



# Green Energy Transition in Bangladesh

Examining Support Measures and  
Estimating Investment Requirements

Fahmida Khatun  
Estiaque Bari  
Foqoruddin Al Kabir



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সেন্টার ফর পলিসি ডায়ালগ (সিপিডি)  
Centre for Policy Dialogue (CPD)

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## EXECUTIVE SUMMARY

1. Bangladesh has made significant progress on several economic and social indicators by fulfilling most of the Millennium Development Goals (MDGs) during 2000-2015. Following the success, Bangladesh set 40 (39+1) national priority targets to achieve the Sustainable Development Goals (SDGs) for an inclusive and sustainable development. One of the critical priorities of the SDGs is to promote green growth to ensure inclusive development which also coincides with one of the Multi-annual Indicative Programme (MIP) priorities ('green inclusive development') of the European Union (EU) for Bangladesh during 2021–2027. Under SDG 7, Bangladesh has already ensured access to electricity for all citizens. However, the recent energy crisis has put the country's macroeconomic stability under pressure. This crisis is associated with the consequences of excessive dependence on import-driven fossil fuel-based electricity generation. Thus, achieving SDG priority targets such as transitioning from fossil fuel-based electricity generation into renewable source-based generation will have important implications for Bangladesh's development. Additionally, Bangladesh's graduation from the least developed country (LDC) status in 2026 will call for a more efficient management and utilisation of both production and consumption of ecosystem to maintain global competitiveness. On all counts, to achieve green inclusive development, Bangladesh will need to invest substantially in green projects.
2. The key objective of the study is to identify opportunities and challenges of green investment in Bangladesh by—(i) reviewing existing support measures (including incentives) and policies for making investment in green projects, (ii) identifying opportunities and implementation challenges for investing in green projects, and (iii) making an estimate of the green investment required for electricity generation from renewable energy sources. In the policy discourse, it is hoped that the findings of the study will narrow the knowledge gap and contribute towards holistic measures by the government for leveraging green investment through the private sector's (including the financial sector) engagement. The study findings are also expected to support development partners including the EU in taking focused and strategic decisions on 'green growth' in Bangladesh.
3. Bangladesh Bank, through its refinancing schemes and policy guidelines, is playing a key role in engaging banks and FIs to other real economic sectors to promote financing for green investment projects. For example, Bangladesh Bank has already adopted a taxonomy on green financing and has also identified 68 green products/sectors. Moreover, from September 2020 onwards, it has set a 5 per cent green finance target of the total funded term loan disbursement/investment for all banks and financial institutions (FIs). However, non-performing loan (NPL) ratio is significantly lower for the funds disbursed in green projects than other traditional projects. Hence, the central bank should encourage banks and FIs more to promote financing for green projects. Apart from the above initiatives, a number of fiscal incentives are available for—private (sector) participation in the power sector, investors making investment in renewable energy projects, 'prosumers' (consumers who are producers) for adopting net-meter based solar system, export-oriented industries to establish green buildings for production, and investors for making green investment in leather and leather goods development.
4. There are a few challenges in stimulating green financing projects through key informant interviews (KIIs) and field research. These are as follows: (i) banks and FIs often receive applications from small-scale local enterprises (such as cottage, micro, small and medium enterprises, or CMSMEs) which are not able to submit required documents to comply with financial regulations; (ii) businesses for green financing often fail to come out of the pilot phase and finally go for a sustainable revenue-generating business model; (iii) due to delay in implementation of the pilot phase, businesses often make significant revisions in original

project profiling which creates further delay in reassessment, fund mobilisation and project financing; (iv) green projects usually require higher maturity period than other loanable schemes in terms of payback, which often discourages the investors from investing in green projects; (v) green projects, which need high initial cost, fail to arrange funding and some of the low-scale green entrepreneurs even fail to prove creditworthiness; (vi) the technology used in green projects is relatively new in Bangladesh; and in the absence of robust backward supply chain, it results in poor governance of the projects, (vii) a number of clients are availing corporate social responsibility (CSR) funds from multiple banks and the number is difficult to identify due to the lack of integrated database on borrowers of CSR funds; and (viii) underdeveloped bond markets and an immature capital market are impeding the potential growth of financing in green projects.

5. Currently, Bangladesh's energy sector is heavily dependent on fossil-fuel based sources. As of June 2022, Bangladesh has 25,528 MW installed capacity for electricity generation. Of which, only 3.5 per cent are from renewable sources including solar, wind, hydro power, biogas and biomass. According to Renewable Energy Policy (REP) 2008, a target was set to produce 5 per cent electricity from renewable sources by 2015 (MPEMR, 2008). Even though it was not achieved in 2015, while publishing Power System Master Plan (PSMP) 2016, the Government of Bangladesh (GoB) was optimistic about setting a target to achieve 10 per cent electricity generation from renewable sources by 2020 (MPEMR, 2016). Unfortunately, the revised target was also not achieved. It suggests that, although electricity generation from renewable energy is a priority in the policy documents, progress is rather slow in attaining the targets. Despite past failures, according to Power Sector Analysis 2021 based on MCPP 2030, the GoB plans to generate 40 per cent of its electricity from renewables by 2041 (GoB, 2021; IDCOL, 2021). With this aspiration, as per the current plan and initiative of the GoB, the future of electricity generation from renewable sources is likely to be dominated by solar energy. As estimated in the study, to stimulate the projected green energy transition in Bangladesh by 2041, roughly USD 19.2 to USD 37.2 billion investment will be needed only to develop the required installed capacity from renewable energy sources.
6. The government should consider renewable source-based projects as fast track projects and the EU and other development partners may contribute towards the institutional capacity building of Sustainable and Renewable Energy Development Authority (SREDA) to achieve green and inclusive development. Besides, scaling up of interventions such as 'net meter' based solar system solutions will be critical. Therefore, 'net meter' based pilot projects should receive high policy priority by involving all sectors/industries given it demands for 'no' or 'little' land preparation cost. Rural settlements should be included in pilot interventions to promote 'net meter' based solar system solutions and the EU and development partners may provide funds to design a feasibility study. In addition, the GoB should rationalise tax structure further for promoting renewable energy and the margin of fiscal incentives may be increased to promote green establishments. The size of Bangladesh Bank's refinancing scheme should be enhanced where the development partners may help to mobilise funds for green financing. Moreover, the GoB should put more emphasis on developing a robust bond market to finance future green projects; and development partners including the EU may strongly advocate to stimulate the process. Finally, a better coordinated approach with policy consistency is needed from public organisations to encourage investment in green projects by engaging the private sector, commercial banks and FIs, and development partners.

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## ABBREVIATIONS

ADB	Asian Development Bank
AIT	Advance Income Tax
BCCTA	Bangladesh Climate Change Trust Act
CMSME	Cottage, Micro, Small and Medium Enterprise
COP	Conference of the Parties
CSR	Corporate Social Responsibility
ERM	Environmental Risk Management
ESDD	Environmental and Social Due Diligence
ESRM	Environmental and Social Risk Management
ETP	Effluent Treatment Plant
EU	European Union
FDI	Foreign Direct Investment
FI	Financial Institution
GBCSRD	Green Banking and Corporate Social Responsibility Department
GED	General Economics Division
GoB	Government of Bangladesh
GTF	Green Technology Fund
HFO	Heavy Fuel Oil
HSD	High Speed Diesel
IDCOL	Infrastructure Development Company Limited
IEA	International Energy Agency
IPP	Independent Power Producer/Plant
IREA	International Renewable Energy Agency
KII	Key Informant Interview
LC	Letter of Credit
LEED	Leadership in Energy and Environmental Design
LLGDP	Leather and Leather Goods Development Policy
MCPP	Mujib Climate Prosperity Plan
MDG	Millennium Development Goal
MPEMR	Ministry of Power, Energy and Mineral Resources
MSMP	Power Sector Master Plan
NEM	Net Energy Metering
NPL	Non-Performing Loan
PDB	Power Development Board
PGCB	Power Grid Company of Bangladesh
PSPGP	Private Sector Power Generation Policy
QRRSF	Quarterly Review Report on Sustainable Finance
RE	Renewable Energy

REB	Rural Electrification Board
REP	Renewable Energy Policy
RMG	Readymade Garments
SDG	Sustainable Development Goal
SFD	Sustainable Finance Department
SHS	Solar Home Systems
SREDA	Sustainable and Renewable Energy Development Authority
SRF	Socially Responsible Financing
TDS	Technology Development Fund
UNFCCC	United Nations Framework Convention on Climate Change
USGBC	United States Green Building Council
VAT	Value Added Tax
WDI	World Development Indicator



## SECTION 1: INTRODUCTION

The Government of Bangladesh (GoB) has set 39+1<sup>1</sup> national priority indicators to achieve targets under the Sustainable Development Goals (SDGs) (SDG Tracker, 2022), following Bangladesh's success in attaining the Millennium Development Goals (MDGs) during 2000-2015. One of the aspirations of the GoB is to transition from fossil fuel-based electricity generation to renewable source-based generation. Although only 3.5 per cent of total electricity currently comes from renewable sources (SREDA, 2022), the GoB has declared to produce 40 per cent electricity from renewable energy by 2041 (GoB, 2021). To achieve this target and attain affordable and clean energy (SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all), Bangladesh will need to make substantial investment in green projects. At the same time, integrating other green investment projects into the national development strategies will be critical for Bangladesh in meeting targets under a number of SDGs such as clean water and sanitation (SDG 6), sustainable cities and communities (SDG 11), responsible consumption and production (SDG 12), and climate action (SDG 13) by 2030.

Green projects are defined by taking environmental implications into consideration. According to the taxonomy adopted by the European Union (EU), an investment project will be termed 'green' if the project outcome meets the following three criteria. Firstly, the project must make a substantive contribution to achieve one of the following six environmental objectives: (i) climate change mitigation; (ii) climate change adaptation; (iii) sustainable use and protection of water and marine resources; (iv) transition to a circular economy; (v) pollution prevention and control; and (vi) protection and restoration of biodiversity and ecosystems. Secondly, the project cannot feature components that may cause significant harm to the other above-mentioned environmental objectives. Thirdly, the project must follow to meet minimum safeguards (EU Technical Group of Sustainable Finance, 2020). These above-mentioned criteria articulated in the EU taxonomy will help avoid the chances of greenwashing where companies give

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<sup>1</sup>In addition to 39 indicators, another indicator has been prioritised for localisation of the SDGs by 'leaving no one behind' (LNOB) in most possible short time, under the instructions of SDG Working Committee of the Prime Minister's Office.

a false impression of their environmental impact or benefits (European Commission, 2022). In line with the EU taxonomy, Bangladesh Bank has developed its own 'Sustainable Finance Policy for Banks and Financial Institutions', and primarily listed 68 green products or projects or initiatives applicable for term finance (Bangladesh Bank, 2020).

Globally, both mitigation of climate related challenges and adaptation to the impact of climate change are important. Climate actions require huge public and private investment. Developed countries pledged to provide nearly USD 43.2 billion to finance various types of adaptation and mitigation projects to tackle the challenges of global climate change (Climate Funds Update, 2022). However, till June 2022, only USD 10.7 billion has been disbursed. This is only 24.6 per cent of total pledged amount (Climate Funds Update, 2022). While developed countries need to be more proactive in disbursing pledged funds, governments of developing countries and the private sector must make strategic investment in green projects for the sustainability of economic progress. In fact, the major source of green investment funds is expected to come from the private sector for its own interest while governments should introduce conducive policies and incentives (or penalties) to encourage investors to go green and bring efficiency in the production system by reducing wastage.

To tackle climate change related challenges and achieve a green and sustainable growth in Bangladesh, the GoB has developed a number of policies including Mujib Climate Prosperity Plan up to 2030 (MCP 2030), National Solar Energy Roadmap (2021–2041), Energy Efficiency and Conservation Master Plan up to 2030, Clean Development Mechanism (CDM), and Renewable Energy Policy (REP) 2008. Additionally, to promote green technology, Bangladesh Bank has developed a number of refinancing schemes for supporting environment-friendly technologies such as renewable energy, energy efficiency, solid waste management, liquid waste management, alternative energy, and recycling and recyclable products. Till July 2022, 39 banks and 19 financial institutions (FIs) have signed a participation agreement with Bangladesh Bank to avail finance from these schemes. Although relevant policies are in place and several directives from Bangladesh Bank have been issued, it is generally observed that the private banks and FIs are still hesitant to approve loanable funds for green investment projects.

In the above-mentioned context, this study is undertaken to identify opportunities and challenges of green investment in Bangladesh. The specific objectives of the study are to: (a) review existing support measures (including incentives) and policies in Bangladesh for making investment in green projects; (b) identify opportunities and implementation challenges for investing in green projects; and (c) present an estimation of green investment required in Bangladesh for electricity generation from renewable sources in view of different scenarios. Results of the study are expected to narrow the knowledge gap and contribute towards taking holistic measures by the government for leveraging green investment through the private sector's (including the financial sector) engagement. Findings of the study are also expected to help development partners to take more focused and strategic advocacy decisions on 'green growth' in Bangladesh.

This report is organised in the following manner. Following the introduction, Section 2 spells out the approaches taken by the research team to conduct the study and explains the method and data used in this paper. Section 3 informs existing support measures for investment in green projects in Bangladesh. Section 4 presents selected stylised facts on green investment in Bangladesh. Section 5 documents three case studies which highlight opportunities and challenges of green investment at the project level. This section also discusses existing challenges faced by commercial banks and FIs to promote green financing despite policy guidelines in place by Bangladesh Bank. Section 6 presents an estimation of the investment requirement for producing electricity from renewable sources as per the national commitment. Section 7 provides a discussion based on the results of the study. Finally, Section 8 makes a set of recommendations emanated from the study findings.

## **SECTION 2: RESEARCH APPROACH**

The research report is based on the review of secondary resources. It has developed case studies using information collected through key informant interviews (KIIs), and analysed data from national and international sources on investment in green projects. Throughout this report, the research team used the definition of 'green project' which is in line with the taxonomy developed by the EU and which also reflects Bangladesh's own criteria of green projects.

The review of secondary resources includes reports, journal articles, and national policy documents dealing with the issues of investment in green projects and renewable energy in Bangladesh. To identify the existing policy supports and incentives for investment in green projects, this research has undertaken an extensive review of the following national policy documents: (i) MCPP 2030 (GoB, 2021), (ii) Power Sector Analysis 2030 based on MCPP (IDCOL, 2021), (iii) Draft National Solar Energy Roadmap (2021–2041) (SREDA, 2020), (iv) Energy Efficiency and Conservation Master Plan up to 2030 (SREDA and MPEMR, 2015), (v) Power System Master Plan (PSMP) 2016 (MPEMR, 2016), (vi) Private Sector Power Generation Policy (PSPGP) (Ministry of Energy and Mineral Resources, 2004), (vii) REP (MPEMR, 2008), (viii) Net Metering Guidelines (NEG) 2018 (SREDA and MPEMR, 2018), (ix) 8th Five Year Plan (8FYP) of Bangladesh from July 2020 to June 2025 (GED, 2020), (x) Bangladesh Climate Change Trust Act (BCCTA) 2010 (Ministry of Environment and Forest, 2016), (xi) Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009 (Ministry of Environment and Forest, 2009), (xii) Bangladesh Delta Plan 2100 (GED, 2018), (xiii) Leather and Leather Goods Development Policy (LLGDP) 2019 (Ministry of Industries, 2019), (xiv) Sustainable Finance Policy for Banks and FIs 2020 (Bangladesh Bank, 2020), (xv) Quarterly Review Report on Sustainable Finance (QRRSF) from March 2013 to March 2022 (Bangladesh Bank, 2022); (xvi) Guidelines on Environmental and Social Risk Management (ESRM) for Banks and Financial Institutions 2017 (Bangladesh Bank, 2017) and (xvii) Nationally Determined Contributions (NDCs) 2021 (Ministry of Environment, Forest and Climate Change, 2021). Such an extensive review of the existing policies was imperative to identify the relevant and updated information which could be used in this study. The research team also reviewed national budget documents for fiscal year (FY) 2021–22 and FY2020–21 for analysing current tax and duty structure of green products developed by Bangladesh Bank. Existing tax and duty structures are analysed with a view to identifying the supportive (contradictory) fiscal measures for enhanced investment in green projects.

The research team conducted eight KIIs involving 10 participants and one expert group meeting (EGM) involving seven participants. The detailed list of participants is presented in Annex B (Annex Table 2). The information and suggestions received from

relevant experts contributed significantly to design the study and substantiate the report. Furthermore, three case studies have been developed from the information collected through the KIs. These are: (i) investment opportunities and challenges for making a green factory in readymade garments (RMG) sector taking as an example of a LEED-certified Platinum (green) RMG factory, (ii) investment opportunities and challenges for establishing an independent power plant (IPP) based on the example of a solar park in Manikganj, and (iii) investment opportunities and challenges for environment-friendly ‘Brick Kiln’ projects by using the refinancing schemes of Bangladesh Bank through an analysis of the case of a clean automatic brick kiln project.

The research team used both national and international database to conduct analyses relevant to the scope of this study. To conduct descriptive and meta-analysis and present it as stylised facts, the following sources of data have been used. Renewable energy related data in the context of Bangladesh are collected from the SREDA’s national renewable energy database. Electricity capacity and generation related data are collected from the database of Power Development Board (PDB) under MPEMR, Bangladesh. Besides, Bangladesh ‘green financing’ related data are compiled from Bangladesh Bank’s QRRSF from March 2013 to March 2022. Additionally, International Renewable Energy Agency (IRENA) database is used to predict the energy demand in Bangladesh by following linear and non-linear trend analysis. The research team also used Climatescope database developed by Bloomberg New Energy Finance (NEF) to conduct an econometric analysis on investment in clean energy (renewable energy). During this exercise, a number of control variables are compiled from the World Development Indicator (WDI) database developed by the World Bank. The detailed methodology of the econometric analysis is presented in Section 6.

### **SECTION 3: SUPPORT MEASURES FOR GREEN INVESTMENT IN BANGLADESH**

Sustainable development is a holistic approach that promotes energy saving mechanism, pollution reduction, waste management, innovation of green products, efficient use of resources, and safe management of nature-based ecosystem (Olawumi and Chan, 2018). It underscores the importance of

utilising resources by keeping a balance between production system and conservation of the resources. In order to facilitate sustainable development process, both public and private investments in green projects are essential. In this regard, creating incentives and disincentives (enforcing regulatory measures, and penalties among others) for businesses are critical for government to encourage private investors to invest in green projects. Globally, some of the notable incentives for green investments are green credit, green bonds, environmental compensation, environmental tax, regulatory instruments, and fiscal transfer schemes (Huang et al., 2019; Pigato, 2019). To encourage private investment in green projects, the GoB has introduced several support measures including direct incentives under various policies and institutional arrangements. The existing support measures (e.g., initiatives/incentives/instruments) for promoting investment in green projects are discussed below.

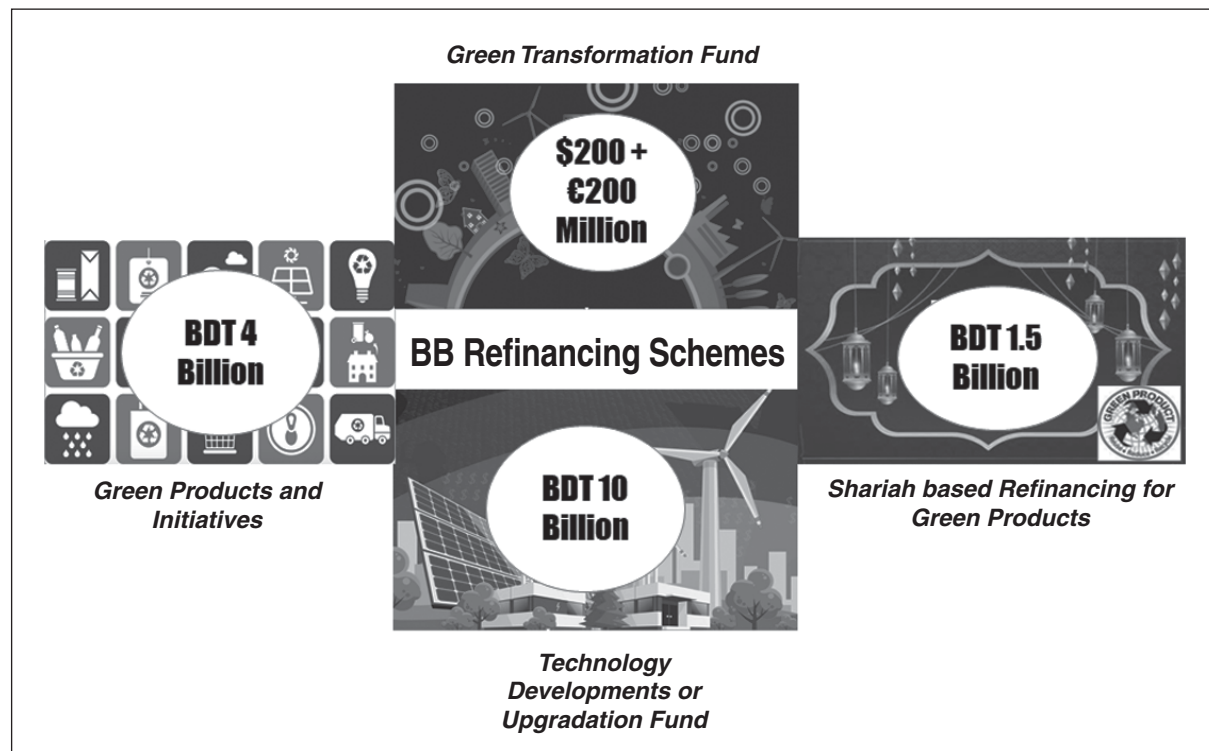
#### **3.1 Bangladesh Bank Initiatives for Promoting Investments in Green Projects**

Currently, Bangladesh Bank has four direct refinancing schemes for promoting investments in green projects (Figure 1). These are: (i) BDT 4 billion equivalent refinance scheme for investing in environment-friendly products or initiatives, (ii) BDT 1.5 billion equivalent refinance scheme for Islamic banks and FIs for investment in green products or initiatives, (iii) green technology fund (GTF) worth USD 200 million to import green machineries and 200 million EURO to import green machineries as well as industrial raw materials, and (iv) BDT 10 billion worth technology development or upgradation Fund (TDF) for 32 industrial sectors mentioned in Bangladesh Export Policy 2018–2021 (Bangladesh Bank, 2022).

In addition to the above-mentioned refinancing schemes, Bangladesh Bank has set following targets for other banks or FIs to accelerate the scale of financing for green investment projects. These targets are non-binding in nature. However, under ESRM Guideline 2017, banks and FIs receive certain benefits or incentives for meeting these targets (Bangladesh Bank, 2017).

- According to Bangladesh Bank’s GBCSRD (the Green Banking and CSR Department) Circular No. 04/2014, from January 2016 onwards, the minimum target of direct green finance was set at 5 per cent

**Figure 1: Bangladesh Bank Refinancing Schemes for Promoting Green Investments**



Source: Authors' compilation from Bangladesh Bank website.

of the total funded loan disbursement or investment for all banks and FIs.

- In 2015, through GBCSRD Circular No. 04/2015, banks and FIs were instructed to form a 'Climate Risk Fund' having allocation at least 10 per cent of their corporate social responsibility (CSR) budget.

### 3.2 Fiscal Incentives for Private Participation in the Power Sector

Given the scope of renewable energy in Bangladesh, the power and energy sector will require a significant amount of investment in green projects. To ensure private participation in the power sector, the GoB allowed private investors to build commercial power plants that comply with the existing environmental laws and regulations, and technical standards of grid interconnection and operation. According to private sector power generation policy (PSPGP) of Bangladesh 2004, a number of fiscal incentives will be enjoyed by private investors, such as (i) corporate income tax waiver for 15 years; (ii) relaxed customs duties on a certain amount of import for 12 years; (iii) repatriation of equity along with dividends will be allowed freely; (iv) exemption from income tax in

Bangladesh for foreign lenders; (v) the instruments and deeds required to be registered under local regulations will be exempted from stamp duty payments; and (vi) foreign investors will also enjoy tax exemption on royalties, technical know-how and technical assistance fees, interest on foreign loans, and capital gains from transfer of shares on investment. Alongside, several other fiscal benefits (for example, possibility of land lease support from the GoB) are on offer for private investors in the power sector (Ministry of Energy and Mineral Resources, 2004).

### 3.3 Incentives Proclaimed in Energy Efficiency and Conservation Master Plan

To provide a roadmap to the GoB to improve efficiency in energy use, SREDA and the Power Division have jointly developed and published the Energy Efficiency and Conservation Master Plan by 2030 in 2015. According to the planned document, the GoB needs to provide incentives to attract private investment in renewable energy projects. Hence, the government has announced three types of incentives as follows: (i) subsidies will be provided to investors



for installing energy-efficient equipment which is expected to contribute in the diffusion of energy efficiency facilities and equipment in the country, (ii) investors will receive preferential taxation facility in the form of tax reduction or exemption to invest in energy-efficient technologies, and (iii) investors will also provide concessional loans at a discounted rate for energy efficiency and conservation related initiatives (SREDA and MPEMR, 2015). In the long run, these fiscal measures are expected to contribute significantly in attaining energy efficiency (including conservation of energy) in Bangladesh.

### **3.4 Incentives Proclaimed in Renewable Energy Policy of Bangladesh**

The REP was developed in Bangladesh in 2008 by the Ministry of Power, Energy and Mineral Resources (MPEMR). The objective of the policy is to encourage the use of renewable energy and investment in renewable energy projects. Hence, a number of fiscal incentives have been proposed in the REP 2008, as follows: (a) 15 per cent value added tax (VAT) exemption on all renewable energy equipment and related raw materials in producing renewable energy, (b) renewable energy project investors from both private and public sectors will enjoy corporate tax waiver for first five years of operation, (c) an incentive tariff of 10 per cent higher than the highest purchase price of electricity by the utility from private generators may be considered for electricity generated from renewable energy sources (MPEMR, 2008). In addition, it is mentioned that SREDA will consider providing subsidies for installation of the renewable energy technology such as solar, wind, biomass and other renewable and clean energy projects. Furthermore, a recommendation was made to facilitate micro-credit support system in rural and remote areas to provide financial support for the purchases of renewable energy equipment (MPEMR, 2008).

### **3.5 Introduction of Net Energy Metering Guideline and Incentives for Prosumers**

Net energy metering guideline was introduced in Bangladesh in 2018 in order to encourage the consumption of renewable energy. In the policy, consumers were recognised as prosumers; this refers to a policy mechanism that allows consumers to connect their renewable energy systems to the national grid, and thus, consumers act as producers.

Since consumption of renewable energy like solar energy is not widely popularised in Bangladesh, the GoB introduced net metering policy to stimulate a wider group of users including organisations and individuals to install more solar plants. The prosumers are incentivised to sell their excess amount of electricity produced from renewable energy sources or import the equal amount from national grid in exchange of green electricity. The consumer's bill will be calculated as an aggregated manner that will adjust the net amount of electricity. For example, if the amount of imported and exported electricity is equal, then the prosumer will pay only the demand charge and other fixed charges. According to the policy, the GoB is supposed to facilitate technical supports and metering arrangement (SREDA and MPEMR, 2018). From 2019 to June 2022, nearly 42.19 MWp install capacity is added to national grid through net metering arrangement and total 1658 prosumers are currently availing benefit from this arrangement (SREDA, 2022).

### **3.6 Incentive for Green Buildings for Export-oriented Industries**

In the budget speech FY2022-23, the Finance Minister of Bangladesh proposed to introduce 12 per cent tax rate for all other general industries exporting goods and services and 10 per cent for green ones (Ministry of Finance, 2022). Before that, it was only enjoyed by the RMG sector. With this new budget proposal, a wider pool of investors from all export-oriented sectors who are operating their businesses from green factory buildings will enjoy 2 per cent additional fiscal incentive in the form of lower tax rate. According to the United States Green Building Council (USGBC), till June 2022, a total 183 factory buildings from Bangladesh received Leadership in Energy and Environmental Design (LEED) green building certification, including 163 RMG factories and the rest from other export-oriented sectors. At the same time, 506 more buildings from Bangladesh are under assessment to be recognised as green buildings (USGBC, 2022). It is hope that the new budget proposal will encourage more investors to implant green building infrastructures in their factories.

### **3.7 Incentives in Leather and Leather Goods Development Policy**

With an objective to promote export and clean production, the Ministry of Industries introduced the

Leather and Leather Goods Development Policy in 2019. The policy encourages to invest in green technologies to reduce environmental pollution. For this, priority-based credit will be distributed to firms that will adopt effluent treatment plant (ETP). Moreover, prioritised incentive will be provided to the firms for adopting the environmental compliance introduced by the policy. The policy document has also mentioned about providing financial incentives to firms that are involved in clean production (Ministry of Industries, 2019). However, the policy does not clearly define ‘clean’ production’ due to which there is a scope for confusion.

### 3.8 Investment Opportunities through the Climate Change Trust Fund 2010

The government developed and published BCCSAP in 2009 (Ministry of Environment and Forest, 2016). Under this action plan, the BCCTF is a unique national climate fund managed by the GoB since its inception in 2009 (Ministry of Environment and Forest, 2009). Since then, till FY2020–21, the government from its own resources financed more than USD 480 million to implement 732 projects of various types (adaptation, mitigation and research) and dimensions (BCCT, 2022). Of which, 377 projects are completed and 355 are still ongoing as of September 2021. These projects are being implemented by a number of non-government organisations (NGOs) across the country. Especially, under mitigation and research projects, investors can avail funds from the trust for investing in renewable technology with an aim to provide local climate change solutions.

The tax and tariff structure demonstrated in the national policy documents clearly suggests that the government is supportive towards promoting investment in green projects. While a number of dedicated refinancing schemes are introduced by Bangladesh Bank for promoting investment in green projects, a significant portion among these schemes is dedicated for export-oriented industries. It is also important to note that a number of refinancing schemes that are available for local industries are ‘not necessarily’ green in nature; for instance, Bangladesh Bank’s refinancing scheme for facilitating investment in ship breaking industry. In addition, a few tariffs-related decisions are not aligned with the GoB’s comprehensive plan involving the promotion of renewable energy in the country. For example, although VAT exemption on solar panels and batteries

exists, but there are no exemptions on solar inverter which is a crucial component of solar power plants. According to FY2021–22 budget proposal, total tax incidence was raised to 37 per cent on the import of solar inverters (HS 85044090) including 10 per cent customs duty (CD), 15 per cent VAT and 5 per cent advance income tax (AIT) (Ministry of Finance, 2021). Apart from these inconsistencies as observed, the majority of the government policies aim at providing fiscal benefits to both private and public investors so that they can attract more investment including foreign direct investment (FDI) in green projects.

## SECTION 4: STYLISED FACTS ON THE PROSPECT OF GREEN INVESTMENT IN BANGLADESH

This section will present statistical facts on select indicators to better illustrate the current status of green investment and its future prospect in Bangladesh.

### 4.1 Bangladesh’s Dependence on Non-Renewable Sources for Electricity Generation

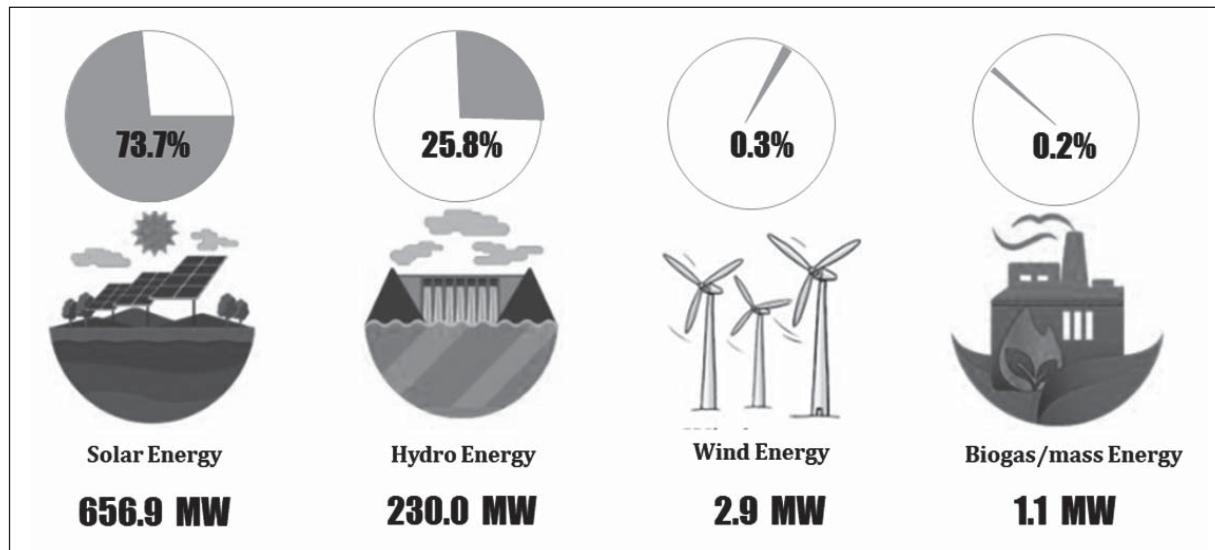
Bangladesh has 25,528 MW installed capacity for electricity generation as of June 2022. Of which, only 3.5 per cent is from renewable sources including solar, wind, hydro power, biogas and biomass (Table 1). It shows that Bangladesh’s current electricity capacity is

**Table 1: Electricity Generation Mix in Bangladesh**

Fuel/Resource	Installed Capacity (MW)	Share (per Cent)
Gas	11,330	44.4
Heavy fuel oil (HFO)	6,238	24.4
Captive	2,800	11.0
Coal	1,768	6.9
High speed diesel (HSD)	1,341	5.3
Imported	1,160	4.5
Renewable*	891	3.5
<b>Total</b>	<b>25,528</b>	<b>100.0</b>

Source: SREDA, 2022.

Note: \* including off-grid solar plants.

**Figure 2: Renewable Energy Mix in Bangladesh**

**Source:** SREDA, 2022.

**Note:** \* including off-grid solar plants.

predominantly dependent on non-renewable sources like natural gas, and coal.

Figure 2 suggests that currently, 73.7 per cent of total renewable energy for electricity generation (of total capacity of 891 MW) is generated from solar, while 25.8 per cent is generated from hydro and 0.3 per cent comes from wind power. Only 0.5 per cent of electricity is converted from biogas and biomass. Among the existing solar plants, only 46.5 per cent of its capacity is connected to national grid while the rest are off-grid in nature.

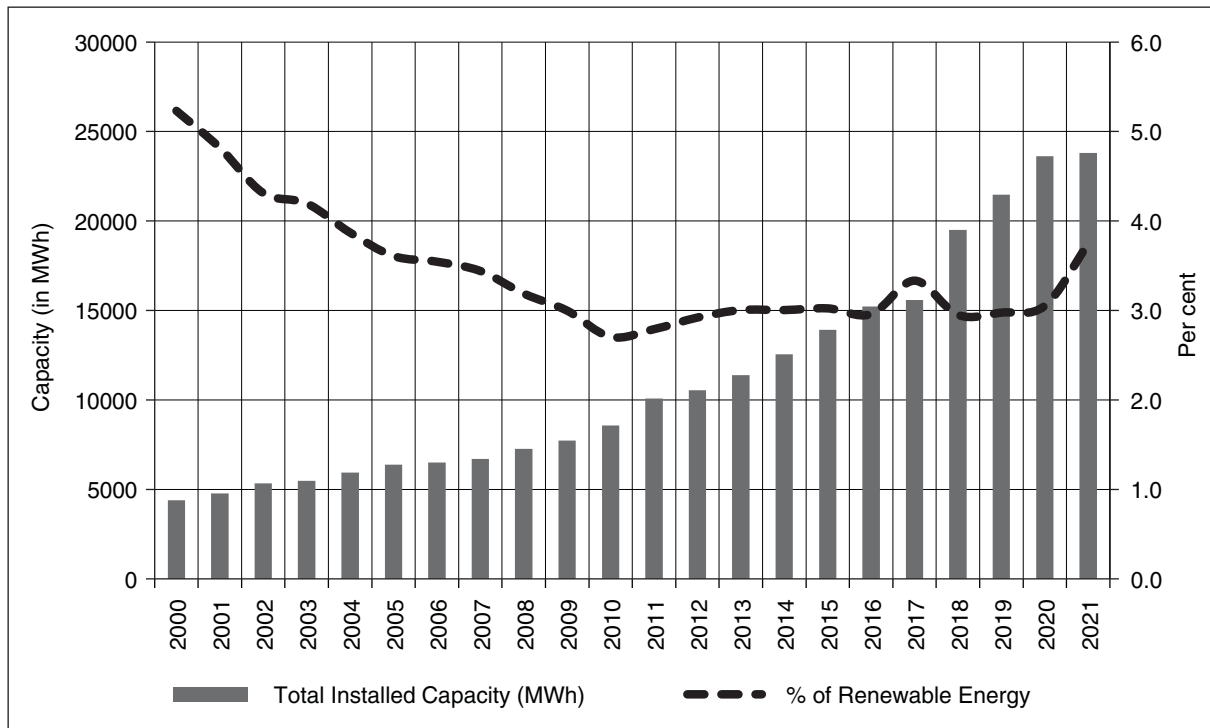
#### 4.2 Slow Progress of Renewable Energy-based Electricity Generation

According to the WDI database, the access to electricity was only 32 per cent in Bangladesh in 2000. Since then, in the past two decades, Bangladesh has made remarkable progress in terms of ensuring electricity for its people. In fact, Bangladesh ensured 100 per cent access to electricity in 2021. During this journey, Bangladesh heavily relied on non-renewable sources of energy for improving its capacity to generate electricity. Electricity generation from renewable energy increased from 230 MW to 891 MW in 20 years. However, in terms of its share in overall installed capacity, electricity generation from renewable sources has stagnated since 2006 (Figure 3).

According to REP 2008, a target was set to produce 5 per cent electricity from renewable sources by 2015 (MPEMR, 2008). The target was not achieved in 2015. However, the GoB was optimistic about setting a target while publishing PSMP 2016 to achieve 10 per cent electricity generation from renewable sources by 2020 (MPEMR, 2016). Therefore, although electricity generation from renewable energy is a priority in the policy documents, progress in attaining the targets is rather slow. Meanwhile, 81 non-renewable projects received USD 9.0 billion public flows<sup>2</sup> while it was only USD 1.9 billion for 109 renewable projects between 2000 and 2020 as shown in Figure 4 (IRENA, 2022).

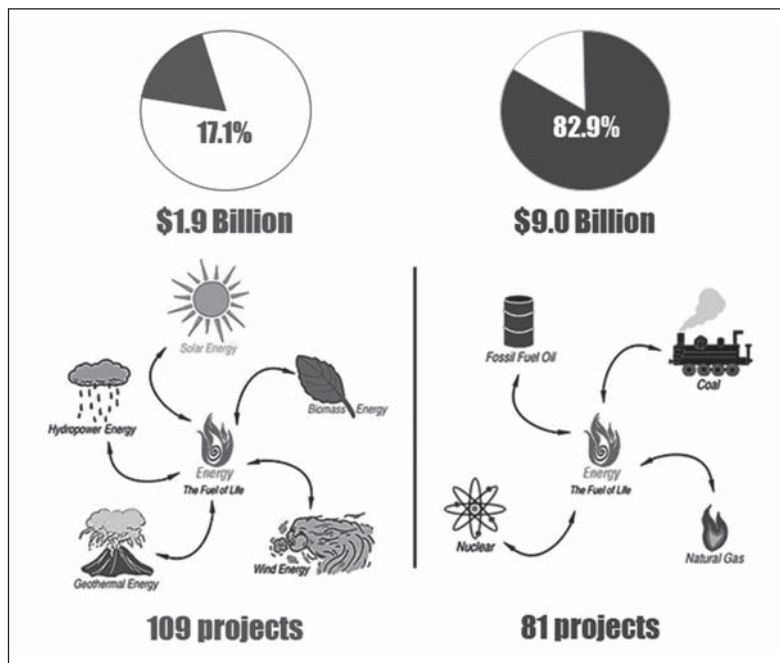
<sup>2</sup>Public flows are the financial flows in the form of commitments originating from public institutions like governments, multilateral development banks and other public finance institutions. A commitment represents a legal contract to mobilise financial funds directed to one or more countries. These flows are corrected for currency exchange rates and inflation to a base year.

**Figure 3: Trend of Installed Capacity for Electricity Generation in Bangladesh**



Source: IRENA, 2022.

**Figure 4: Public Flows to Energy Projects in Bangladesh from 2000 to 2020**



Source: IRENA, 2022.

### 4.3 Future of Renewable Energy Likely to be Solar-driven in Bangladesh

According to the Power Sector Analysis 2021 based on MCPP 2030, the government plans to generate 40 per cent of its electricity from renewables by 2041 (GoB, 2021; IDCOL, 2021). With this aspiration, as per the current plan and initiative of the GoB, the future of electricity generation from renewable sources is likely to be dominated by solar energy. In this connection, the government has already approved eight new solar parks. Upon full implementation of these ongoing projects, a total of 440.75 MW installed capacity will be added to the national grid. In addition, another 23 solar parks of total 1424.2 MW are now at the planning phase (Table 2). Apart from the establishments of solar parks,



**Table 2: Current Planning on Electricity Generation from Renewable Sources**

Sources of Renewable Energy	Completed and Running		Implementation Ongoing		Under Planning	
	Number of units	Capacity (in MW)	Number of units	Capacity (in MW)	Number of units	Capacity (in MW)
<i>Solar park*</i>	8	231.0	8	440.75	23	1424.2
<i>Rooftop solar except NEM**</i>	117	39.4	3	0.576	1	0.852
<i>Net metering rooftop solar</i>	1659	42.9	–	–	–	–
<i>Solar irrigation</i>	2570	49.2	96	2.776	–	–
<i>Solar mini grid</i>	28	5.8	–	–	–	–
<i>Solar nano grid</i>	2	0.0	–	–	–	–
<i>Solar charging station</i>	14	0.3	–	–	–	–
<i>Solar drinking water systems</i>	116	0.1	–	–	–	–
<i>Others</i>	–	7.7	–	–	–	–
<i>Solar home system</i>	6037601	263.5	–	–	–	–
<i>Solar street light</i>	296861	17.1	–	–	–	–
Solar	***	656.9	–	444.1	–	1,425.1
Wind	3	2.9	2	62	7	295
Hydro	1	230.0	–	–	–	–
Biogas****	8	1.0	1	0.4	3	49.5
Biomass	1	0.4	1	–	–	–
All (Grand Total)	–	891.2	–	506.5	–	1,769.6

**Source:** SREDA, 2022.

**Note:** \* Eight (8) solar parks proposals were rejected from the planning phase; \*\* 2 units of total 0.047 MW capacity are under maintenance while other 2 units were rejected from the planning phase; \*\*\* did not add all the units as there is large variance between different solar plants; \*\*\*\*by excluding 87,536 units of small biogas projects.

wider penetration of solar systems through ‘net metering rooftop solar’ is receiving high priority in the policy agenda alongside solar irrigation projects (SREDA, 2022).

At the same time, two wind power generation systems received approval from the GoB. The projects are underway. Upon full implementation of these projects, a total of 62 MW installed capacity will be added to the national grid from the renewable energy sources. Meanwhile, seven other potential wind power plants of total 295 MW are under review by SREDA. Besides, the government is planning to add nearly 49.9 MW renewable energy to produce electricity from biogas. In short, if the plans are fully executed, a total of 506.5 MW installed capacity would be added to the national grid in the next few years. At the same time, 1,769.6 MW more energy might be installed from renewable sources (SREDA, 2022). Therefore, to implement

these renewable energy projects, a substantial amount of green investment will be required from both private and public sector. This will need scaling up the size of the existing refinancing schemes of Bangladesh Bank to promote investment in a greater number of green projects.

#### **4.4 ‘Net Energy Metering’ Programme Yet to Gain Momentum**

In the last decade, 117 rooftop solar home systems (SHS) were installed. Total capacity of these systems was 39.4 MW. A significant number of rooftop SHS were implemented by Infrastructure Development Company Limited (IDCOL) between 2003 and 2014. Moreover, a majority of these systems availed refinancing from Bangladesh Bank under ‘Refinance Scheme for Green Products/Initiatives/Projects’. However, the rooftop SHS did not receive

much attention despite binding regulations from the concerned government agency.

Through KILs, the research team of this study finds that these systems were not connected to the national grid at that time. Hence, consumers could not get the benefits anticipated for the rooftop solar home system due to the lack of net energy metering (NEM). However, with the introduction of NEM guideline 2018, prosumers of SHS can now export the surplus electricity to the national grid and adjust the bill thereafter.

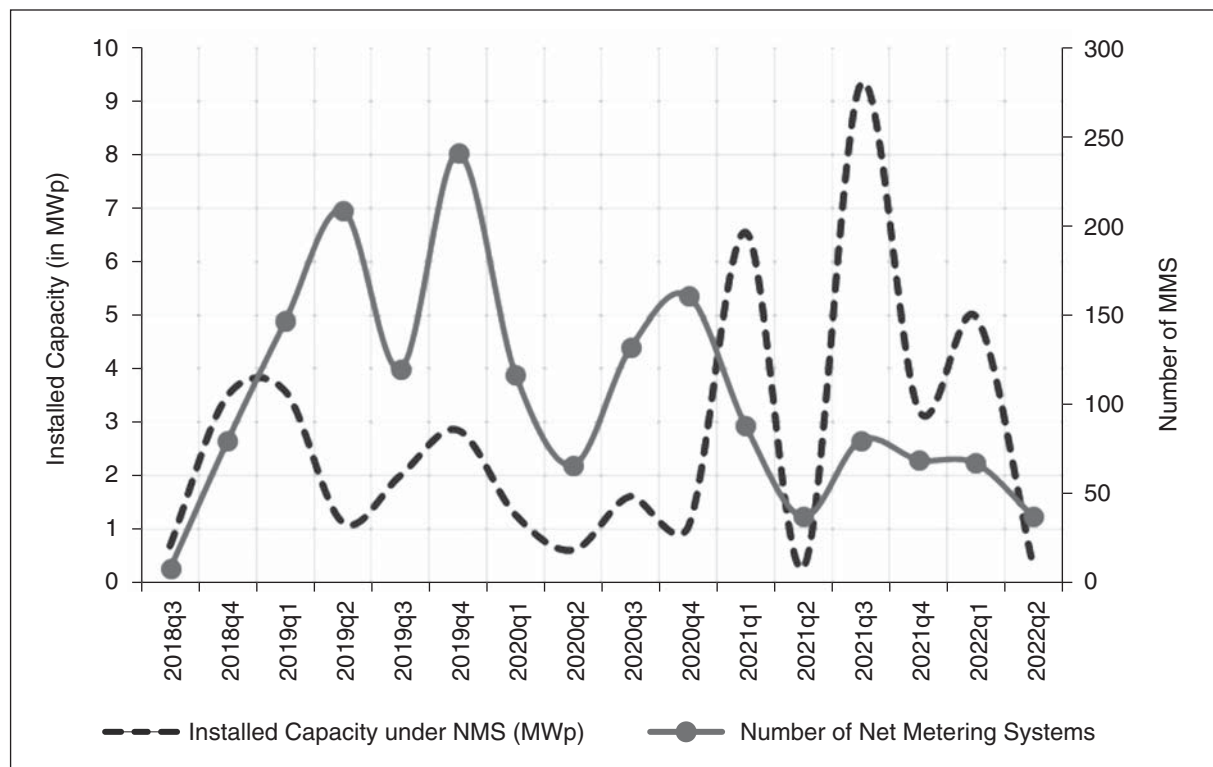
Figure 5 shows quarter-wise analysis of rooftop SHS with NEM facility from July 2018 to June 2022. So far, a total 1,659 NEM systems are installed, and a significant majority of these are installed on the factory rooftops (SREDA, 2022). The figure shows no specific pattern—neither for the number of installations nor for the capacity of the installed systems. However, it is roughly observed that the rate of installation has declined from the fourth quarter of 2020. Nevertheless, the installed capacity is higher now in terms of magnitude. The results of the analysis suggest that,

though NEM programme is making some progress, it is yet to be adopted at the community level at a larger scale. One of the key reasons for lower adoption rate may be its technicality. To avail this facility, a potential prosumer needs ‘a single three phase bidirectional smart meter’ while a significant number of old buildings even within Dhaka city may not have such arrangement installed (SREDA and MPEMR, 2018). Besides, prosumers often do not see the benefits of installing the NEM on paper. It is because the existing format of ‘electricity bill’ does not show the adjustment in figure (invoice) and its potential benefit in value terms. It may require installation of additional meters, making it more problematic for consumers.

#### 4.5 Bangladesh Bank’s Refinancing Scheme Considered Critical in Promoting Green Investment Projects

In 2011, Bangladesh Bank has developed environmental risk management (ERM) guideline. With the help of the guideline, Bangladesh Bank played a crucial role in integrating financial sector

**Figure 5: Quarter-wise NEM System Installation**



Source: SREDA, 2022.

with other real economic sectors for promoting green projects. Later in 2013, Bangladesh Bank issued green banking policy guidelines for banks and FIs.

As part of sustainable finance initiatives, Bangladesh Bank primarily takes policy measures, monitors sustainable finance activities of banks and FIs, and operates refinance support to promote investment for green initiatives. According to the data compiled from various editions of QRRSF, funds worth nearly BDT 552 billion have already been disbursed as direct green finance (Bangladesh Bank, 2022). This amount is roughly 8 per cent of total disbursement made to projects that have some sustainability components in the scope. Figure 6 shows that the disbursement of direct funds for the implementation of green projects are gradually increasing. Given that a large number of green projects (including renewable energy projects) are now at implementation or planning phase, Bangladesh Bank is likely to experience an increasingly higher demand for new fund disbursement under this segment.

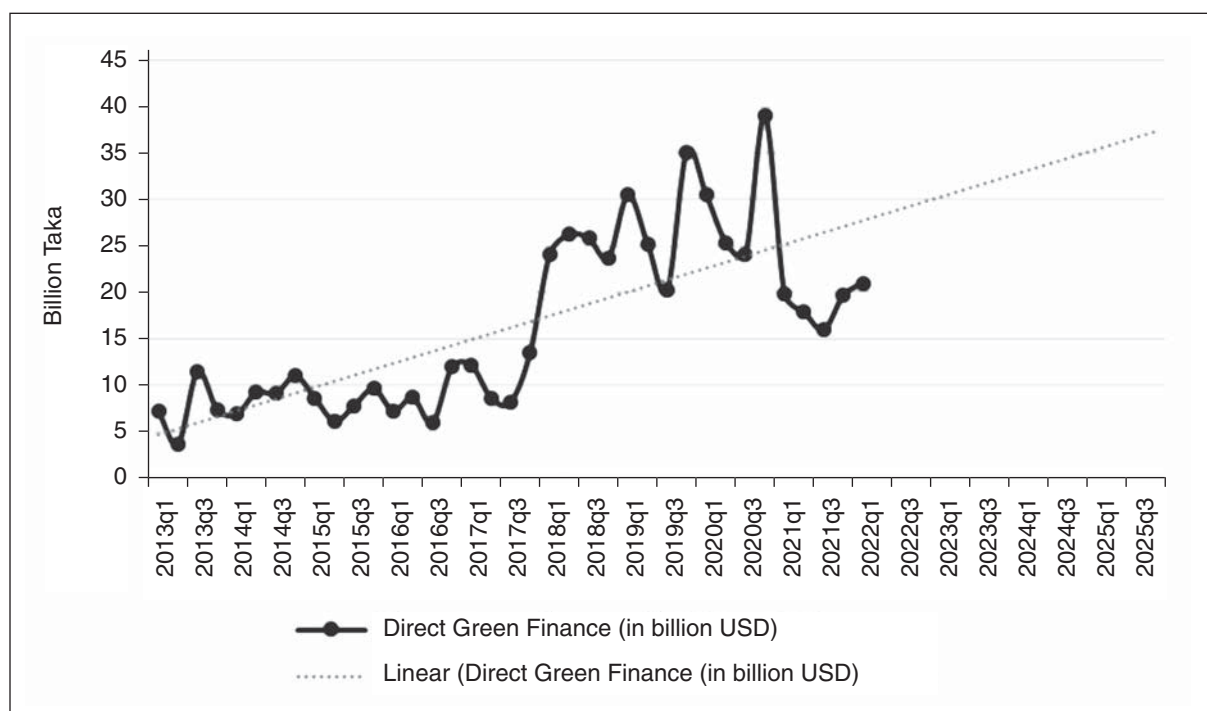
Figure 7 presents the percentage distribution of direct funds mobilised towards different projects by

sectors. From 2013 to March 2022, nearly 38 per cent of total direct green funds were disbursed for the establishment of green buildings. Additionally, 19 per cent direct green funds were mobilised for the waste management (including both solid and liquid waste management) projects while another 12 per cent funds were channelled for clean brick kiln projects. Moreover, 9 per cent of funds were mobilised to the projects which manufactured recycling products or installed energy-efficient technologies in the production system. Besides, 7 per cent of total direct green finance were disbursed for projects aimed at generating electricity from renewable sources. Rest of the funds were disbursed for green agriculture, cottage, micro, small and medium enterprises (CMSMEs), and socially responsible financing (SRF) projects.

#### 4.6 NPL Rate Significantly Lower for Projects under Green Financing

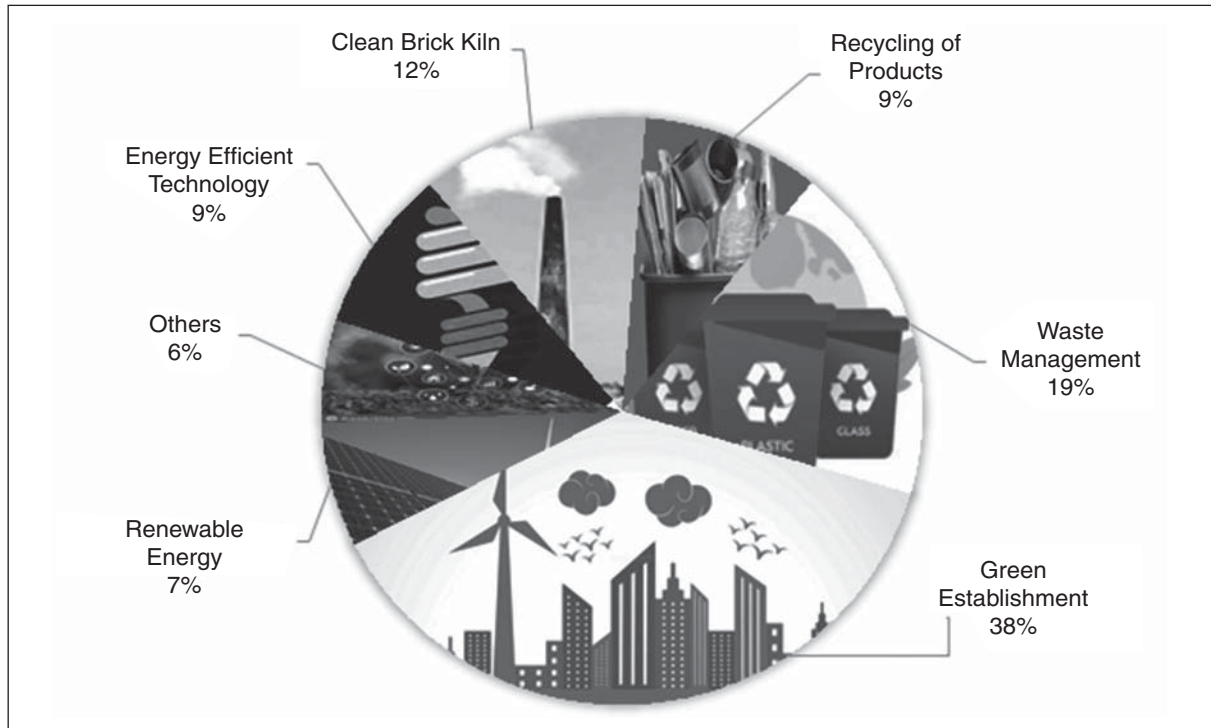
Non-performing loans (NPL) is a major concern for the financial management of the banking sector. However, NPL in green projects is much lower compared to the national average rate. Hence, while NPL rate on

**Figure 6: Disbursement of Direct Green Finance by Quarters**



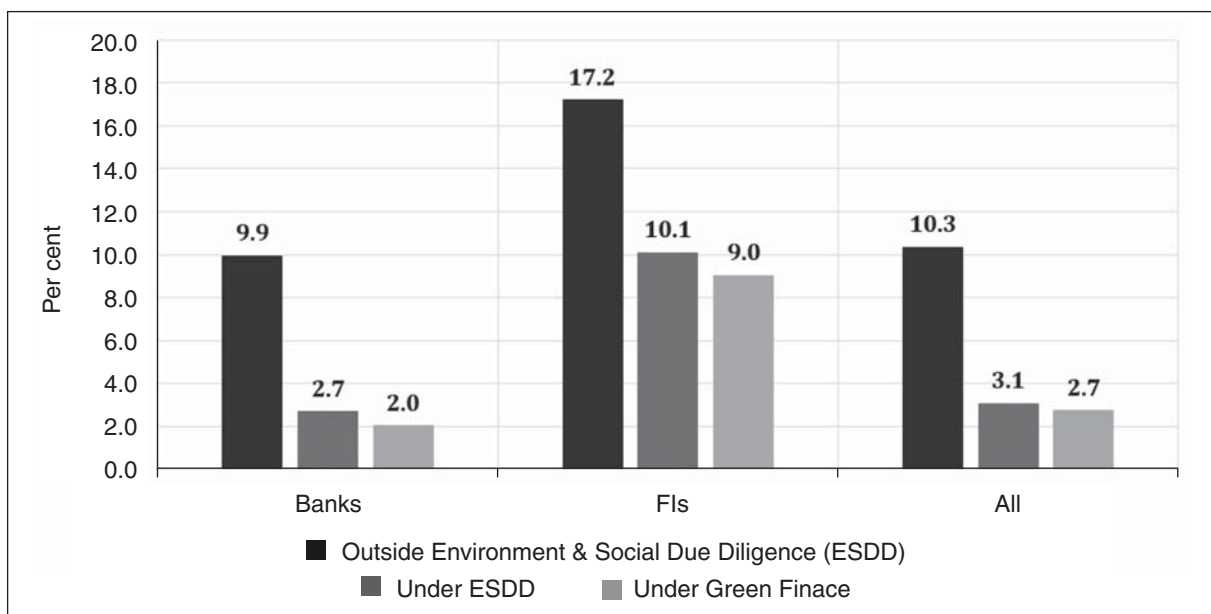
Source: QRRSF, from March 2013 to March 2022.

**Figure 7: Percentage of Direct Green Funds Disbursed by Sectors**



Source: QRRSF, from March 2013 to March 2022.

**Figure 8: Status of NPLs till September 2020**



Source: QRRSF, July–September 2020 (Bangladesh Bank, 2020).

regular loans was nearly 10.3 per cent during July–September 2020, it was only 3.1 per cent for loans disbursed to projects that went through environment and social due diligence (ESDD) (Figure 8). The NPL rate was even lower for loans mobilised towards green projects; only 2.7 per cent till September 2020. Recent reports (i.e., QRRSF report of Bangladesh bank) from Bangladesh Bank’s SFD suggest that NPL has decreased further since then (Bangladesh Bank, 2020). It illustrates that financing green projects which went through ESDD process is safer than financing any other projects. It should encourage both commercial banks and FIs to finance investment in green projects.

## SECTION 5: OPPORTUNITIES AND CHALLENGES OF INVESTMENT IN GREEN ENERGY PROJECTS

In this section, existing opportunities and challenges for investing in green projects in Bangladesh are discussed in two ways:

- (i) developing three case studies from three different sectors to portray the micro situation at project level, and
- (ii) highlighting observations from KIIs where stakeholders mentioned about the existing challenges for banks and FIs to promote green financing even though policy guidelines from Bangladesh Bank are in place.

### 5.1 Case Studies on Selected Green Investment Projects

In this section, three case studies are presented on various green investment projects in Bangladesh by collecting information through KIIs. These three case studies are discussed below.

#### Case 1: Investing in green RMG factory establishment

##### **Background**

‘A’<sup>3</sup> is a LEED-certified Platinum (green) RMG factory of Bangladesh. It was established in 2018, and the

<sup>3</sup>Actual name of the factory is not mentioned but other information on the factory are real.

size of the factory is more than 8,100 square meters. The factory is located in Dhamrai, Savar Upazilla. In 2021, the firm produced nearly 1.6 million pieces of garments and earned an export revenue equivalent to USD 4.8 million. Around 524 people work in this factory including workers and staff.

##### **Opportunities availed by factory A**

The owner of the factory availed bank loan by utilising the window of Bangladesh Banks’s refinancing scheme for environment-friendly green establishments.<sup>4</sup> If this arrangement was not in place, the owner would have to avail a regular-term loan at market-determined interest rate. Due to the availability of Bangladesh Bank’s refinancing scheme for green establishments, the owner availed the loan eventually by at least 2 per cent less than the previous market interest rate. According to the owner, given the volume of the loan, even 1 per cent drop in terms of bank interest rate proves to be helpful in completing such a project.

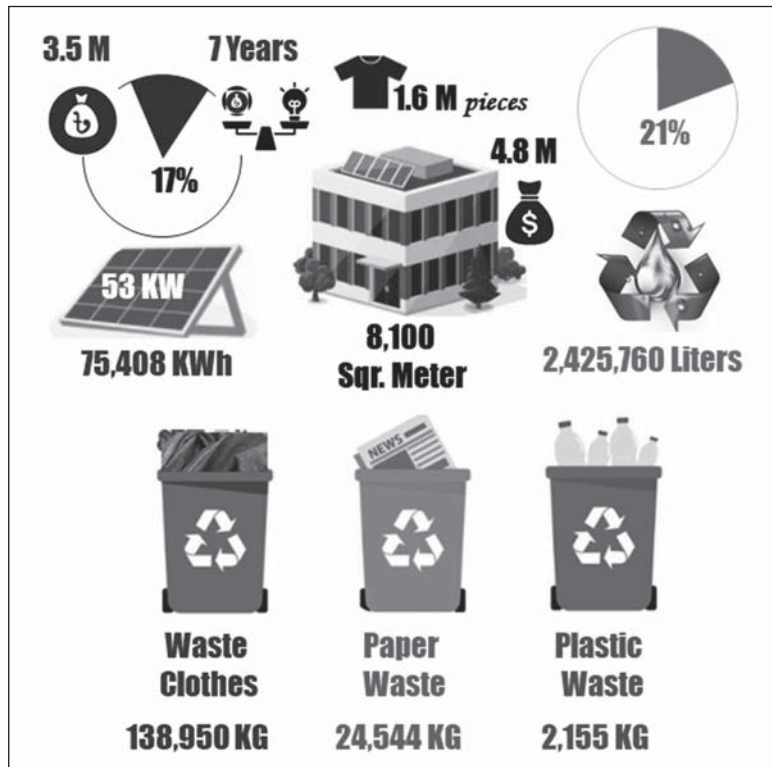
Besides keeping 40 per cent space free in the factory premise, installing technologies to ensure sustainable energy and water use are essential for fulfilling the LEED certification criteria set by the USGBC. In 2021, to produce 1.6 million pieces of garments, factory A used nearly 11,301,670 litres of water; of which, around 21 per cent was recycled (2,425,760 litres to be precise) (Figure 9). Given the current commercial rate charged by Dhaka WASA for water use, the firm saved nearly BDT 0.47 million by cycling ground water alone. However, it is important to note that currently, there is no additional tariff charged for commercial use of the ground water outside Dhaka city.

Moreover, by investing BDT 3.5 million, a 53 KW solar capacity is installed in 2019 in the factory premise with 20 years of lifespan. In the last three years, on average, about 17 per cent of factory’s total energy demand is met from installed solar system (Figure 9). In 2021 alone, a total of 75,408 KWh energy was used from installed solar system to produce 1.6 million pieces of garments production, which was roughly 17.5 per cent of total energy used for production purpose.<sup>5</sup> Given the industrial tariff rate of Bangladesh Rural Electrification Board (REB), the

<sup>4</sup>Since 2014 till March 2022, Bangladesh Bank refinanced a total of nearly BDT 209.5 billion only for the establishment of environment-friendly buildings in Bangladesh.

<sup>5</sup>The total energy used for production was of 462,226 KWh in 2021.

**Figure 9: Key Facts on Sustainable RMG Production**



Source: Authors' illustration.

### **Challenges faced by factory A**

However, the owner of the factory reiterated that Bangladesh Bank's green financing facility at the end is a refinancing mechanism. Therefore, the firm requires their own financial capacity/strength to make a solid progress in the project implementation based on a term loan even before being eligible for applying for such refinancing scheme. For this reason, it will be challenging for a number of small factories which are currently operating in rented buildings/plots, to transition into green establishment and this may require additional funding. As LEED certification is not a compliance criterion at buyers end, offer price remains the same even after such a makeshift investment towards establishment of green buildings and its maintenance. Hence, several RMG manufacturers, particularly the smaller ones, do not see much short-term marginal benefit of investment in green establishment projects.

firm managed to save BDT 1.5 million in the last three years by using solar energy from its own capacity. It suggests that it would take roughly seven years to pull off the initial investment required to install the solar energy system. As the installed solar system is supposed to sustain for 20 years, the factory is likely to get a net cash benefit for next 13 years by saving energy. However, the challenge is that the solar inverters delivered by commercial vendors are not performing as promised. Also, at this stage, servicing capacity of fixing solar panels and inverters in cases of troubleshooting is rather weak in Bangladesh. Hence, maintaining solar rooftop/home system itself is still a challenging task for its users.

Besides, the factory recycled 138,950 kg of cutting room waste clothes, 2,155 kg of plastic waste and 24,544 kg of paper waste in 2021. In the absence of competitive by-product industry, the demand for these types of factory wastes is still naive. Hence, a few factories dump such wastes in nearby places and pollute the environment heavily.

### **Case 2: Investing in solar park as IPP**

#### **Background**

'B'<sup>6</sup> is a solar park project that submitted its first proposal to MPEMR in 2016. The solar park is located in Paturia, Shiboloy, Manikganj. Currently, the capacity of the plant is 35 MW with a contract period of 20 years. The total land area of the power plant is 140 acres with a total installed DC capacity of 45.38 MWp. The performance ratio of the power plan is 81.42 per cent. The estimated energy generation in the 1st year was 61,558,000 kWh and the actual generation was 61,498,641 kWh. It also reduced 40,493.4 tons of CO2 emissions in the first year.

#### **Opportunities availed by company B**

The total project cost was BDT 5,335.5 million with 52 per cent equity and 48 per cent debt ratio. Initially, the firm received the approval from an international bank

<sup>6</sup>Actual name of the solar park is not mentioned but other information about the park is real.



to get financing for the project operation. However, the financing agreement was not implemented due to administrative issues. Later, a private commercial bank issued the entire term loan for a tenure of 10 years. Under this arrangement, loan repayment will be made in local currency. This modality of payment arrangement is critical for Bangladesh's forex exchange management since a number of solar park projects are at the planning phase. Initially, Bangladesh Power Development Board (PDB) will buy electricity from the plant at a rate of USD 0.139 for per kwh on 'no electricity no payment' basis.

### Challenges faced by company B

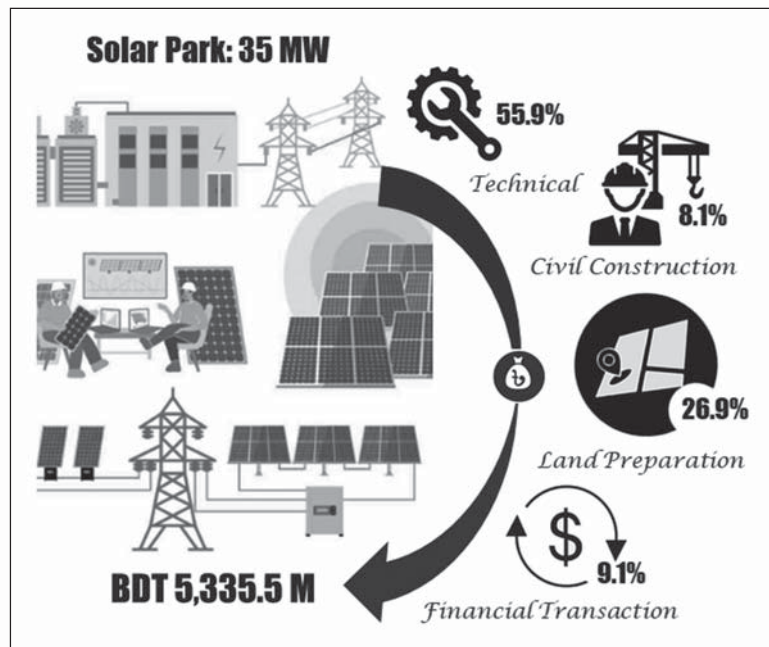
When compared to similar projects with other countries, the key investment challenge is to manage the high cost of land purchase and preparation. For example, in this project, nearly 26.9 per cent project cost is exhausted just to purchase and prepare the land to establish the power plant (Figure 10). The high cost of land preparation is also underscored in National Solar Energy Roadmap, 2021–2041 by citing an example from India “Under the Solar Park scheme launched by the Ministry of New and Renewable Energy (India), selection of location, acquisition and development of the land is carried out by the implementing agency, while in Bangladesh, the project developer has to do all these by itself. This not only reduces the cost, but also makes the process more efficient and convenient” (SREDA, 2020).

Besides, a relatively higher technical cost is observed in developing solar parks in Bangladesh than other global practices. Lower availability of solar resources is often held responsible for that since Bangladesh's annual climate cycle is heavily influenced by a long monsoon period resulting in low and irregular solar insolation for several months in a row.

In addition, the delay in bureaucratic processes and project evaluation often forced businesses to bring multiple revisions in the original project profiling. Revisions in the project profiling create further

delay and uncertainty in terms of availing finance from banks and FIs as per original settlements or understandings. Besides, to operate and manage such a huge solar park, investors still need to rely on foreign expertise, given limited technical know-how of local professionals from Bangladesh. However, the

**Figure 10: Key Facts on Investing in a Solar Park in Bangladesh**



Source: Authors' illustration.

firm also benefitted in several ways from Bangladesh Bank's refinancing scheme for environment-friendly establishments and technology installation.

### Case 3: Investing in clean brick kiln project

#### Background

'C'7 brick kiln project planned to go for a clean (tunnel) auto brick project in 2013. To combat pollution produced by brick kilns, in 2014, the Ministry of Environment announced that no more local brick kilns will be allowed to operate after 2016. According to the owner of the firm, the declaration eventually encouraged him to make an investment in clean auto brick project given its expected profitability. At the

<sup>7</sup>Actual name of the project is not mentioned but other information on the project are real.

same time, Bangladesh Bank also started to fund for two types (Hoffmann and Tunnel) of green auto brick kiln projects in collaboration with Asian Development Bank (ADB) for eco-friendly brick manufacturers (ADB, 2022).<sup>8</sup> This tunnel-based brick kiln project is one of the projects that received refinancing facility under this ADB-Bangladesh Bank collaboration.

'C' brick kiln project's tunnel-based manufacturing unit is established in Shibpur Upazilla, Narshindi near Shitalakshya riverbank. The area of project site is nearly 30-bigha and initial investment requirement was nearly BDT 2.5 million for one bigha land. The daily production capacity of the plant varies between 80,000 to 100,000 pieces of bricks and generates employment for 70 people under a relatively safe working environment. The total investment required was nearly BDT 700 million for this project.

#### ***Opportunities availed by company C***

On 15 July 2015, the firm submitted their project profile to a local bank, and on 21 September 2016, they received an approval from the bank. The firm received the first disbursement (Letter of credit or LC for machineries) on December 14, 2016. Followed by that, in 2016, the owner applied for the green financing scheme of Bangladesh Bank. In 2018, the firm received green financing loan from the ADB through Bangladesh Bank under the 'Brick Kiln Efficiency Improvement Project'. The firm received a total BDT 350 million from four banks/FIs. The initial interest rate was 11 per cent. The firm was offered an 18-month grace period followed by an eight-year repayment schedule (it was originally for seven years but later received an extension for one year). Under the Bangladesh Bank-ADB refinanced arrangement, finally, the firm could avail the loan by 2 per cent less than the previous interest rate of 11 per cent. However, it took nearly two years to start commercial operation for the company C from the date of original submission of the proposal.<sup>9</sup> This delay in paperwork and administrative procedures created significant additional cost than the estimated project cost; for which businesses hardly can re-negotiate with FIs/

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<sup>8</sup>Under this arrangement, ADB financed a total USD 50 million to support 7 HHKs and 12 tunnel kilns, resulting in an increased annual capacity of 753 million bricks (ADB, 2022).

<sup>9</sup>Under this ADB-Bangladesh Bank refinancing scheme, on average, it took nearly three years and four months to start commercial operation for firms from the date of original submission of the proposal.

Banks for additional loan requirement based on the same proposal.

#### ***Challenges faced by company C***

The firm received a term loan of BDT 35 million as working capital at 9 per cent interest rate. However, given inputs like mud for producing brick kiln is needed to be purchased in bulk, the owner repeatedly mentioned the sanctioned loan since working capital is relatively low considering the plant's production capacity. For instance, in three months, nearly 3.75 lakh and 50 thousand square feet of mud is required which roughly costs more than BDT 50 million. Besides, 11 tons of coal is required per day, at current market price (March 2022) the cost was BDT 22,000 per ton. Hence, nearly BDT 15 million operational capital is required for three months for the purchase of coals.

Apart from that, due to the lack of by-product industry, the firm has to spend BDT 1 million for waste management alone. Although such tunnel brick kiln can operate nearly for 350 days in a year while traditional firebricks can operate for roughly about 150 days, the price margin in the market is not significant enough given high installation cost of clean brick kiln projects. A tunnel brick kiln project requires nearly 20 times higher initial investment than that of traditional brick kilns. For instance, on average, a traditional fire brick kiln project needs BDT 35 million to set up the business and start operation.

Though the Ministry of Environment urged to stop, the traditional firebrick kiln projects are ongoing as 'business as usual' even after 2016. Hence, the anticipated return on investment for clean brick kiln projects has been significantly reduced. The lack of coordination between various government organisations is also discouraging investment in green projects in Bangladesh. For instance, while the Ministry of Industries declared clean auto bricks (such as tunnel brick kiln) as 'industry' in 2016, the Ministry of Environment and Forest urged to promote the use of cement blocks for the greater interest of the environment. The plan is to gradually phase out even clean auto bricks from 2025. Lack of coordination, weak implementation of regulation, and inconsistency in the government policy are the major bottlenecks for investors to invest for green projects. Investors are also experiencing rigidity from banks/FIs for getting loans (especially for working capital) for green projects as designing viable 'financial product' is suffering from policy inconsistencies.



## 5.2 Challenges for Banks and FIs in Promoting Green Financing

Banks and FIs often receive applications from small-scale local enterprises, such as the CMSMEs, which are not able to submit required documents to comply with financial regulations. As a result, several CMSMEs/small-scale businesses find it challenging to prove their creditworthiness to secure funding in the form of either equity or liability. Besides compliance related documentation issues, a few challenges were identified during KIIs conducted by the study team. These challenges are as follows: (a) businesses claiming for green financing often fail to come out of the pilot phase and finally go for a sustainable revenue-generating business model; (b) due to the delay in implementation of the pilot phase, businesses often make significant revisions in original project profiling which creates further delay in reassessment, fund mobilisation and project financing; (c) high transaction cost prevails for banks and FIs to monitor green loans compared to other loanable schemes; (d) usually green projects require higher maturity period than other loanable schemes in terms of payback, thus creating a gap in terms of maturity from the investors' perspective; (e) green projects and green financing are almost entirely dependent on the interventions from Bangladesh Bank; there is hardly any leadership among private banks and FIs to promote financing in green projects; (f) green projects requiring high initial cost fail to arrange funding, and some of the low-scale green entrepreneurs even fail to prove credit-worthiness; (g) technology used in green projects are relatively new in Bangladesh; and in the absence of robust backward supply chain, it results in poor handling and governance of the projects; (h) a number of clients avail CSR funds from multiple banks and this number is difficult to identify due to the lack of integrated database on the borrowers of CSR funds; and (i) underdeveloped bond markets and an immature capital market impede the potential growth of financing in green projects. These factors impact banks and FIs to engage in promoting financing for green investment projects despite having a policy guideline to disburse a minimum of 5 per cent of the total loan portfolio to green projects.

The discussion made above on various challenges facing investors in Bangladesh indicates that there are several shortcomings existing in the business climate of Bangladesh. However, this also shows that the country has ample opportunities to improve

efficiency in areas of business, commerce, and trade. Improvement of efficiency will require both policy measures and higher investment on green and energy efficient projects. This will help Bangladesh in making a green energy transition and achieve inclusive and sustainable development.

## SECTION 6: FUTURE INVESTMENT NEEDS TO MEET GREEN ENERGY DEMAND

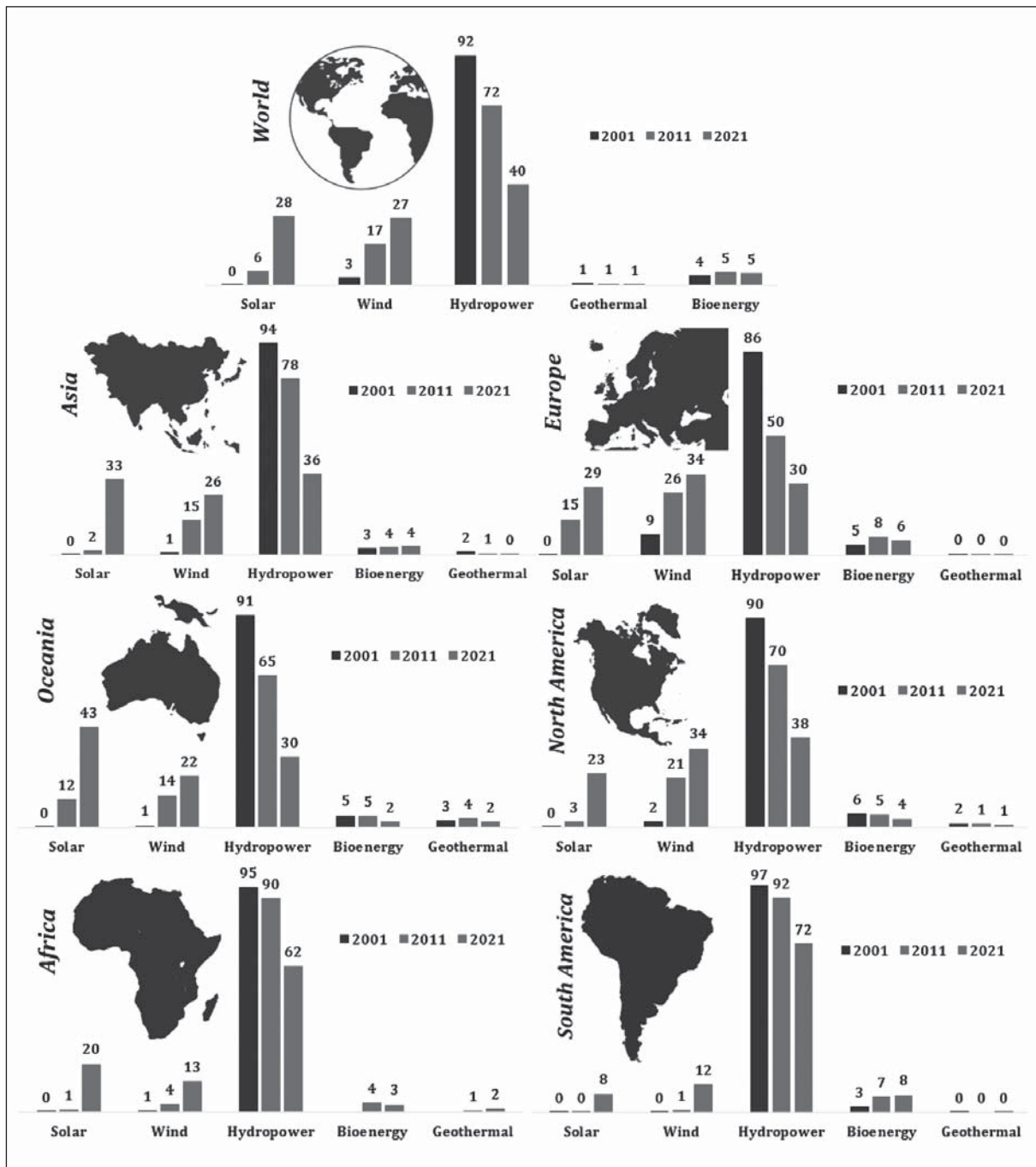
In the previous section, three different case studies in the context of Bangladesh have been discussed. Due to the lack of sector-wise data availability on green investment in Bangladesh, a comprehensive estimation is not possible within this study given its time and budget. However, in this section following a trend analysis on global renewable energy mix, an attempt is made to estimate future investment requirement to meet the renewable energy demand as per Bangladesh's commitment to secure 40 per cent electricity generation capacity from renewable sources.

### 6.1 Global Trend of Renewable Energy Mix

Globally, the share of renewable energy from hydropower declined to 40 per cent in 2020 from 92 per cent in 2010. At the same time, the share of renewable energy from solar power increased from less than 1 per cent to 28 per cent, and wind power increased from 3 per cent to 27 per cent. In fact, the rate of increase in share of renewable energy from solar power has recorded significantly higher than wind energy between 2011 and 2020 (IRENA, 2022). Besides, the share of renewable energy from bio-energy and geothermal is stagnated at 5–6 per cent over last two decades.

From Figure 11, following observations can be made. Over last two decades—(i) the global share of renewable energy mix diverted towards wind and solar from hydropower; (ii) while solar projects have received more attention over wind projects in Asia and Oceania, wind-based projects have received more priority than solar in Europe and North America; (iii) despite a declining trend, hydropower projects still holds a major share of renewable energy mix in Africa and South America, and (iv) in the process of this transition, solar projects have gained better momentum in recent times.

Figure 11: Percentage Share of Renewable Energy Mix

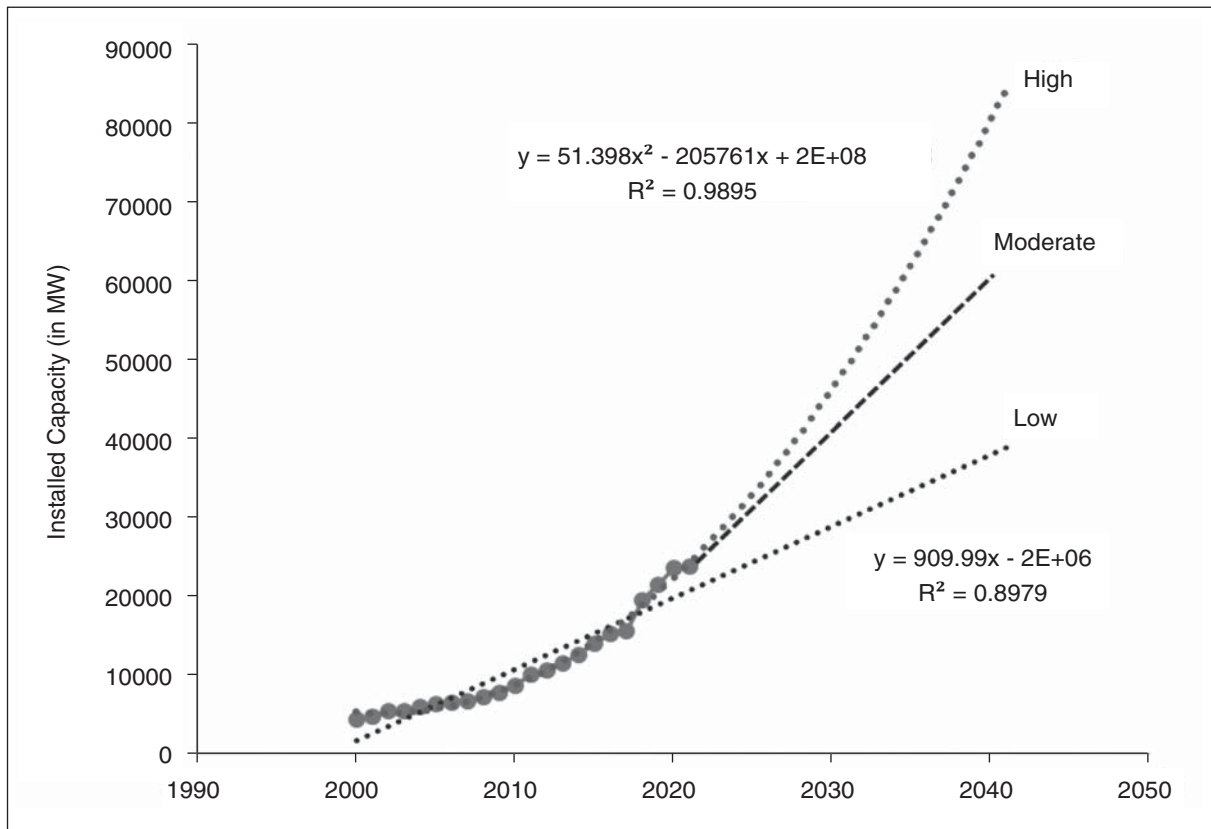


Source: Authors' illustration.

## 6.2 Expected Capacity for Electricity Generation in Bangladesh in 2041

By using data on installed capacity for electricity generation in Bangladesh from 2001 to 2021, the research team conducted a linear and a non-linear

trend analysis. The linear trend analysis shows that, by 2041, the predicted demand of installed capacity for electricity generation in Bangladesh will be slightly higher than 40,000 MW (Case I: low predicted value) by 2041 (Figure 12).

**Figure 12: Projected Capacity for Power Generation in Bangladesh in 2041**

**Source:** Authors' calculation.

On the other hand, a non-linear trend analysis shows that, by 2041, the predicted demand of installed capacity for electricity generation in Bangladesh will be a nearly 85,000 MW (Case 2: high predicted value) (Figure 12). While 'low' predicted value captures a sluggish growth in power capacity generation during 2001–2010, the 'high' predicted value seems a highly optimistic case. Therefore, the research team took an average of 'low' and 'high' predicted value and computed a 'middle value' (Case III) that predicts a slightly higher than 60,000 MW installed capacity requirement for electricity generation in Bangladesh in 2041. In the PSMP 2016, a similar prediction (ranging from 60,000 to 82,000 MW) was made on the required installed capacity for electricity generation by 2041.

### 6.3 Potential Future Investment Demand for Renewable Energy Projects in Bangladesh

#### *Estimations based on meta-analysis*

A meta-analysis is carried out to estimate the probable investment demand for renewable energy projects in Bangladesh to meet 40 per cent of energy demand for electricity generation from renewable sources under three different scenarios. The demand for Bangladesh's installed capacity for electricity generation is analysed under following three scenarios: (i) 'low' scenario (at 40,000 MW), (ii) 'medium' scenario (at 60,000 MW) and (iii) 'high' scenario (at 80,000 MW) by 2041.

**Table 3: Estimated Investment Demand for Renewable Energy Projects**

Renewable Sources	Investment demand under different scenarios (in billion USD)		
	<i>Low</i> (Capacity 40,000 MW)	<i>Medium</i> (Capacity 60,000 MW)	<i>High</i> (Capacity 85,000 MW)
Solar	15.8	24.4	35.2
Wind	3.9	5.9	8.5
Hydro	4.2	6.8	9.9
Other	0.0	0.1	0.1
Total	23.9	37.2	53.7

**Source:** Authors' calculation.

According to the result of the meta-analysis, the estimated demand for investment will be between USD 23.9 (Table 3) and USD 53.7 billion in Bangladesh by 2041 to develop the required installed capacity from renewable energy projects (see, Annex A for detailed explanation). Of this, nearly 65.6 per cent investment will be required to implement solar-based projects. Another 15.8 per cent investment will be needed to finance wind-based power projects while 18.4 per cent will be required to finance hydro power projects. However, the above-mentioned estimation derived from the meta-analysis should be considered keeping a few caveats in mind, such as: (a) given its past trend, the price of solar panel and inverters are likely to decrease in future in the international market, (b) next technological breakthrough is likely to increase the efficiency of producing electricity from renewable sources, and (c) commitments made by countries during the COP26 (26th United Nations Climate Change Conference) are materialised and the process continues.

#### ***Estimations based on regression analysis***

In addition, an ordinary least square (OLS) regression has been conducted to estimate the investment requirement for installing additional capacity required to meet the commitment of 40 per cent electricity generation capacity from renewable energy sources in 2041.

#### ***Methodology of empirical model***

An OLS regression analysis is carried out to estimate the investment demand to develop additional installed power generation capacity from renewable energy sources. The dependent variable is the 'change in installed capacity of electricity from renewable energy sources' while the core independent variable is the 'change in investment on clean energy'. The relevant data is compiled from the Climatescope database developed by Bloomberg New Energy Finance (NEF) that keeps records on both installed capacity and investment figures on clean energy for 136 countries from 2015 to 2020. The dataset also contains information on the stock of installed power generation capacity till 2014 by countries. In addition, disaggregated information on installed power generation capacity by different renewable energy sources are available in the above-mentioned dataset. Besides, a few other independent variables are compiled from the WDI database to conduct the regression analysis (World Bank, 2022). Based on the Climatescope database, the median installed power generation capacity from renewable energy sources was found to be 289 MW per country in 2014. At the same time, Bangladesh's installed power generation capacity from renewable energy sources was roughly 377 MW (IRENA, 2022). Therefore, the regression analysis is carried out for countries that had installed power generation capacity above 289 MW in 2014. The general expression of OLS model conducted is as follows:

$$\Delta IC_{RE}(t-(t-5)) = f(\Delta I_{CE}(t-(t-5)), \frac{RE_S}{RE_t}, \frac{RE_W}{RE_t}, \frac{RE_H}{RE_t}, PE, AE, CC, \sum_{i=1}^{n=t-6} RE) \text{ for } \sum_{i=1}^{n=t-6} RE > 289 \text{ MW}$$

Where, latest year,  $t=2020$  and other expressions are as follows,

$\Delta IC_{RE}(t-(t-5))$	Change in installed capacity of electricity from renewable energy sources (in MW) during 2015–2020
$\Delta I_{CE}(t-(t-5))$	Change in investment on clean energy (in billion USD) during 2015–2020
$\frac{RE_S}{RE_t}$	Solar power capacity as per cent of total renewable energy: five years weighted average from 2016 to 2020
$\frac{RE_W}{RE_t}$	Wind power capacity as per cent of total renewable energy: five years weighted average from 2016 to 2020
$\frac{RE_H}{RE_t}$	Hydro power capacity as per cent of total renewable energy: five years weighted average from 2016 to 2020:
$\sum_{i=1}^{n=t-6} RE$	Installed power generation capacity from renewable energy sources till 2014 by countries
$PE$	Population density (per square kilometre) by countries
$AE$	Access to electricity (per cent of population) by countries
$CC$	Categorical variable for country classification

**Table 4: Regression Results**

Dependent Variable: <i>Change in Installed Capacity of Electricity from Renewable Energy Sources (in MW)</i>	
Independent variables	(ii)
Change in investment on clean energy (in billion USD)	1,180*** (307.7)
Solar power capacity as per cent of total renewable energy	279.4 (209.0)
Wind power capacity as per cent of total renewable energy	414.8 (338.7)
Hydro power capacity as per cent of total renewable energy	86.92 (130.2)
Installed power generation capacity from renewable energy sources	-0.994*** (0.00741)
Population density (per square kilometre)	125.0 (131.5)
Access to electricity (per cent of population)	461.1 (762.3)
Country classification (low income countries =0)	
<i>Lower-middle income countries (=1)</i>	23,083 (27,415)
<i>Upper-middle income countries (=2)</i>	-5,666 (13,296)
<i>High income countries (=3)</i>	-24,058 (25,375)
Constant	-75,309 (88,097)
Observations	57
R-squared	0.954

**Source:** Authors' calculation.

Based on data from 57 countries which had a renewable energy installed capacity of at least 290 MW back in 2014, the result of regression model suggests that an additional increase in investment of USD 1 billion on clean energy can install 1,180 MW renewable energy capacity. Table 4 presents the results of the econometric analysis. Extrapolating this global estimate for Bangladesh case, and assuming the country will attain the 'medium scenario' mentioned above in section 6.2, an additional 22,602 MW renewable energy capacity will be required. Hence, nearly USD 19.2 billion additional investment will be required to substantiate green energy transition in Bangladesh by 2041. Combining the results of meta-analysis and OLS regression, to stimulate green energy transition in Bangladesh by 2041, roughly

USD 19.2 to USD 37.2 billion investment will be needed to develop the required installed capacity from renewable energy sources for making a green energy transition by 2041.

## SECTION 7: DISCUSSION

As per its NDCs, Bangladesh aims to reduce greenhouse gas (GHG) emission by 6.73 per cent in 2030 unconditionally, i.e., without external support. It will enhance its GHG reduction target to 15.12 per cent if it receives financial and technical assistance from international sources. However, the attainment of targets is not automatic and will require a few measures. These include major structural shifts and subsequent investment in energy and power sector



management, transportation, use of energy-efficient technologies in various sectors including industrial sector, infrastructure development, agriculture, and water and waste management. According to MCPP 2030, nearly USD 80 billion additional investment will be made by the GoB to attain resilience in energy, water, transport, and business supply chain management by 2030 (GoB, 2021). The International Finance Corporation (IFC) reveals that Bangladesh's climate-smart investment potential is about USD 172 billion during 2018–2030 (IFC, 2017). Factoring the aspiration of Bangladesh to become a 'high income country' by 2041, the potential investment requirement may even exceed IFC's estimation by two/threefold since policymakers will have to promote a circular economy.

The recent surge in spot market price of crude oil price and liquefied natural gas (LNG), amid 'Russia-Ukraine' war and COVID-19 pandemic, created significantly high competition among countries to secure primary energy requirements for future. For instance, between May 2020 and July 2022, LNG spot market price increased eightfold while crude oil price increased nearly three times. While it is a 'hit in the jackpot' for primary energy producing countries, others (importing countries) are struggling to secure minimum supply of primary energy demand by constantly worrying about its 'balance of payment' situation. Bangladesh being one of the importing countries of primary energy, the government is struggling to even use half of its installed capacity due to fuel shortage and high primary energy prices. And, now the government is forced to re-introduce 'load shedding' as a temporary solution despite having an overcapacity in power generation. This very situation highlights the importance of implementing projects and achieving national targets in a timely manner as pointed out in various planned documents such as MCPP 2030. For example, had the target of 10 per cent renewable energy been implemented in accordance with the target set in REP 2008, the government could have potentially avoided current power cuts with 2,500 MW produced from renewable energy by 2021.

After years of decline, despite the cost of clean energy technologies started to increase since 2020, the investment in clean energy exceeded USD 1.4 trillion in 2021 (IEA, 2022). This suggests that power generation from renewable energy sources is currently becoming more reliable to countries than it was even two years back. Increasingly, high cost of

producing electricity from fossil fuels-based primary energy resources forced countries to expedite its effort towards securing more energy independence which can be achieved through renewable sources. Globally, governments allocated USD 710 billion for long-term clean energy and sustainable recovery measures (IEA, 2022). However, Bangladesh's effort towards higher energy mix from renewable energy is rather limited. In fact, at current market prices, the average cost of electricity generation from solar energy on a regular sunny day is half compared to the cost of producing power from furnace oil and diesel. In many other developed and developing countries, electricity generation from private power plant operators seeks guarantee of primary energy supply. The GoB, however, is responsible to supply fuel. Hence, during this crisis, the GoB is paying capacity charges for idle power plants. This not only increases financial cost of operation with 'no benefit', but also increases economic costs by limiting the government's ability to promote investment for green projects.

## SECTION 8: RECOMMENDATIONS

Stable power generation is the pre-condition for investment in critical sectors such as transportation, infrastructure, agriculture, water, and waste management. The recent energy crisis has pushed countries to develop tailored responses and achieve some level of self-reliance on power generation. It further reveals that energy crisis can lead to macroeconomic instability since energy is crucial for production and economic growth. However, growth which is not 'welfare-enhancing and inclusive' is not sustainable. Therefore, the government should enhance investment in renewable energy which is beneficial for human health and natural ecosystem. Since the EU MIP priorities 2021–2027 for Bangladesh puts emphasis on human capital development, green inclusive development, and inclusive governance, the EU may extend financial and technological support to Bangladesh in achieving these goals. This would also encourage other development partners to provide support for green transition in Bangladesh. Based on the findings and discussions, this study puts forward following recommendations.

1. Given the importance of energy security, the GoB should declare renewable energy-based projects under SREDA as fast track projects and mobilise financial and technological assistance which can help improve the share of energy mix based on renewable energy. In this connection,

the institutional capacity of SREDA needs to be enhanced.

2. 'Net meter' based pilot projects should receive high policy priority and all sectors/industries should be involved since it requires 'no' or 'little' land preparation cost. High cost of land preparation is the major concern for establishing solar parks in Bangladesh. Considering that 'net meter' based solar system has the potential to expedite installed capacity from renewable energy in relatively quick succession with 'no' or 'little' land cost preparation, it should receive high priority in policy agenda. In this regard, recent announcement by the policymakers to install rooftop solar systems in all educational buildings to feed additional power to the grid by the GoB is a welcomed decision. It should be executed fast. Similar interventions should be replicated for other buildings by industries/sectors. Hence, there is a need for technical support to SREDA and Power Grid Company of Bangladesh (PGCB) for improving efficiency in the transmission and distribution channels of the power sector.
3. Rural settlements should be included in pilot interventions to promote 'net meter' based solar system solutions. Currently, SREDA is promoting 'net meter' based solar solutions mostly in urban areas. This is also limited to the settlements that have three phase electricity connection. While several urban settlements share single rooftop in a high-rise building, rural settlements (mostly one or two storied structures) in Bangladesh offer more areas for solar panel installation in a relatively populated community. With required technical solutions, SREDA should focus more on rural areas for wider penetration of 'net meter' based solar systems in addition to its current initiatives. In the initial phase, SREDA may develop model networks within communities to encourage more 'prosumers' to participate in this 'net meter' based solar system solution. In this regard, the idea of 'Solshare'<sup>10</sup> may be reviewed by SREDA to come up with technically and financially feasible solution so that more rural SHS are directly connected with the national grid. A feasibility study for net meter based solar system solutions in the rural areas should be undertaken.
4. The GoB should rationalise tax structure further and revisit some of its fiscal measures to promote renewable energy. The specific measures are suggested below.
  - The GoB should fully implement the commitments made in REP 2008. Currently, VAT exemption on solar panels and batteries exists, but there is no exemption on solar inverters. Moreover, the import duty on inverters (HS 85044090) was raised by 37 per cent in the national budget of FY2021–22. An extensive policy that considers VAT exemption on all types of equipment for a renewable power plant, especially solar power plants, should be considered.
  - The environment protection surcharge of 1 per cent that was mentioned in the Finance Act of 2014 on goods produced by industries polluting the environment should be implemented.
  - The GoB should gradually phase out fossil fuel subsidies and redirect funds to finance renewable energy-based projects.
  - The GoB should consider introducing a formal feed-in tariff policy exclusively for renewable energy needs. Although an informal feed-in tariff policy exists, current energy crisis in Bangladesh calls for a clearer and specific incentive package to encourage renewable energy producers regardless of their generation capacity.
  - The margin of fiscal incentives may be increased to promote green establishments. As mentioned in Section 3.6, currently, only 2 per cent additional fiscal benefit in terms of reduced tax are enjoyed by industries exporting goods and services. This may be extended up to 3 per cent or more. Alternatively, the GoB may reduce a small portion of AIT for operating businesses from green factories. For instance, RMG exporters now pay 1 per cent AIT on exported value. For green factory operation, AIT may be reduced to 0.9 per cent.
5. The size of Bangladesh Bank's refinancing scheme should be increased. Access to loans, particularly working capital for green investments from banks and FIs needs to be enhanced. CMSMEs should also have access to such funds.

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<sup>10</sup>Peer-to-peer energy exchange.



6. There is a need for better coordination among various public organisations for policy consistency. This is also required for improving implementation status of green projects.
7. The GoB should place more emphasis on developing a strong bond market to finance future green projects. The current size of bond market in Bangladesh is roughly about USD 17.5 billion and dominated by government debt securities and capital bonds issued by banks and FIs. While bond market contributes significantly to support long-term financing for public sector projects in developed countries, Bangladesh's bond market

currently lacks capacity to deal with the long-term investment gap for development purposes including investment for green projects. Globally, bond market supports financing significantly for green establishment projects. In case of Bangladesh, green establishment financing is mostly reliant on Bangladesh Bank's refinancing scheme and bank's or FI's term loans. Recently, a green bond is introduced in Bangladesh, but banks/FIs are only interested in financing small-scale projects under this initiative. On a welcoming note, Bangladesh Bank has formulated the country's first green bond policy. This is expected to facilitate functioning of green bonds within specific guidelines.

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## ANNEXURE

### Annex A: Detailed Explanation of Meta-Analysis

The detailed explanation of meta-analysis is discussed in this section. In Annex Table 1, column 'a' shows sources of renewable energy e.g., solar, wind, hydro and biogas to produce electricity. Solar energy projects include solar park, rooftop solar system, solar irrigation and floating solar (where mini-grid, micro-grid, etc., are included). Column 'b' shows that a total 83.7 per cent renewable energy will be produced from solar power, whereas 7.0 per cent and 9.0 per cent will be from wind and hydro power respectively. Rest will be produced from biogas to electricity. In determining percentage share of sources of renewable energy, the research team followed the disaggregation mentioned in power sector analysis 2030 document that was developed based on MCPP. Column 'c' presents total installed capacity under renewable energy from existing and ongoing projects. Column 'd' highlights the potential installed capacity from projects that are currently in planning stage. In Section 6.2, three scenarios were developed to compute the analysis. Columns e–g inform about the required installed capacity considering 40 per cent electricity will be generated from sources of renewable energy by 2041 under three different scenarios. Columns h–j show how much additional installed capacity in quantity will be required from renewable energy sources to fulfil the target. Column 'k' shows investment required for installing per MW capacity at project level under different arrangements. For instance, investment required to produce per MW capacity in solar parks is taken as an average value (from a priori information) from the following two projects: 134.3 MW Mongla Solar Park and 35 MW Spectra Solar Park project. Investment related information as regards capacity development under rooftop solar projects is collected from KIIs with officials of United General Electric Company Ltd. Later, the same value is also used for solar irrigation and floating solar projects. The caveat is, the prices of solar panels vary significantly with the level of efficiency. Investment related information as regards wind power is collected from the office of Siddhant Wind Energy Pvt Ltd. Investment related information as regards hydro power is used from similar projects that are under implementation in India. Finally, columns l–m reveal how much additional investment will be needed to install the required capacity to achieve the target of generating 40 per cent of Bangladesh's energy from renewable sources by 2041.

**Annex Table 1: Detailed Calculation on Investment Demand for Renewable Energy Projects**

Sources of Renewable energy	Per Cent Share of Renewable Energy	EC+UI (MW)	UP (MW)	Required Installed Capacity (MW)			Additional Capacity Required (MW)			Investment (in Million USD per MW)	Additional investment (in Billion USD)					
				Low (L)			Medium (M)				High (H)			L	M	H
				e	f	g	h	i	j		k	l	m			
<i>Solar Park</i>	40.0	672	1,424	6,400	9,600	13,600	5,728	8,928	12,928	1.61	9.22	14.37	20.81			
<i>Rooftop Solar</i>	35.0	83	1	5,600	8,400	11,900	5,517	8,317	11,817	1.00	5.52	8.32	11.82			
<i>Solar Irrigation</i>	5.0	52		800	1,200	1,700	748	1,148	1,648	1.00	0.75	1.15	1.65			
<i>Floating Solar</i>	3.7	295		592	888	1,258	298	594	964	1.00	0.30	0.59	0.96			
<b>Total Solar</b>	<b>83.7</b>	<b>1101</b>	<b>1,425</b>	<b>13,392</b>	<b>20,088</b>	<b>28,458</b>	<b>12,291</b>	<b>18,987</b>	<b>27,357</b>	-	<b>15.79</b>	<b>24.43</b>	<b>35.24</b>			
<b>Wind</b>	<b>7.0</b>	<b>65</b>	<b>295</b>	<b>1,120</b>	<b>1,680</b>	<b>2,380</b>	<b>1,055</b>	<b>1,615</b>	<b>2,315</b>	<b>3.66</b>	<b>3.86</b>	<b>5.91</b>	<b>8.47</b>			
<b>Hydro</b>	<b>9.0</b>	<b>230</b>		<b>1,440</b>	<b>2,160</b>	<b>3,060</b>	<b>1,210</b>	<b>1,930</b>	<b>2,830</b>	<b>3.50</b>	<b>4.24</b>	<b>6.76</b>	<b>9.91</b>			
<b>Biogas</b>	<b>0.3</b>	<b>2</b>	<b>50</b>	<b>48</b>	<b>72</b>	<b>102</b>	<b>46</b>	<b>70</b>	<b>100</b>	<b>1.00</b>	<b>0.05</b>	<b>0.07</b>	<b>0.10</b>			
<b>Grand Total</b>	<b>100.0</b>	<b>1,398</b>	<b>1,770</b>	<b>16,000</b>	<b>24,000</b>	<b>34,000</b>	<b>14,602</b>	<b>22,602</b>	<b>32,602</b>	-	<b>23.94</b>	<b>37.17</b>	<b>53.72</b>			

Source: Authors' calculation.

Note: EC (existing capacity installed), UI (under implementation), UP (under planning).

**Annex B: List of Participants in KIIs and EGM****Annex Table 2: List of Participants in KIIs and EGM**

<b>Sl.</b>	<b>Interviewee</b>
1	<b>Mr Khondkar Morshed Millat</b> , <i>General Manager</i> , Sustainable Finance Department, Bangladesh Bank *
2	<b>Mr B N Dulal</b> , <i>Managing Director</i> , First Auto Bricks Limited
3	<b>Mr Malek</b> , <i>Executive Manager</i> , First Auto Bricks Limited
4	<b>Mr Mohammad Rashed Al Hasan</b> , <i>Senior Project Officer</i> , South Asia Department (SARD), ADB
5	<b>Dr Shah Md. Ahsan Habib</b> , <i>Professor and Director</i> , Bangladesh Institute of Bank Management
6	<b>Ms Tanzida Islam</b> , <i>Programme Manager Environment</i> , H & M
7	<b>Mr Mahboob Sarwar-E-Kainat</b> , <i>Adviser</i> , Spectra Engineers Limited
8	<b>Ms Salma Islam</b> , <i>Head of Project</i> , Fundraising & Communication, Solshare
9	<b>Ms Aziza Sultana Mukti</b> , <i>Head of Operations</i> , Solshare
10	<b>Mr Sheikh HM Mustafiz</b> , <i>Managing Director</i> , Cute Dress Industry Limited
11	<b>Mr Md. Maruf Ur Rahman</b> , <i>Director Sales &amp; Marketing</i> , United General Electric Company Ltd.
12	<b>Mr Hasan Mahmood Khurshid</b> , <i>Project Manager</i> , Sustainable Finance Unit, IPDC Finance Ltd.
13	<b>Mr Muhit Rahman</b> , <i>Managing Director and Head of Financial Market</i> , SCB
14	<b>Dr Afifa Raihana</b> , <i>Senior Environmental Specialist</i> , International Finance Corporation (IFC)
15	<b>Ms Uzma Chowdhury</b> , <i>Director Finance</i> , PRAN-RFL Group
16	<b>Mr Md. Enamul Karim Pavel</b> , <i>Director (Loans) &amp; Head of Renewable Energy Program</i> , Infrastructure Development Company Limited (IDCOL)

**Note:** \* participated both in KII and EGM.

The key objective of the study is to identify opportunities and challenges of green investment in Bangladesh by—(i) reviewing existing support measures (including incentives) and policies for making investment in green projects, (ii) identifying opportunities and implementation challenges for investing in green projects, and (iii) making an estimate of the green investment required for electricity generation from renewable energy sources. In the policy discourse, it is hoped that the findings of the study will narrow the knowledge gap and contribute towards holistic measures by the government for leveraging green investment through the private sector’s (including the financial sector) engagement. The study findings are also expected to support development partners including the European Union in taking focused and strategic decisions on ‘green growth’ in Bangladesh.

### **Disclaimer**

This publication is supported by the European Union. Its contents are the sole responsibility of the authors and do not necessarily reflect the views of the European Union or the CPD.

### **About the Authors**

*Dr Fahmida Khatun* is the Executive Director of the CPD. *Mr Estiaque Bari* is a Visiting Fellow at the CPD and a Senior Lecturer of the Department of Economics at East West University. *Mr Foqoruddin Al Kabir* is a Research Associate at the CPD.

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### **Cover Design**

Avra Bhattacharjee