</b>			<b>33</b>
Source: Bangladesh Bank, (2021). For more details, see <a href="http://www.bb.org.bd">www.bb.org.bd</a> .			

#### 4. Empirical Findings

##### 4.1 Comparative Scenario of Green Financing During the COVID-19 Pandemic

- *Overall Green Finance of Banks and NBFIs*

Table A1 shows the overall green finance of banks and NBFIs during the period 2019–2020. In order to identify the impact of COVID-19 on banks and NBFIs' green financing of various ecofriendly projects, the study compared the outcomes of the fiscal year 2020 and 2019. The empirical findings revealed that banks' total green financing increased by 7.26% during the pandemic compared to the past year, while NBFIs experienced 18.53% reduction in their total green financing during the same period.

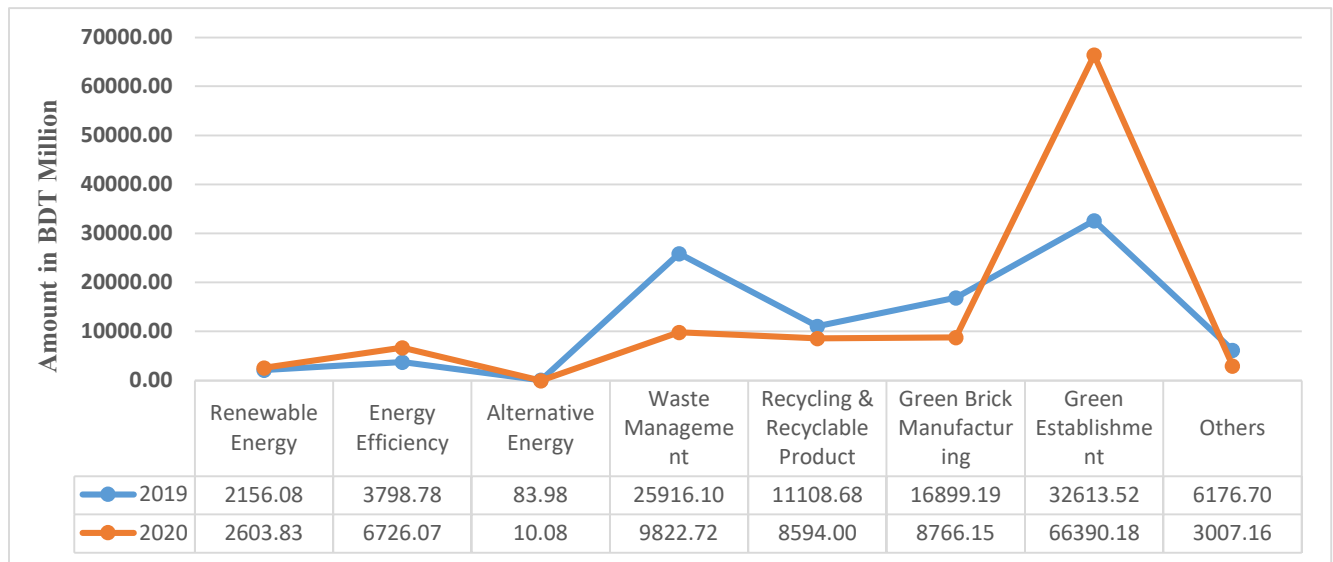


**Figure 1:** Total green finance of banks and NBFIs

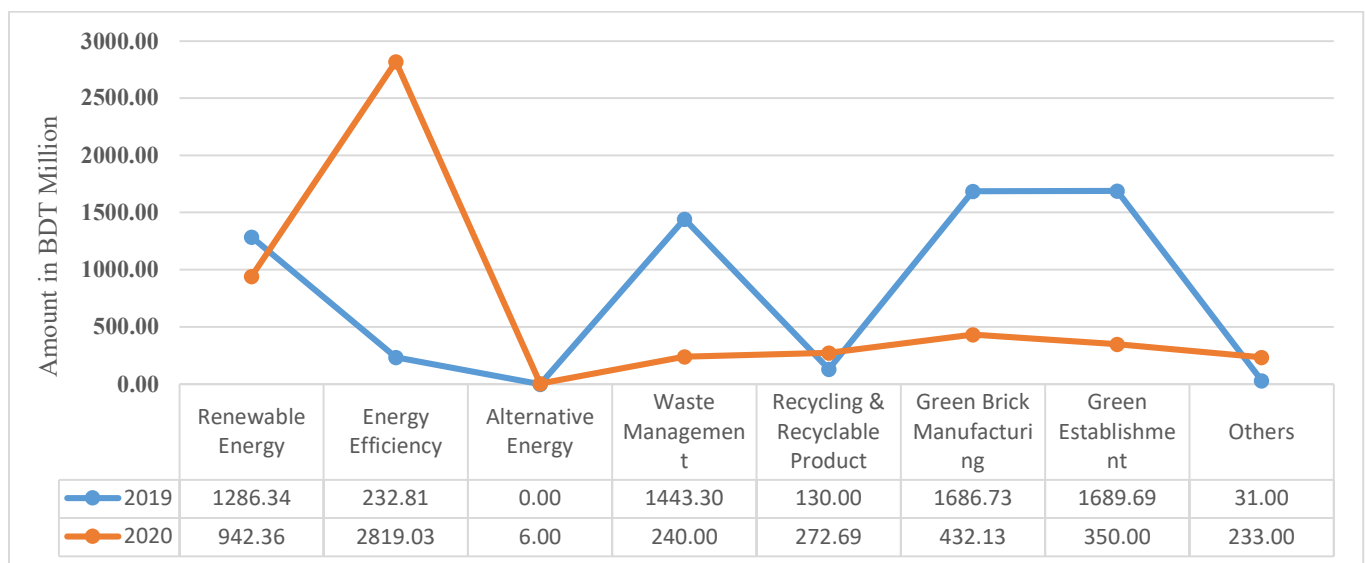


### • Sector-Wise Green Finance of Banks and NBFIs

Table A2 shows the sector-wise green financing of banks and NBFIs during the study period 2019–2020. The overall banking sectors' green financing projects such as green establishment, green brick manufacturing, renewable energy, energy efficiency, recycling and recyclable product, etc., were estimated to be BDT 105,920.18 Million in 2020, exceeding the amount (BDT 98753.04 million) obtained in 2019. Thus, green financing of banks had improved during COVID-19 pandemic. On the contrary, NBFIs invested BDT 5,295.20 million on green financing in 2020, which is relatively lower compared to that of the previous year (BDT 6, 499.87 million). Furthermore, the empirical findings suggest that NBFIs' category-wise green financing during the pandemic decreased by 18.53% in 2020.



**Figure 2:** Sector-wise green finance of banking institutions during the COVID-19 pandemic in Bangladesh



**Figure 3:** Sector wise-green finance of NBFIs during the COVID-19 pandemic in Bangladesh

- **Sector-Wise Green Finance of PCBs, SOCBs and FCBs**

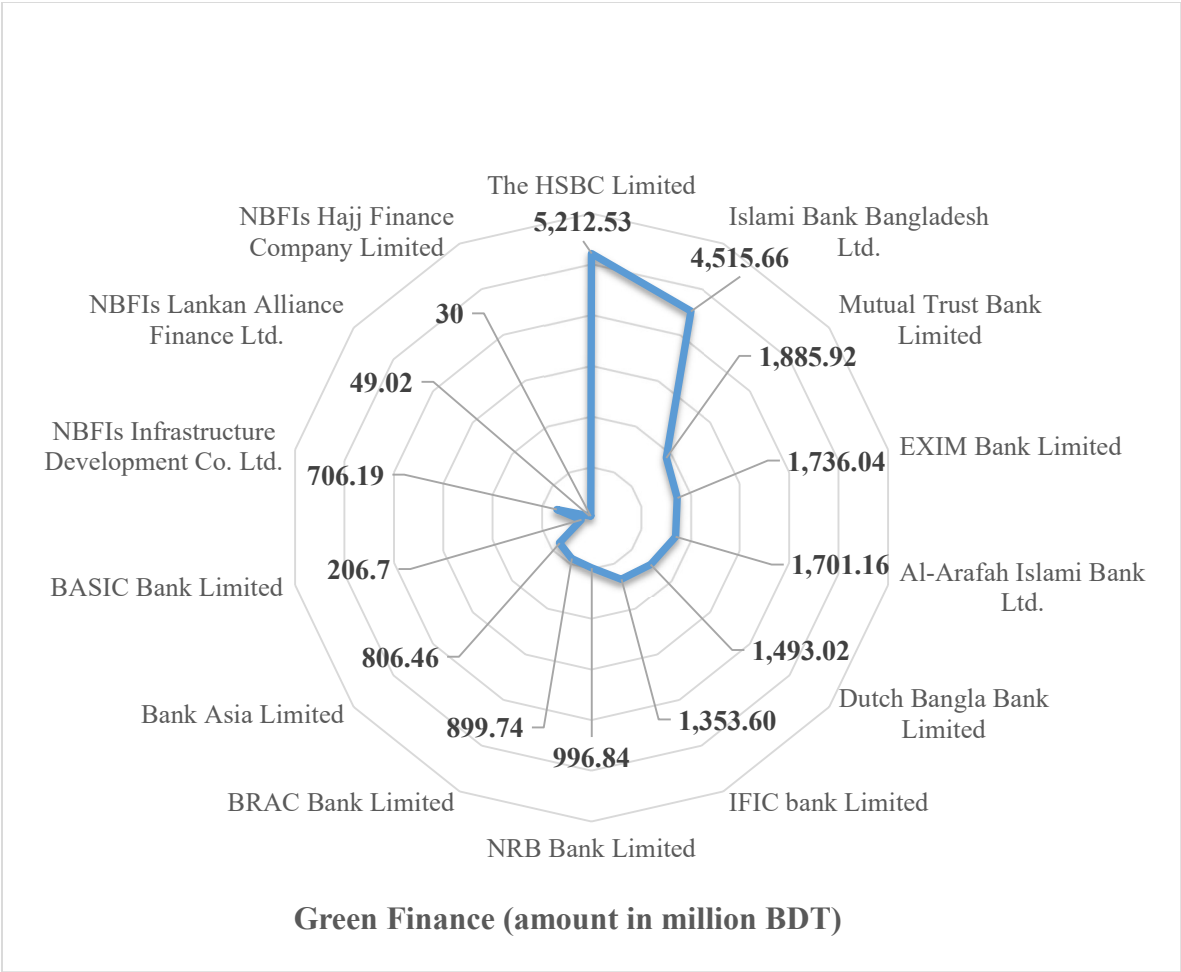
Table 3 shows the sector-wise green financing of PCBs, SOCBs and FCBs during the period of pandemic. The empirical findings indicate that category-wise green financing of PCBs decreased by 11% during the pandemic, while SOCBs' sector-wise green financing witnessed 56.54% increase during the same period. More interestingly, the results further reveal that FCBs' green financing during the pandemic increased by 78.69% in 2020 compared to 2019. Therefore, it can be concluded that SOCBs and FCBs play crucial role in the development of green economy during the pandemic through green financing of various ecofriendly projects.

**Table 3: Sector-Wise Green Finance of PCBs, SOCBs and FCBs**

Sources of Green Finance	PCBs		SOCBs		FCBs	
	2019	2020	2019	2020	2019	2020
Renewable Energy	1,921.36	1,979.41	15.35	7.48	216.57	608.60
Energy Efficiency	3,667.96	6,398.37	-	-	130.83	327.70
Alternative Energy	83.98	10.08	-	-	-	-
Waste Management	25,571.35	8,878.87	216.70	660.05	128.05	283.80
Recycling & Recyclable Product	10,852.60	8,298.55	253.68	290.85	2.40	4.60
Green Brick Manufacturing	16,172.27	8,402.90	726.92	363.25	-	-
Green Establishment	13,878.21	3,2737.93	-	579.85	18,735.31	33,072.40
Others	6,169.16	2,962.65	6.79	7.43	-	35.59
Total (amount in BDT million)	78,316.88	69,668.75	1,219.44	1,908.91	19,213.16	34,332.69
Changes in %	11.04% decrease in 2020		56.54% increase in 2020		78.69% increase in 2020	
Source: SFD, BB (2021). For more details, see <a href="http://www.bb.org.bd">www.bb.org.bd</a> .						

- **Leading Banks and NBFIs in Green Financing During the COVID-19**

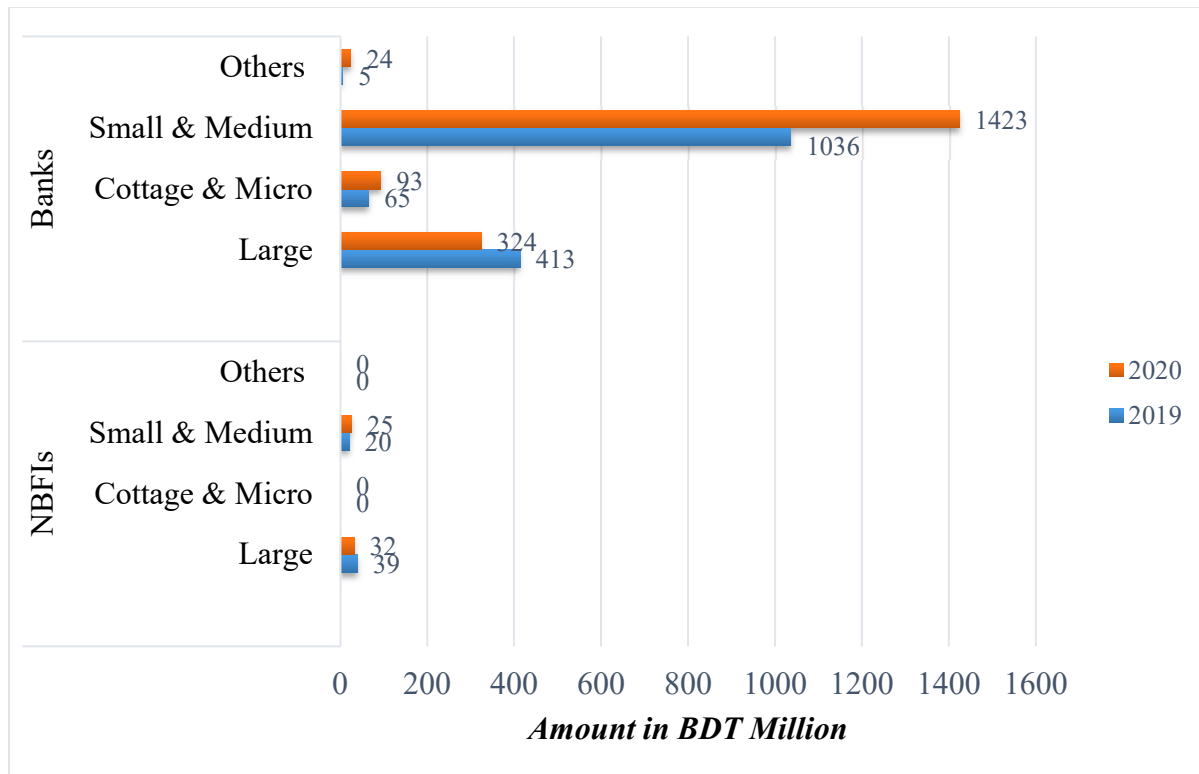
Table A3 shows the top-performing banks and NBFIs with respect to green financing in Bangladesh during the COVID-19 pandemic, as of September 2020. The HSBC Limited, Islami Bank Bangladesh Limited, Mutual Trust Bank Limited, EXIM Bank Limited, and Al-Arafah Islami Bank Limited were top five performing banks in terms of green financing during the pandemic, as they had committed more than 10% of their total loan disbursement to green finance. On the other hand, the leading NBFIs include Infrastructure Development Co. Ltd., Lankan Alliance Finance Ltd., and Hajj Finance Company Limited, with more than 5% of their total loan disbursement dedicated to green finance, as can be shown in Figure 4.



**Figure 4:** Leading Banks and Financial Institutions in Green Finance during the COVID-19 Pandemic, as of September 2020.

• **The Number of Borrowers from the Green Finance of Banks and NBFIs**

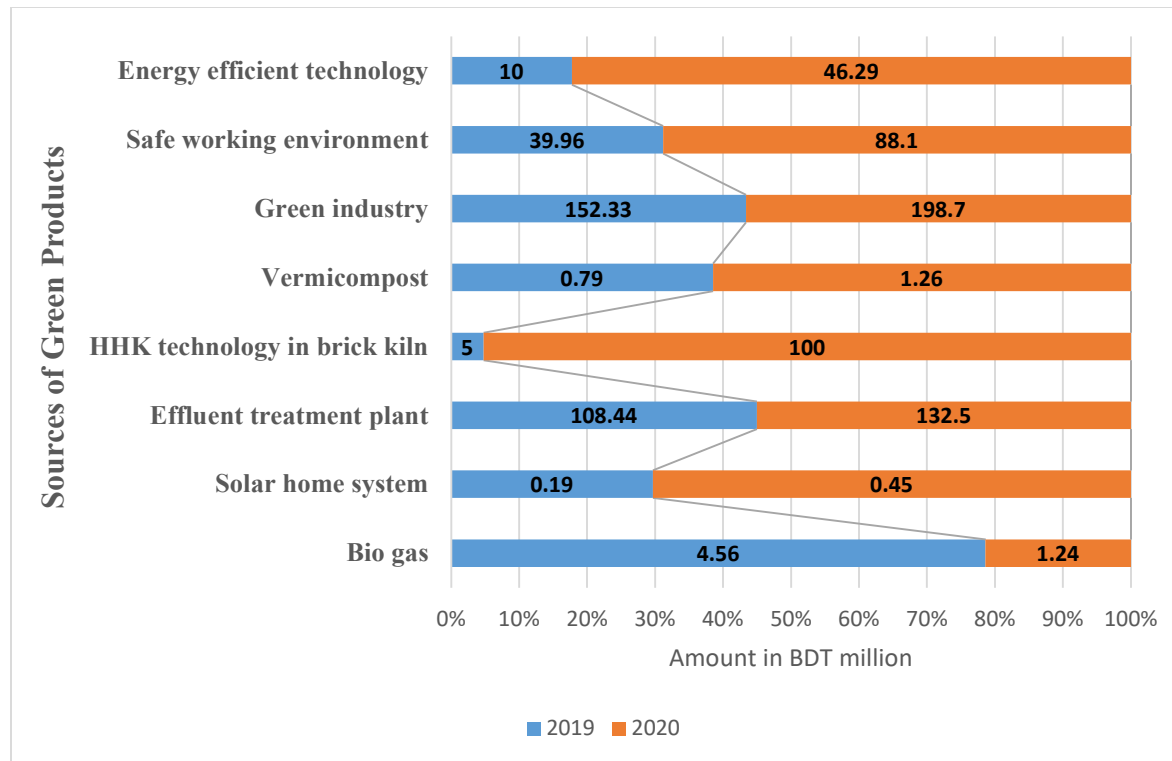
The number of borrowers from the banks and NBFIs’ green finance during the period of COVID-19 are shown in Table A4. The main borrowers from the green financing scheme of banks and NBFIs include large, cottage and micro, small and medium businesses; and other enterprises. The empirical findings show that the number of borrowers from the green finance increased by 23% for the banking institutions while nearly 3% decrease was observed for the NBFIs during the pandemic.



**Figure 5:** Number of Borrowers from Green Finance

- **The BB Refinance Scheme for Green Product/Initiatives**

In 2009, BB had developed an initial refinancing scheme of BDT 2.0 billion and subsequently increased to BDT 4.0 billion to promote green goods or initiatives at a lower interest cost. The BB refinancing scheme for the green products/initiatives of banks and NBFIs during the period of COVID-19 are presented in Figure 6 and Table A5. The empirical results indicate that BB refinancing scheme for various green products such as biogas, solar home system, HHK technology in brick kiln, effluent treatment plant, vermicompost, green industry, safe working environment, and energy efficient technology grew by 76.97% during the pandemic compared to the past year. Therefore, it can be concluded that BB plays a vital role in increasing investments in ecofriendly products to promote green banking for the development of the country's green economy during the pandemic.



**Figure 6:** The BB Refinance Scheme for Green Product/Initiatives

#### 4.2 Non-Performing Loans (NPLs) Under Investment and Green Finance

Table 4 shows the comparison between the NPLs of banks and NBFIs under the total investment as well as green financing during the COVID-19 pandemic. The research findings show that the total outstanding and classified loans within the green finance investment decrease for both banks and NBFIs. In contrast, an increment was observed in the total outstanding and classified loans under the Environmental and Social Due Diligence (ESDD) investment of both banks and NBFIs during the COVID-19 pandemic. Therefore, the expansion of banks and NBFs' NFIs during the pandemic presents an uncertainty to the future of the banking sector in Bangladesh.

**Table 4:** Comparison between the NPLs of banks and NBFIs during the COVID-19 pandemic

Issue	Banks			NBFIs		
	As of Dec. 2019	As of Sept. 2020	Changes (amount in BDT million)	As of Dec. 2019	As of Sept. 2020	Changes (amount in BDT million)
Outstanding loan/investment under green finance	10802393.10	285296.61	-10517096.49	667712.92	32213.16	-635499.76
Classified loan/investment	954337.98	5744.17	-948593.81	65360.21	2911.87	-62448.34

under green finance						
Total outstanding loans/ investment	2251068.46	11410865.22	9159796.76	145097.81	659506.37	514408.56
Total classified loans/ investment	70139.01	954658.89	884519.88	12249.83	103945.97	91696.14
Outstanding loans/investment under ESDD	259578.31	2459780.71	2200202.40	30918.00	133810.62	102892.62
Classified loans/investment under ESDD	6325.61	65611.56	59285.95	2869.46	13512.85	10643.39
Source: SFD, BB (2021). For more details, see www.bb.org.bd.						

### 4.3 Banks and NBFIs' Environmental and Social Risk Management

Table 5 shows the environmental and social risk management of banks and NBFIs during the study period 2019–2020. Apart from the number of environmental risk-rated projects, the empirical results also indicate that the number of the projects financed decreased during the period of COVID-19 for both banks and NBFIs in Bangladesh. Furthermore, total amount disbursed against the rated projects also declined by 31.70% for banks and 2.67% for NBFIs during the outbreak.

**Table 5:** Banks and NBFIs' Environmental & Social Risk Management

Issue	Banks		NBFIs	
	2019	2020	2019	2020
Number of environmental risk-rated projects	60346	50778	3103	2317
Number of environmental risk-rated projects financed	44835	39778	2815	2149
Amount disbursed against rated projects (in million BDT)	2037446	1391672	109607.3	106677
Changes in %	Decreased by 31.70% in 2020		Decreased by 2.67% in 2020	
Source: SFD, BB (2021). For more details, see <a href="http://www.bb.org.bd">www.bb.org.bd</a> .				

### 4.4 The In-house Environmental Management of Banks and NBFIs

- **The Bangladesh Bank's In-house Environmental Management**

Table 6 exhibits the in-house green practices of BB during the COVID-19 period. In order to make its home operations environmentally sustainable, energy-efficient and technologically advanced, BB had introduced a range of rigorous initiatives. The empirical findings showed that BB had undertaken significant steps towards green practices during the pandemic, such as rooftop solar power system and chiller-based air conditioning; online documentation and leave management system; online/office order and electronic pass for visitors; carbon footprint measurement and e-recruitment; and enterprise resource planning (ERP) and online account statement; etc.



Table 6: The Bangladesh Bank's In-house Green Practices During the COVID-19

SL	In-house green practices
1	Rooftop solar power system & chillar-based air conditioning
2	Online documentation & leave management system
3	Online/office order & electronic pass for visitors
4	Enterprise Data Warehouse (EDW) system
5	Bangladesh Electronic Fund Transfer Network (BEFTN)
6	Carbon footprint measurement & e-recruitment
7	Enterprise Resource Planning (ERP) & online account statement
8	LAN/WAN computer network among all BB offices
9	Bangladesh Automated Cheque Processing System (BACPS)
10	Credit Information Bureau (CIB)
Source: SFD, BB (2021). For more details, see www.bb.org.bd.	

### • The Banks and NBFIs' In-House Environmental Management

The banks and NBFIs' in-house environmental management during the COVID-19 pandemic are presented in Table 7. The empirical results showed that the total number of banks' branches powered by solar energy increased by 2.01% during this pandemic, while it remained unchanged for the NBFIs. With respect to ATM booths of banking institutions, a 5% increase was observed during the pandemic. Furthermore, the total number of banks' ATM booths powered by solar energy diminished by a staggering 58% during the pandemic, compared to the past year. However, there is a substantial expansion in the number of banks' agent outlets and outlets powered by the solar energy during the COVID-19 pandemic. Therefore, it can be concluded that the overall banks and NBFIs' in-house environmental management generally improved except for the number of solar-powered ATM booths, which contracted during the pandemic.

Table 7: The In-House Environmental Management of Banks and NBFIs

Issue	Banks			NBFIs		
	2019	2020	Changes (%)	2019	2020	Changes (%)
No. of branches	10,545	10,596	0.48	284	280	-1.41
No. of solar-powered branches	598	610	2.01	3	3	-
No. of ATM booths	7,431	7,823	5.28	-	-	-
No. of solar-powered ATM booths	76	32	-57.89	-	-	-
Number of agent outlets	26,637	30,851	15.82	-	-	-
Number of solar-powered agent outlets	5	16	220.00	-	-	-
Source: SFD, BB (2021). For more details, see www.bb.org.bd.						

### • The In-House Environmental Management of PCBs, SOCBs and FCBs.

Table 8 shows the in-house environmental management of PCBs SOCBs and FCBs during the outbreak. The results revealed that the PCBs and FCBs' in-house environmental management improved during the pandemic except for the number of solar-powered ATM booths, which

decreased by 68.25% for PCBs and 9.09% for FCBs compared to the previous year. Besides, the in-house environmental management of SOCBs also increased during the outbreak. Therefore, the overall in-house environmental management of PCBs, SOCBs and FCBs were satisfactory during the pandemic, indicating the substantial adoption of green banking initiatives by the banking institutions in Bangladesh.

Table 8: The In-House Environmental Management of PCBs, SOCBs and FCBs.

Issue	PCBs			SOCBs			FCBs		
	2019	2020	Change s	2019	2020	Change s	2019	2020	Change s
No. of branches	5283	5321	0.72%	3777	3788	0.29%	64	66	3.13%
No. of solar-powered branches powered	512	524	2.34%	76	76	0.00%	5	5	0.00%
No. of ATM booths	7046	7427	5.41%	240	252	5.00%	139	138	-0.72%
No. of solar-powered ATM booths	63	20	- 68.25%	2	2	0.00%	11	10	-9.09%
Number of agent outlets	26437	30571	15.64%	200	280	40.00%	-	-	-
Number of solar-powered agent outlets	5	16	220.00 %	-	-	-	-	-	-
Source: SFD, BB (2021). For more details, see <a href="http://www.bb.org.bd">www.bb.org.bd</a> .									

#### 4.5 Green Banking Activities in the Bangladeshi Banking Sector at a Glance

Table 9 shows the green banking activities of PCBs, SOCBs, and FCBs in Bangladesh during the COVID-19 pandemic. The empirical findings indicate that the total number of branches with an online coverage increased by 4.55%, 0.6%, and 1.54% for PCBs, SOCBs, and FCBs respectively during the pandemic. Furthermore, the number (percentages) of online branches declined slightly for the PCBs and SOCBs during the pandemic, while that of FCBs remained unchanged. Therefore, it can be said the automation of banking institutions' services towards green banking in Bangladesh was satisfactory.

Table 9: Automation Towards Green Banking in Bangladesh

Issue	PCBs			SOCBs			FCBs		
	2019	2020	Change s	2019	2020	Change s	2019	2020	Change e
No. of total branches	5083	5321	4.68%	3758	3,788	0.80%	65	66	1.54%
No. of branches with online coverage	5080	5311	4.55%	3688	3716	0.76%	65	66	1.54%
% of online branches	99.94	99.81	-0.13%	98.14	98.10	-0.04%	100	100	0.00%
Source: SFD, BB (2021). For more details, see <a href="http://www.bb.org.bd">www.bb.org.bd</a> .									

## 5. Discussion and Conclusion

The main purpose of this study is to identify the impact of COVID-19 pandemic on the green banking activities of banks and NBFIs in Bangladesh. Besides, this study also shows the effect of the outbreak on the green finance of banks and NBFIs in Bangladesh. This study is descriptive in nature and focused predominantly on the secondary data. To fulfill the aforementioned objectives, the secondary data were obtained from the various annual, quarterly, and monthly published reports of BB, banks, and NBFIs in Bangladesh during the pandemic period 2019–2020. Furthermore, the study also compared the green banking data with that of the previous year to examine the influence of the pandemic. The data obtained were analyzed using various descriptive statistics, percentage changes, table, graph, and qualitative method. Consequently, the empirical findings revealed that the banks' total green financing rose by 7.26% during the pandemic compared to the previous year, contrasting the 18.53% decrease experienced by NBFIs during the same period. This result is consistent with the recent study of Khairunnessa et al., (2021) that, contrary to the NBFIs, banking institutions in Bangladesh had improved during the past year in terms of green financing. Moreover, the overall banks' green financing of various projects such as green establishment, green brick manufacturing, renewable energy, energy efficiency, recycling & recyclable product and others were estimated to be BDT 105920.18 Million in 2020, which exceeded the amount (BDT 98753.04 million) invested in 2019. Thus, Green financing of banks have clearly improved during COVID-19. On the other hand, NBFIs invested BDT 5,295.20 million in green financing in 2020, which is slightly lower compared to the BDT 6,499.87 million expended in 2019. Furthermore, the empirical findings suggest that NBFIs' category-wise green financing during the pandemic decreased by 18.53% in 2020. Similarly, category-wise green financing by PCBs declined by roughly 11% during the pandemic, in contrast to 56.54% increase witnessed in the SOCBs' sector-wise green financing. More interestingly, the results showed that the FCBs' green financing increased by 78.69% during the outbreak, which is similar to the findings of recent studies (Khairunnessa et al., 2021; Zheng et al., 2021). Therefore, we can conclude that SOCBs and FCBs play crucial role in the development of green economy during the pandemic through their green financing of various ecofriendly projects.

The main borrowers from the green financing of banks and NBFIs are large, cottage and micro, small and medium businesses; and other enterprises. Based on the results, the number of borrowers from the green financing increased by approximately 23% for the banking institutions, while about 3% decrease was observed for the NBFIs during the pandemic. Besides, the results indicate that the HSBC Limited, Islami Bank Bangladesh Limited, Mutual Trust Bank Limited, EXIM Bank Limited, and Al-Arafah Islami Bank Limited were the top five performing banks in terms of green financing during the COVID-19 pandemic, as they had allocated more than 10% of their total funded term loan disbursement for green finance. On the other hand, the leading NBFIs, which include Infrastructure Development Co. Ltd., Lankan Alliance Finance Ltd., and Hajj Finance Company Limited, disbursed more than 5% of their total loan disbursement to green finance. Thus, our findings are consistent with the earlier studies (Khairunnessa et al., 2021; Zheng et al., 2021). Furthermore, the empirical findings indicate that the BB refinancing scheme for various green products such as biogas, effluent treatment plant, solar home system, vermicompost, HHK technology in brick kiln, green industry, safe working environment, and energy efficient technology had risen by 76.97% during this pandemic compared to the past year. Therefore, it can be said that the BB exerts great influence in promoting green banking through green financing of

various ecofriendly products for the development of the country's green economy during the pandemic.

The research findings also show that, during this pandemic in Bangladesh, both banks and NBFIs regressed in term of the total outstanding and classified loans within their investment under green finance. Thus, it can be observed from the outputs that green financing of different ecofriendly projects by the banks and NBFIs in Bangladesh is more productive than the traditional financing during the COVID-19 pandemic. On the other hand, the total outstanding and classified loans under the investment and the investment under Environmental and Social Due Diligence (ESDD) for both banks and NBFIs increased during the pandemic. This findings is in line with the recent studies (Barua & Barua, 2021; Ghosh & Saima, 2021; Hosen et al., 2020), which revealed that Bangladeshi banking system had been severely challenged by the increasing levels of NPLs due to the global COVID-19 crisis. Rapidly rising NPLs often create doubts in the depositors' minds, and reduces customers' confidence in depositing money into banks, resulting in a liquidity crisis for banks. Therefore, the growing concern for the future of banking sector in Bangladesh, as the NPLs of banks and NBFs had greatly expanded during the pandemic. The outputs of the study revealed that the total number of environmental risk-rated projects and the projects financed decreased during the COVID-19 period for both banks and NBFIs in Bangladesh. Similarly, the total amount disbursed against the rated projects had decreased by staggering 31.70% for banks and meagre 2.67% for NBFIs during the outbreak. Furthermore, in terms of the in-house environmental management of BB, the empirical findings showed that BB had taken significant steps towards green practices during the COVID-19 pandemic. Green banking practices of BB including rooftop solar power system and chiller-based air conditioning, online documentation and leave management system, online office order and electronic pass for visitors, carbon footprint measurement and e-recruitment, enterprise resource planning (ERP) and online account statement, etc.. The results showed that the PCBs and FCBs' in-house environmental management improved during the pandemic except for the number of solar-powered ATM booths, which exhibited a 68.25% and 9.09% decrease for PCBs and FCBs respectively compared to the pre-pandemic year. On the other hand, there was an increase in the SOCBs' in-house environmental management during the study period. Therefore, it can be concluded that the overall in-house environmental management performance of PCBs, SOCBs and FCBs were satisfactory during the pandemic, indicating the credible and proper adoption of green banking activities by banking institutions in Bangladesh.

Generally, the improvement in the green banking activities of PCBs, SOCBs and FCBs in Bangladesh had been substantial during the pandemic period. Thus, the empirical findings revealed that the total number of branches with an online coverage increased by 4.55%, 0.6% and 1.54% for PCBs, SOCBs and FCBs respectively during the pandemic. On the other hand, the number (percentage) of online branches slightly decreased for the PCBs and SOCBs during this pandemic, while that of FCBs remained unchanged, which is consistent with the past studies (Akter et al., 2018; Hoque et al., 2019; Khairunnessa et al., 2021; Zheng et al., 2021). These studies highlighted that the green banking in Bangladesh had improved in recent years, especially in terms of green funding and in-house risk management, which is largely promoted by the BB in a bid to green the Bangladeshi banking system. Therefore, we can conclude that the automation of banking services towards green banking in Bangladesh was satisfactory particularly during the COVID-19 pandemic.

## 6. Implications for the Green Economic Recovery

### 6.1 Implications for the Government

During the COVID-19 pandemic, major economic activities of global financial institutions were halted, making a global recession imminent. By adopting and developing appropriate policy guidelines, the effect of the pandemic on the economy, the banking sector and other industrial sectors could be reduced to some degree. Consequently, the government of Bangladesh had undertaken various initiatives to lessen the impact of the pandemic on the country's economy. Besides, the outcomes of this study also present some useful green recovery measures to revive the country's economy and cushion the adverse effects of the pandemic for SDGs. First, the financial sector in Bangladesh had suffered from the poor management of NPLs, which could further increase after the pandemic. This has presented the banks and NBFIs with risk of huge liquidity crisis, which will affect the economy of the country. Therefore, to strengthen the banking sector, the main economic driver in Bangladesh, the government should undertake necessary steps to reduce the NPLs of banks and NBFIs through strong monitoring, establishment of proper policy guidelines and provision of funds with lower interest rates to mitigate the liquidity crisis faced during the pandemic. Second, the government of Bangladesh should consider green recovery measures including grants, loans and tax reliefs for green banking activities; green transport; clean energy development; and circular economy to create more jobs, reduce unemployment, and stimulate economic activity through banks and NBFIs. In addition, the government can support positive environmental results and facilitate the attainment of sustainable development in the country during the pandemic by striking balance between green and non-green expenditure. Furthermore, the government can encourage innovation, implement a wider spectrum and systemic change in key sectors, accelerate existing environmental policies and use green pipelines for their projects. Besides, the new perspective of a relatively low oil price offers a great opportunity to increase carbon prices and reform fossil fuel subsidies. To conclude, green economic recovery measures are essential to address the immediate and interconnected problems of climate change and loss of biodiversity.

### 6.2 Implications for the Banks and Financial Institutions

The empirical findings of this study has some useful implications for researchers, banking institutions, managers, and policy makers of emerging economies like Bangladesh to lessen the adverse effects of the COVID-19 pandemic on the green banking and financing of banks and NBFIs for the attainment of sustainable development of the country. To date, banking and financial sectors in Bangladesh including BB had taken several initiatives to mitigate the negative impacts of the COVID-19 pandemic. However, further recovery steps should also be considered, in addition to the formation of a contingency team with clear tasks of achieving the strategic objectives of a sustainable future in Bangladesh's banking sector. First, our results suggest that NPLs had risen enormously for banks and NBFIs during the pandemic, creating a liquidity problem for the banks. Thus, BB should take a radical measure to reduce NPLs in the banking sector, while policy guidelines should be drawn up to revive the country's financial system. Besides, it is high time for the manager of each bank to evaluate and revalue its total lending portfolios, as well as monitor the portion invested. Second, banks and financial institutions may raise funds by issuing green bonds to mitigate the liquidity crisis faced during the COVID-19 pandemic. Third, COVID-19 may create an avenue to help clients and affected communities via green banking activities, and in turn boost the banks' credibility and brand. Thus, the banks and NBFIs can improve their daily



operations during the pandemic by adopting green banking activities such as online payments, online banking, remote deposits, green credit card, and funding of ecofriendly projects to support the government in its effort to achieve the SDGs. Finally, the findings showed that the overall green banking activities including green financing, in-house environmental management, and social and environmental risk rating of green projects financed by the banks and financial institutions in Bangladesh during the COVID-19 pandemic were satisfactory. Therefore, banks and financial institutions of the Bangladesh should continue to embrace green banking to sustain the revival of the economy from the negative impacts of the. Besides, BB may also reinforce this habit by ensuring proper monitoring, establishing proper guidelines and providing training, education, and seminar to the employees of the banks and financial institutions to ensure the sustainable banking in the future.

## 7. Study Limitations and Future Research

Although the present study provides some insightful theoretical and practical implications for the effect of COVID-19 on the green banking activities of banks and NBFIs in Bangladesh, it is not bereft of some limitations, which represent the scope for further research. First, this study relied only on secondary data obtained from the central bank of Bangladesh and other sample banks and NBFIs during the period 2019–2020. Since this is an ongoing situation, all of the information obtained from the secondary sources is subject to changes at all times. Therefore, the future research could improve the study by expanding the study duration and collecting primary data using survey methods to identify the impact of the COVID-19 pandemic on the environmental performance of banks during the pandemic. Second, the study analyzed the impact of COVID-19 on the green banking activities including green financing of banks and NBFIs in Bangladesh using a systematic review approach. Therefore, subsequent study could consider measuring the COVID-19 pandemic impact on the banks' profitability and liquidity using a panel data set. Third, we utilized simpler analysis namely descriptive statistics, percentage changes and varying graphs and tables to achieve our study objectives. Thus, tangible results can be obtained in the future study by using stronger statistical techniques such as regression analysis, Data Envelopment Analysis (DEA), and AMOS-based Structural Equation Modelling (SEM) to identify the impact of the pandemic on the green banking and financing of banks and financial institutions.

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**Ethical Statement:** Not Applicable



## Appendices

Table A1: Total Green Finance of Banks and NBFIs

Issue	Banks		NBFIs	
	2019	2020	2019	2020
Green Finance (in million Tk)	98,753.0 4	1,05,920.18	6,499.87	5,295.20
Changes in %	7.26% Increase in 2020		18.53% Decrease in 2020	
Source: Sustainable Finance Department (SFD), Bangladesh Bank (2021).				

Table A2: Sector-wise green finance of banks and NBFIs during the period of COVID-19

Sources of Green Finance	Banks		NBFIs	
	2019	2020	2019	2020
Renewable Energy	2,156.08	2,603.83	1,286.34	942.36
Energy Efficiency	3,798.78	6,726.07	232.81	2,819.03
Alternative Energy	83.98	10.08	0.00	6.00
Waste Management	25,916.10	9,822.72	1,443.30	240.00
Recycling & Recyclable Product	11,108.68	8,594.00	130.00	272.69
Green Brick Manufacturing	16,899.19	8,766.15	1,686.73	432.13
Green Establishment	32,613.52	66,390.18	1,689.69	350.00
Others	6,176.70	3,007.16	31.00	233.00
Total (amount in BDT million)	98,753.04	1,05,920.18	6,499.87	5,295.20
Changes in %	7.26% increase in 2020		18.53% decrease in 2020	
Source: SFD, BB (2021). For more details, see www.bb.org.bd.				

Table A3: Leading Banks and Financial Institutions in Green Finance during the COVID-19 Pandemic, as of September 2020.

SL	Name of the Banks	Abbreviation	Green Finance (in million BDT)
1	The HSBC Limited	HSBCL	5,212.53
2	Islami Bank Bangladesh Ltd.	IBBL	4,515.66
3	Mutual Trust Bank Limited	MTBL	1,885.92
4	EXIM Bank Limited	EXIMBL	1,736.04
5	Al-Arafah Islami Bank Ltd.	AIBL	1,701.16
6	Dutch Bangla Bank Limited	DBBL	1,493.02
7	IFIC bank Limited	IFICBL	1,353.60
8	NRB Bank Limited	NRBBL	996.84
9	BRAC Bank Limited	BBL	899.74
10	Bank Asia Limited	BAL	806.46
11	BASIC Bank Limited	BBL	206.70
SL	Name of the NBFIs		Green Finance (in million BDT)
1	Infrastructure Development Co. Ltd.	IDCL	706.19

2	Lankan Alliance Finance Ltd.	LAFL	49.02
3	Hajj Finance Company Limited	HFCL	30.00
Note: These banks and NBFIs had committed more than 10% and 5% of their total loan disbursement to green finance respectively. Source: SFD, BB (2021). For more details, see www.bb.org.bd.			

**Table A4:** Number of Borrowers from Green Finance:

Business	Banks			NBFIs		
	2019	2020	Changes	2019	2020	Changes
Large	413	324	-21.55%	39	32	-17.95%
Cottage & Micro	65	93	43.08%	-	-	-
Small & Medium	1036	1423	37.36%	20	25	25.00%
Others	5	24	380.00%			-
<b>Total</b>	1519	1864	22.71%	59	57	-3.39%
Source: SFD, BB (2021). For more details, see www.bb.org.bd.						

**Table A5:** The BB Refinance Scheme for Green Product/Initiatives

Product	2019	2020
Bio gas	4.56	1.24
Solar home system	0.19	0.45
Effluent treatment plant	108.4	132.5
HHK technology in brick kiln	5	100
Vermicompost	0.79	1.26
Green industry	152.3	198.7
Safe working environment	39.96	88.1
Energy efficient technology	10	46.29
Total	321.3	568.54
Relative changes in %	Increased by 76.97% in 2020 compared to the past year	
Source: SFD, BB (2021). For more details, see www.bb.org.bd.		

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