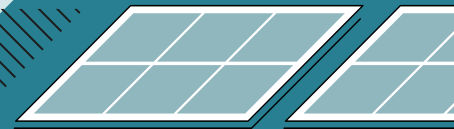




ANALYSIS



BANGLADESH



Target Market Analysis Bangladesh

# Solar PV Potential for Embedded Generation in the Commercial and Industrial Sector

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## Currency units

BDT	Bangladesh Taka
EUR	Euro
USD	United States Dollar

Conversion rate as of 20.10.2023

USD 1 =	BDT 110.16
BDT 1 =	USD 0.009078
EUR 1 =	BDT 117.37
BDT 1 =	EUR 0.008520

Source: <https://www.exchange-rates.org>

## Technical units

Btu	British thermal unit
Ckm	Circuit kilometre
GWh	Gigawatt hour
kgoe	Kilograms of oil equivalent
Km	kilometre
KV	Kilovolt
kWh	Kilowatt hour
kWh/m <sup>2</sup> /day	Kilowatt hour per square metre per day
MkWh	Million kilowatt hour
MMBtu	Million British thermal unit
MMCFD	Million standard cubic feet per day
MW	Megawatt
MWp	Megawatt peak
TWh	Terawatt hour

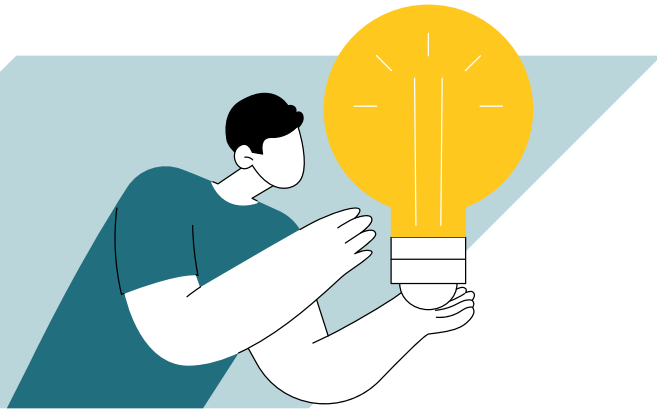
## Abbreviations/acronyms

<b>2PT</b>	Two-Part Tariff
<b>8th FYP</b>	Eighth Five Year Plan
<b>AC</b>	<b>Alternate Current</b>
<b>ADB</b>	Asian Development Bank
<b>AFD</b>	French Development Agency
<b>AKDL</b>	AKH Knitting and Dyeing Ltd.
<b>APSCL</b>	Ashuganj Power Generation Company Limited
<b>BAU</b>	Business-As-Usual
<b>BB</b>	Bangladesh Bank
<b>BBS</b>	Bangladesh Bureau of Statistics
<b>BDT</b>	Bangladesh Taka
<b>BERC</b>	Bangladesh Energy Regulatory Commission
<b>BEZA</b>	Bangladesh Economic Zones Authority
<b>BGCCl</b>	Bangladesh-German Chamber of Commerce and Industry
<b>BGMEA</b>	Bangladesh Garment Manufacturers and Exporters Association
<b>BIDA</b>	Bangladesh Investment Development Authority
<b>BIFFL</b>	Bangladesh Infrastructure Finance Fund Limited
<b>BIN</b>	Business Identification Number
<b>BKMEA</b>	Bangladesh Knitwear Manufacturers and Exporters Association
<b>BOO</b>	Build, Own and Operate

<b>BPDB</b>	Bangladesh Power Development Board
<b>BREB</b>	Bangladesh Rural Electrification Board
<b>BSTI</b>	Bangladesh Standards and Testing Institution
<b>BTMA</b>	Bangladesh Textile Mills Association
<b>CapEx</b>	Capital Expenditure
<b>CCI&amp;E</b>	Chief Controller of Imports and Exports
<b>CEPZ</b>	Chittagong Export Processing Zone
<b>CMSME</b>	Cottage, Micro, Small & Medium Enterprises
<b>COVID-19</b>	Coronavirus disease
<b>CPGCBL</b>	Coal Power Generation Company Bangladesh Limited
<b>CPP</b>	Captive Power Plant
<b>DC</b>	Direct Current
<b>DESCO</b>	Dhaka Electricity Supply Company
<b>DEPZ</b>	Dhaka Export Processing Zone
<b>DPDC</b>	Dhaka Power Distribution Company
<b>DSCR</b>	Debt Service Coverage Ratio
<b>EA&amp;CEI</b>	Electrical Adviser & Chief Electrical Inspector
<b>EBA</b>	Everything But Arms
<b>EGCB</b>	Electricity Generation Company of Bangladesh Limited
<b>EPRC</b>	Energy & Power Research Council

<b>E-to-E</b>	Employee to Enterprise
<b>EZ</b>	Economic Zone
<b>EPB</b>	Export Promotion Bureau
<b>EPC</b>	Engineering, Procurement and Construction
<b>EPZ</b>	Export Processing Zone
<b>EMI</b>	Equated Monthly Installment
<b>ERC</b>	Export Registration Certificate
<b>ESDD</b>	Environmental and Social Due Diligence
<b>ESMAP</b>	Energy Sector Management Assistance Program
<b>EV</b>	Electric Vehicle
<b>FDI</b>	Foreign Direct Investment
<b>FESIL</b>	Far East Spinning Industries Ltd.
<b>FI</b>	Financial Institution
<b>FSCD</b>	Fire Service and Civil Defence
<b>FY</b>	Financial Year
<b>GDP</b>	Gross Domestic Product
<b>GHG</b>	Greenhouse Gas
<b>GOB</b>	Government of Bangladesh
<b>HT</b>	High Tension
<b>HVDC</b>	High-Voltage Direct Current
<b>I&amp;C</b>	Installation and Commissioning
<b>IDCOL</b>	Infrastructure Development Company Ltd.
<b>IEC</b>	International Electrotechnical Commission

<b>IFC</b>	International Finance Corporation	<b>NCCP</b>	National Codex Contact Point	<b>SHS</b>	Solar Home System
<b>IPP</b>	Independent Power Producers	<b>NSB</b>	National Standards Body	<b>SREDA</b>	Sustainable Renewable Energy Development Authority
<b>IRC</b>	Import Registration Certificate	<b>NWPGCL</b>	North-West Power Generation Company Limited	<b>SREPGen</b>	Sustainable Renewable Energy Power Generation
<b>IRENA</b>	International Renewable Energy Agency	<b>O&amp;M</b>	Operation and Maintenance	<b>SREUP</b>	Safety Retrofits and Environmental Upgrades
<b>ISO</b>	International Organization for Standardization	<b>OPEC</b>	Organisation of the Petroleum Exporting Countries	<b>SMMAB</b>	Solar Module Manufacturers Association of Bangladesh
<b>JICA</b>	Japan International Cooperation Agency	<b>OpEx</b>	Operating Expense	<b>TIN</b>	Tax Identification Number
<b>JV</b>	Joint Venture	<b>OTI</b>	Oman Trading International	<b>TPO</b>	Third-Party Ownership
<b>KfW</b>	Kreditanstalt für Wiederaufbau	<b>PBS</b>	Palli Bidyut Samity (Rural Electric Cooperative)	<b>UAE</b>	United Arab Emirates
<b>LEED</b>	Leadership in Energy and Environmental Design	<b>PGCB</b>	Power Grid Company of Bangladesh Limited	<b>UK</b>	United Kingdom
<b>LNG</b>	Liquefied Natural Gas	<b>PPA</b>	Power Purchase Agreement	<b>UNCTAD</b>	United Nations Conference on Trade and Development
<b>LT</b>	Low Tension	<b>PPP</b>	Purchasing Power Parity	<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>MCPP</b>	Mujib Climate Prosperity Plan	<b>PSMP</b>	Power System Master Plan	<b>UPGDCL</b>	United Power Generation and Distribution Company Ltd.
<b>MFA</b>	Multifibre Arrangement	<b>PSPGP</b>	Private Sector Power Generation Policy	<b>US</b>	United States
<b>MPEMR</b>	Ministry of Power, Energy and Mineral Resources	<b>PV</b>	Photovoltaic	<b>USD</b>	United States Dollar
<b>MPP</b>	Merchant Power Plant	<b>R&amp;D</b>	Research and Development	<b>USGBC</b>	United States Green Building Council
<b>MT</b>	Medium Tension	<b>RE</b>	Renewable Energy	<b>VAT</b>	Value Added Tax
<b>MV</b>	Medium Voltage	<b>RJSC</b>	Registrar of Joint Stock Companies	<b>VRE</b>	Variable Renewable Energy
<b>MVA</b>	Megavolt Amperes	<b>RMG</b>	Ready-Made Garments	<b>VRP</b>	Vulnerability to Resilience to Prosperity
<b>NBR</b>	National Board of Revenue	<b>RPCL</b>	Rural Power Generation Company Limited	<b>WZPDCL</b>	West Zone Power Distribution Company Limited
<b>NDC</b>	Nationally Determined Contribution	<b>SAARC</b>	South Asian Association for Regional Cooperation		
<b>NEM</b>	Net Energy Metering	<b>SARSO</b>	South Asian Regional Standards Organisation		
<b>NESCO</b>	Northern Electricity Supply Company Limited				



## ENERGY SOLUTIONS – MADE IN GERMANY

### The German Energy Solutions Initiative

The German Energy Solutions Initiative, coordinated and financed by the German Federal Ministry for Economic Affairs and Climate Action (BMWK), aims to globalise German and European technologies and expertise in climate-friendly energy solutions.

Years of promoting smart and sustainable energy solutions in Germany have led to a thriving industry known for world-class technologies. Thousands

of specialised small and medium-sized enterprises (SMEs) focus on developing renewable energy systems, energy efficiency solutions, smart grids and storage technologies. Cutting-edge energy solutions are also built on emerging technologies like Power-to-Gas, fuel cells and green hydrogen. The initiative's strategy is shaped around ongoing collaboration with the German business community.

#### THE PROJECT DEVELOPMENT PROGRAMME (PDP)

Implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, the Project Development Programme (PDP) is an integral part of the German Energy Solutions Initiative. The PDP combines development cooperation with private-sector engagement to promote climate-friendly energy solutions and facilitate market access for German and European small businesses in selected developing and emerging countries. This fosters economic growth and international cooperation, and contributes to climate change mitigation. The PDP works closely with the German Chambers of Commerce Abroad (AHK) to implement tailor made local solutions.

The PDP team keeps a constant eye on key market sectors in the target countries for providers of climate-friendly energy solutions. Using these insights, they generate sector analyses for areas where renewable energies or energy efficiency measures can compete effectively without extra subsidies.

#### PROJECT OPPORTUNITIES IN DEVELOPING AND EMERGING COUNTRIES

The markets in developing countries and emerging economies are promising, but also pose challenges for international business partners. The PDP team provides free and impartial advice to local companies, in particular, and puts them in contact with German or European business partners.

The team collects data from the energy consumer and evaluates it from a technical and economic perspective, thus developing financially viable projects focused on renewable energies and energy efficiency with local companies. It also offers business initiation opportunities with German or European small and mid-sized companies.

At the same time, the project provides training courses, analyses and studies on the risks and potential of renewable energies to help support market development. Visiting reference projects within the countries also promotes the creation of private-sector business partnerships.

In addition to commerce and industry, operators of refugee camps are a further target group for the transition to renewable energies as many still use diesel generators to supply energy or water.

The focus of activities currently lies in 15 countries across Southeast Asia, South Asia, Sub-Saharan Africa, and the Middle East.



## Executive summary

With daily sunshine ranging from ten to thirteen hours, Bangladesh has ideal conditions for solar power generation, holding significant market potential. While renewable energy constitutes less than five percent of the energy mix, the demand for alternative energy has surged due to the global energy crisis. Initially, Bangladesh relied on its own gas reserves to address the shortage caused by the Russia-Ukraine conflict, but eventually switched to costly imports when its local reserves were depleted. Government actions, including the removal of gas price subsidies to secure an International Monetary Fund loan, led to a 179 percent increase in industrial gas tariffs, rendering gas-powered electricity financially unattractive. Coupled with frequent power supply interruptions, this has affected the competitiveness of businesses. In this context, approximately 7,000 textile and clothing factories are actively seeking reliable alternatives, showing increased interest in photovoltaic solutions.

### UNLOCKING BANGLADESH'S SOLAR ENERGY POTENTIAL

The energy sector in Bangladesh has experienced significant growth in installed capacity and power supply, surging from 5,496 MW in 2009 to 27,361 MW in 2023. Despite achieving 100% power supply for the population in May 2023, challenges persist in the transmission network. Renewable energy accounts for only 4.61% of total power generation, with solar energy as the primary source.

The government aims to increase renewable energy capacity to 4.1 GW by 2030, placing a strong emphasis on solar energy. The development of solar photovoltaic (PV) projects offers clear advantages, including meeting the rising energy demand, reducing dependence on imports, and mitigating the impact of volatile fossil fuel prices.

## Zusammenfassung

Mit täglich zehn bis 13 Sonnenstunden hat Bangladesch ideale Bedingungen für die Solarstromerzeugung und birgt ein enormes Marktpotenzial. Erneuerbare Energien machen bisher weniger als fünf Prozent des Energiemixes aus, aber die Nachfrage nach alternativem Strom ist aufgrund der globalen Energiekrise stark gestiegen. Die Gasknappheit aufgrund des Russland-Ukraine-Konflikts zwang Bangladesch zunächst zur verstärkten Nutzung eigener Gasreserven, bis diese erschöpft waren und teure Importe notwendig wurden. Die Regierung musste, um ein Darlehen des Internationalen Währungsfonds zu erhalten, Gaspreissubventionen streichen, was zu einem Anstieg der Gastarife für die Industrie um 179 Prozent führte. Die dadurch unattraktive Gasstromproduktion, verbunden mit Stromnetzinstabilität durch häufige Lieferunterbrechungen, beeinträchtigt die Wettbewerbsfähigkeit der Betriebe. In diesem Kontext suchen insbesondere die rund 7.000 Textil- und Bekleidungsfabriken nach zuverlässigen Alternativen und zeigen verstärktes Interesse an Photovoltaik-Lösungen.

### ERSCHLIESSUNG DES SOLARENERGIEPOTENZIALS VON BANGLADESCH

Der Energiesektor Bangladeschs verzeichnet ein deutliches Wachstum bei installierter Kapazität und Stromversorgung, mit einer fast fünf-fachen Steigerung von 5.496 MW im Jahr 2009 auf 27.361 MW im Jahr 2023. Obwohl im Mai 2023 eine 100%ige Stromversorgung für die Bevölkerung erreicht wurde, bestehen weiterhin Herausforderungen im Übertragungsnetz. Erneuerbare Energien machen lediglich 4,61 % der Gesamtstromerzeugung aus, wobei Solarenergie die Hauptquelle ist.

Die Regierung plant, die erneuerbare Energiekapazität bis 2030 auf 4,1 GW zu erhöhen und rückt dabei Solarenergie in den Fokus. Die Ent-



The implementation of PV solar projects is gradually increasing, particularly focusing on large-scale projects and rooftop installations. Attractive solar module prices, investment opportunities, local financing models and programs, along with green financing instruments from the Bangladesh Bank, shape the sector. The overall geographic location of the country plays a crucial role in implementing solar energy projects successfully.

The service and industrial sectors significantly contribute to the GDP, with the garment industry playing a key role, especially in export earnings. Despite economic growth, attracting foreign direct investment remains a challenge. The garment and textile industry faces pressure to address environmental impacts due to chemical usage and increased energy consumption, reflecting an intention to transition to more sustainable practices.

#### **BUSINESS OPPORTUNITIES FOR GERMAN SMES IN BANGLADESH**

Bangladesh presents itself as a promising market for German SMEs offering eco-friendly energy solutions. Stable trade relations and German development cooperation have led to an increased focus on renewable energy, good governance, and climate change adaptation. The government's energy strategy aims to attract investments and increase power supply, with special incentives for solar energy, including tax exemptions, profit repatriation facilitations, and allowances for foreign workers. The government also supports the PV industry through a program offering a 10% cash incentive to solar module exporters. Establishing an energy company requires proper registration and adherence to approval procedures, with foreign investors enjoying full protection and non-discriminatory treatment. The country's significant renewable energy potential and favourable policies provide attractive investment opportunities in the energy sector.

wicklung von Solar-PV bietet klare Vorteile, darunter die Deckung des steigenden Energiebedarfs, die Reduzierung von Importabhängigkeit und die Minderung der Auswirkungen volatiler fossiler Brennstoffpreise.

Die Umsetzung von PV-Solarprojekten nimmt allmählich zu, insbesondere bei Großprojekten und Aufdachanlagen. Attraktive Solarmodulpreise und Investitionsmöglichkeiten prägen den Sektor, unterstützt durch lokale Finanzierungsmodelle und -programme sowie grüne Finanzierungsinstrumente der Bangladesh Bank. Die allgemeine geografische Lage des Landes spielt eine entscheidende Rolle bei der erfolgreichen Umsetzung von Solarenergieprojekten.

Der Dienstleistungs- und Industriesektor leistet einen bedeutenden Beitrag zum Bruttoinlandsprodukt, wobei die Bekleidungsindustrie eine Schlüsselrolle vor allem im Exportgeschäft spielt. Trotz wirtschaftlichen Wachstums bleibt die Anziehung ausländischer Direktinvestitionen eine Herausforderung. Die Bekleidungs- und Textilindustrie strebt verstärkt nachhaltige Praktiken an, um Umweltauswirkungen durch den Einsatz von Chemikalien und den erhöhten Energieverbrauch zu reduzieren.

#### **GESCHÄFTSMÖGLICHKEITEN FÜR DEUTSCHE KMU IN BANGLADESCH**

Bangladesh präsentiert sich als vielversprechender Markt für deutsche KMU, die klimafreundliche Energielösungen anbieten. Die stabilen Handelsbeziehungen und die deutsche Entwicklungszusammenarbeit haben zu einem verstärkten Fokus auf erneuerbare Energien, gute Regierungsführung und Klimawandelanpassung geführt. Bangladesch zielt darauf ab, Investitionen anzuziehen und die Stromversorgung zu erhöhen, wobei besondere Anreize für Solarenergie geschaffen werden. Dazu zählen beispielsweise Steuerbefreiungen, Erleichterungen bei der Gewinnrückführung und Zulagen für ausländische Arbeitnehmer,

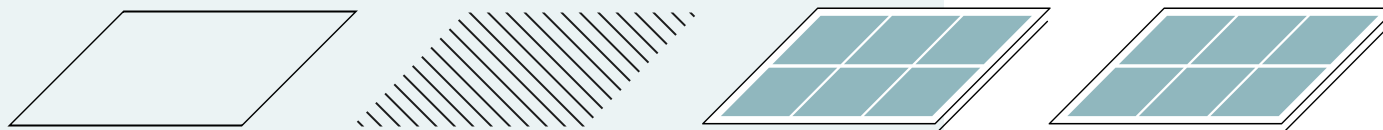
As local solar providers cover only a small portion of the demand (less than 2% annually), excellent business opportunities arise for German SMEs. Leveraging their expertise, German SMEs can meet the needs of the local industry, build long-term relationships, and position themselves as leaders in the emerging solar market before it becomes saturated by local companies. This not only contributes to accelerating Bangladesh's energy transition but also strengthens the competitive position of German SMEs.

Recommended market entry strategies include educating potential customers about the benefits of renewable energy, targeting large factories for rooftop solar solutions, and providing comprehensive solutions for solar projects. Hence, addressing the existing challenges by offering the solutions, the investors can ensure successful market entry and sustainable growth.

sollen die Solarenergieerzeugung fördern. Die Regierung unterstützt die PV-Industrie auch durch ein Programm, das den Exporteuren von Solarmodulen einen Bargeldanreiz von 10 % bietet. Die Gründung eines Energieunternehmens erfordert eine ordnungsgemäße Registrierung und die Einhaltung von Genehmigungsverfahren, wobei ausländische Investoren vollen Schutz und eine nicht diskriminierende Behandlung genießen. Das erhebliche Potenzial des Landes an erneuerbaren Energien und die positiven politischen Rahmenbedingungen bieten attraktive Investitionsmöglichkeiten im Energiesektor.

Da lokale Solaranbieter nur einen geringen Anteil der Nachfrage decken können (weniger als 2 % jährlich), eröffnen sich exzellente Geschäftsmöglichkeiten für deutsche Anbieter. Durch ihre Expertise können deutsche KMU den Bedarf der lokalen Industrie erfüllen, langfristige Geschäftsbeziehungen aufbauen und sich als Marktführer im aufstrebenden Solarmarkt positionieren, bevor dieser von lokalen Firmen gesättigt ist. Dies trägt nicht nur zur Beschleunigung der Energiewende in Bangladesch bei, sondern stärkt auch die Wettbewerbsposition deutscher KMUs.

Empfohlene Markteintrittsstrategien umfassen die Aufklärung potenzieller Kunden über die Vorteile erneuerbarer Energien, die Ausrichtung auf große Fabriken für Aufdach-Solarlösungen und die Bereitstellung umfassender Lösungen für Solarprojekte. Ein erfolgreicher Markteintritt und nachhaltiges Wachstum erfordern die gezielte Bewältigung dieser bestehenden Herausforderungen.



# 1

## Country profile – Bangladesh



## 1.1 General information

Bangladesh came into being as the People's Republic of Bangladesh when Bengali East Pakistan seceded from the union with (West) Pakistan in 1971. The country is situated in the fertile plains of the Ganges (Padma) River delta and borders the Bay of Bengal. It also borders various states of India in the west, north and east and has a short border with Myanmar in the southeast. It occupies an area of 143,998 km<sup>2</sup>; by way of comparison, it is larger than Greece (131,957 km<sup>2</sup>) or slightly smaller than the US state of Iowa (145,746 km<sup>2</sup>). According to the Population and Housing Census of 2022, the country has a population of 165.1 million and a population density of 1,119 per square kilometre<sup>1</sup> (Bangladesh Bureau of Statistics, August 2022).

1 Population and Housing Census 2022, Preliminary Report, Bangladesh Bureau of Statistics, Statistics and Informatics Division, Ministry of Planning, November 2023: [https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b343a8b4\\_956b\\_45ca\\_872f\\_4cf9b2f1a6e0/2023-11-20-05-20-e6676a7993679bfd72a663e39ef0cca7.pdf](https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b343a8b4_956b_45ca_872f_4cf9b2f1a6e0/2023-11-20-05-20-e6676a7993679bfd72a663e39ef0cca7.pdf)

## 1.2 The economy

Bangladesh's economy is the 37<sup>th</sup> largest in the world in nominal terms, and the 25<sup>th</sup> largest according to Purchasing Power Parity (PPP). Pursuant to International Monetary Fund (IMF) estimates, its nominal Gross Domestic Product (GDP) stands at USD 510.4 billion, while the GDP according to PPP was USD 1,496.2 billion. It is also the 2<sup>nd</sup> largest economy in South Asia. Bangladesh is seen by various financial institutions as one of the Next Eleven. As of 2022, Bangladesh had the second largest foreign exchange reserves in South Asia. In 2021, Bangladesh surpassed both India and Pakistan in terms of per capita income.

Bangladesh is one of the most rapidly growing economies in South Asia, with an average annual growth rate of about 6.5% over the past 10 years. Its steady growth can be attributed to its growing service and industrial sectors, export earnings and investment. The country's service sector and industrial sector accounted for 51.24% and 37.65% of the GDP, respectively, in FY 2022-23<sup>2</sup> (Finance Division, Ministry of Finance, June 2023). Exports grew 6.67% year-over-year riding on the extraordinary performance of

2 Bangladesh Economic Review 2023, Chapter Two, Finance Division, Ministry of Finance: June 2023: <https://mof.gov.bd/site/page/44e399b3-d378-41aa-86ff-8c4277eb0990/BangladeshEconomicReview>

the garment sector, according to Export Promotion Bureau (EPB) data. Total investments (public and private) increased by 9% on the preceding fiscal year. However, the investment-GDP ratio reduced slightly to 31.25% in FY 2022-23 from 32.05% in the previous fiscal year<sup>3</sup> (Finance Division, Ministry of Finance, June 2023)<sup>4</sup> (Star Business Report, 2023).

3 Ibid.

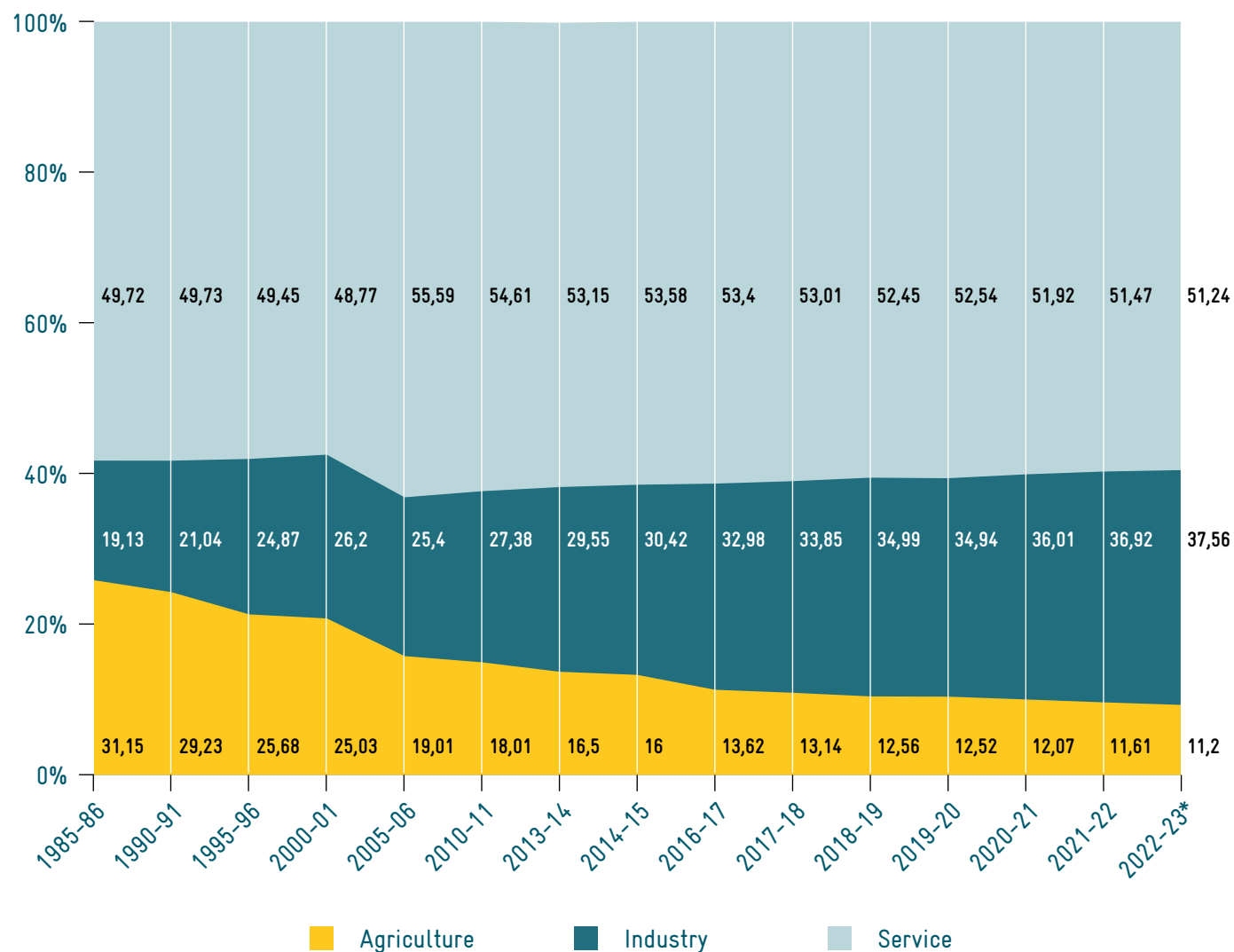
4 Star Business Report, "Bangladesh's growth to slow, unlikely to face recession", The Daily Star, 4 January 2023: <https://www.thedailystar.net/business/economy/news/bangladeshs-growth-slow-unlikely-face-recession-3212101>

## 1.3 Economic structure

### 1.3.1 Structural composition

In FY 2022-23, the agriculture sector's share of the GDP at constant prices dropped to 11.20% from 11.61% in FY 2021-22. The manufacturing and construction sectors' contributions increased to 24.95% and 9.55%, up from 24.29% and 9.54%, respectively, in the previous fiscal year. In the service sector, wholesale and retail trade (15.29%) made the largest contribution, followed by real estate (7.93%) and transport and storage (7.32%). Public administration and defence (3.47%), human health and social work activities (3.46%) and financial and insurance activities (3.17%) followed. The shift from agriculture to industry continued, with a decline in agriculture from 31.15% in 1985-86 to 11.20% in FY 2022-23, while the industry sector's share doubled from 19.13% to 37.56%. The service sector remained relatively stable, accounting for around 51% of the GDP in both FY 1985-86 and the current fiscal year. The structural changes of contribution of major sectors in GDP are shown in Figure 1.

FIGURE 1. Share of the three major sectors at constant prices (FY 1985-86 to FY 2022-23)



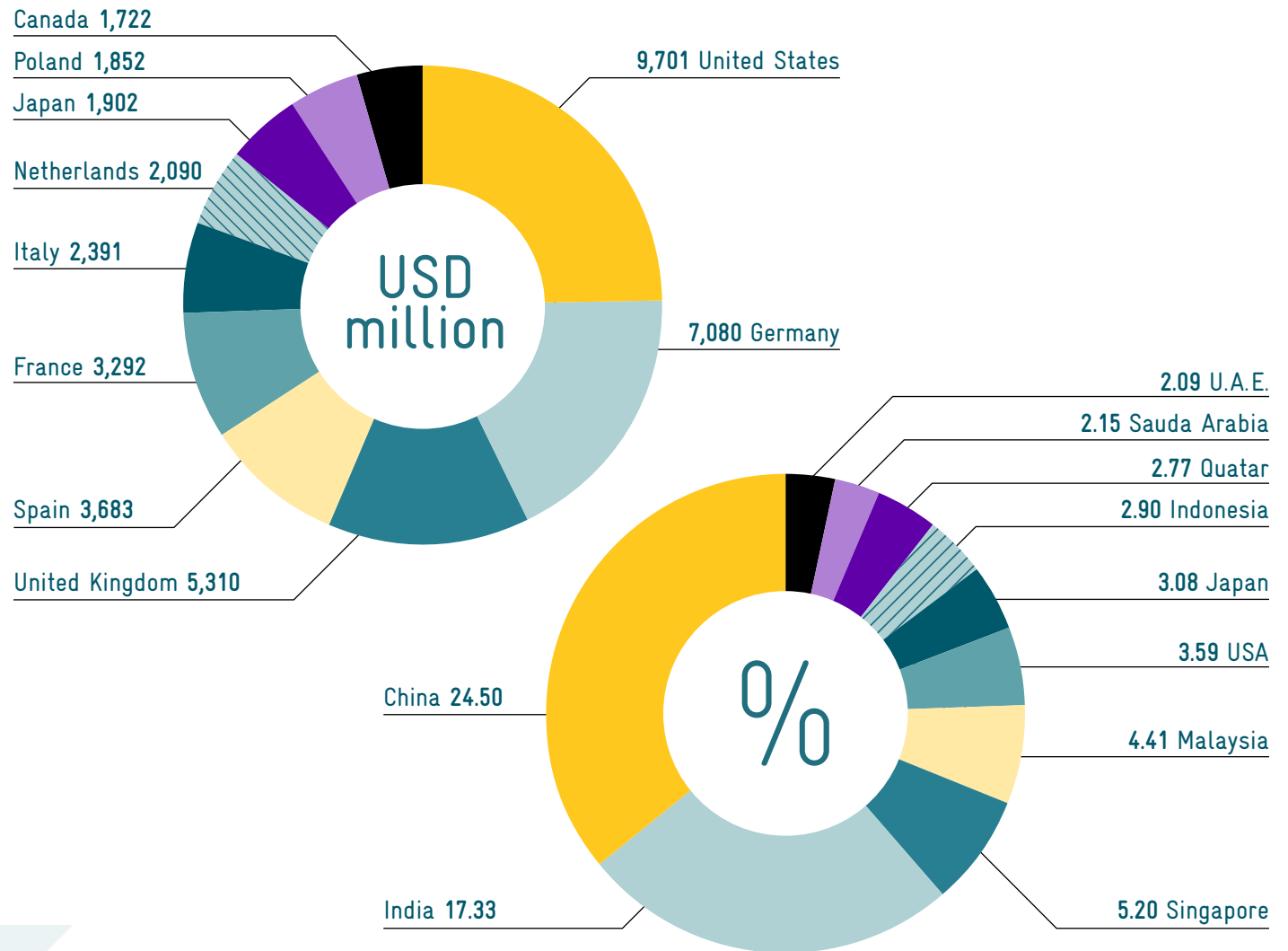
### 1.3.2 International integration

As shown in Figure 2, Bangladesh’s export industry relies heavily on its Ready-Made Garments (RMG) sector, generating USD 46.99 billion in FY 2022-23, with a 10.27% growth in apparel exports. However, other key export sectors such as leather, jute, home textiles, agricultural products and engineering products saw negative growth. Notably, 69.40% of export earnings came from four markets: European Union (45.42%), United States (17.46%), Japan (3.42%) and Canada (3.10%).

According to Bangladesh Bank data, Bangladesh’s major imports in FY 2021-22, among others, included petroleum products worth USD 11.19 billion; textile and articles thereof USD 6.31 billion; iron, steel and other base metals USD 5.91 billion; capital machinery USD 4.90 billion; yarn USD 4.43 billion; raw cotton USD 4.12 billion. The top 10 countries in terms of import value for Bangladesh in FY 2021-22 are presented in Figure 3.

**FIGURE 2. Bangladesh’s exports to top 10 countries, FY 2022-23**

Source: Export Promotion Bureau (EPB) ([https://epb.gov.bd/site/view/epb\\_export\\_data/](https://epb.gov.bd/site/view/epb_export_data/)) (Accessed 25 June 2023)



**FIGURE 3. Bangladesh’s imports from top 10 countries, FY 2021-22**

Source: Bangladesh Bank (<https://www.bb.org.bd/en/index.php/econddata/imprtindex>) (Accessed 25 June 2023)

## 1.4 Trade relations with Germany

Diplomatic ties between Bangladesh and Germany started in 1972, post-Bangladesh's independence from Pakistan. Trade initially faced limitations due to the Multifibre Arrangement (MFA). Notable bilateral agreements include the 1972 Bangladesh-Germany Trade Agreement and the 1981 Bangladesh-Germany Investment Treaty. In 2003, the Bangladesh-German Chamber of Commerce and Industry (BGCCI) was established to assist entrepreneurs in establishing cross-border enterprises. Germany has provided substantial development aid to Bangladesh, with EUR 3.2 billion since 1972, supporting renewable energy, good governance, social and environmental standards, human rights and climate adaptation<sup>5</sup> (BMZ, 2023). In 2021 and 2022, Germany pledged EUR 275.1 million for development cooperation, with an additional commitment of EUR 74 million for 2021. Over the last 28 years, exports from Bangladesh to Germany have grown annually at 12.1%, reaching USD 7.08 billion in FY 2023, while German imports to Bangladesh have increased at an annual rate of 5.97%, almost reaching USD 800 million in FY 2023.

<sup>5</sup> BMZ, German development cooperation with Bangladesh: <https://www.bmz.de/en/countries/bangladesh>

## 1.5 Political stability

In 1971, Bangladesh gained independence from Pakistan. Afterwards, the country went through a challenging period marked by political instability, including autocratic rule and several military takeovers. However, in 1991, Bangladesh successfully transitioned back to a democratic system where citizens vote for their leaders in a parliamentary democracy. Under this electoral system, two major political groups emerged: the Awami League (AL) and the Bangladesh Nationalist Party (BNP). These parties have differing ideologies and often engage in confrontational politics rather than seeking common ground.

In the parliamentary elections of December 2018, the Awami League secured a significant majority, winning 96% of the votes. However, the conduct of these elections faced substantial criticism. The opposition accused the government of manipulating the vote and intimidating critics, leading to violent clashes that resulted in at least 17 fatalities. Prior to the elections, Khaleda Zia, a prominent leader of the opposition from the BNP, was found guilty of corruption and sentenced to over 10 years in prison.

As the political landscape in Bangladesh evolves, it is important for German SMEs to be informed about the upcoming election in January 2024. There are political tensions emerging within the country. The opposition, BNP, has decided to boycott the elections in an attempt to negotiate concessions from the government regarding election management.

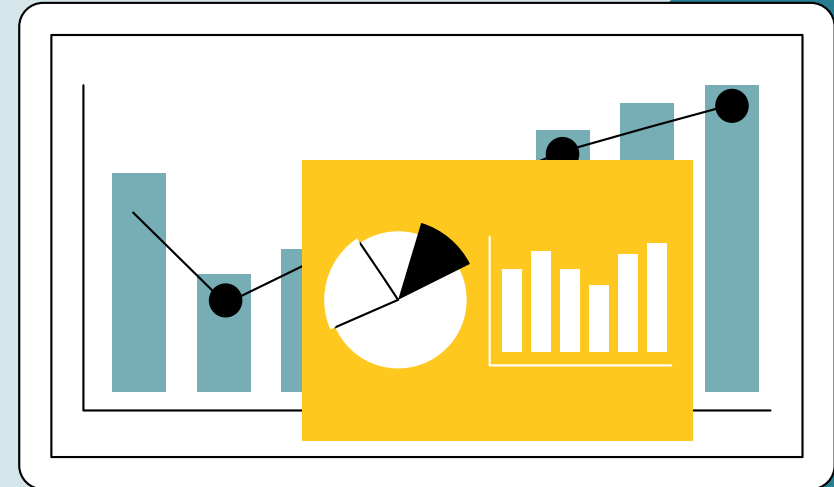
Simultaneously, rising inflation is impacting the daily lives of citizens, leading to increased concerns. Both the BNP and the ruling Awami League (AL) are actively organising large rallies to mobilise their supporters across the nation. However, the current political landscape lacks comprehensive polling data to accurately gauge the state of the play.

A recent study by the International Republican Institute (IRI) (IRI, 2023) sheds light on Bangladesh's political, economic and social dynamics. While citizens express pessimism regarding the economy and the electoral process, the government's focus on infrastructure and development policies has bolstered support for Prime Minister Sheikh Hasina. Despite the growing popularity of the opposition and its calls for a caretaker government, many Bangladeshis remain sceptical of the boycott strategy. Whilst the prevailing pessimism among the public has boosted the opposition's standing, it has not, however, significantly weakened the government's position. Approximately 70% of Bangladeshis believe that Prime Minister Sheikh Hasina is performing well, with majorities approving of the government's policies on various issues, such as access to clean water and education. The 2024 elections carry significant implications for Bangladesh's democratic future. A contentious election that fails to restore public trust could exacerbate disaffection with democracy and further distance Bangladeshis from their democratic traditions.



# 2

## Market opportunities



## 2.1 Opportunities for solar PV investments in Bangladesh

Under the Mujib Climate Prosperity Plan (MCP), Bangladesh has set a revised target of achieving 30% energy from renewable sources by 2030. The national solar energy action plan also calls for around 41 GW of solar power by 2041. According to the Power System Master Plan (PSMP) 2016, total electricity demand in 2030 will be 41,890 MW. As a result, renewable energy power generation capacity will have to reach 12,567 MW. As of 21 June 2023, 10 utility-scale on-grid solar power projects with a total capacity of 460 MW are in operation. The projects under implementation are worth 205 MW. One 60 MW wind power project at Cox's Bazar is being commissioned, while another 2 MW capacity is under construction. There is limited potential for hydro-power since the meteorological conditions of the land have not been considered as suitable for hydroelectric power generation. Therefore, rooftop solar power would be the only option to achieve the growth in renewable energy, and also to reach anything close to the projected target by 2030.

Foreign private investment presents significant opportunities for Bangladesh's renewable energy sector. This could help Bangladesh increase its renewable energy production, reduce its dependence on fossil fuels and reduce its environmental impact. It could also create jobs and attract additional investments,

boosting the country's economy. Such investments can contribute to the country's renewable energy ambitions while fostering economic growth in the country. Bangladesh also needs foreign investment for local capacity building and research and development (R&D) activities.

## 2.2 Prospects & opportunities

### 2.2.1 Industrial renewable energy prospects

The economics of installing a rooftop solar is gradually improving with the decreasing prices of solar power equipment and supportive government policies. At one time, solar-generated electricity was cost-prohibitive; however, it became increasingly attainable as its price fell by about 90% between 2009 and 2019.

In keeping with global trends, per-unit electricity (kWh) generated from rooftop solar systems in Bangladesh has now come down to BDT 5.5-6.5 depending on solar insolation, equipment used and the mode of investment. On the other hand, the price of grid electricity for industrial consumers now averages around BDT 9.85 per kWh (flat rate) depending on the voltage level and time of use. Thus, it makes sense for industrial consumers to set up rooftop solar systems.

Further, the net metering scheme, together with the falling costs of solar power, has created an enabling environment for industrial consumers to monetise unutilised roof space through the installation of rooftop solar systems. Taking advantage of this conducive environment, several industrial consumers have come forward to install rooftop solar systems. For example, one spinning mill installed a 1.1 MWp solar photovoltaic (PV) system with an AC capacity of 1 MW in 2018. The total cost of the project was BDT 89.0 million, of which 20% was equity, while the remaining 80% was financed by Infrastructure Development Company Ltd. (IDCOL). The PV plant would allow savings up to BDT 42,000 per day, while the payback period for the project would be just under 7 years<sup>6</sup> (PSL, 2023). However, available information revealed that the factory saved BDT 6.337 million in electricity costs in eight months spanning from November 2018 to June 2019<sup>7</sup> (Alauddin, 2019).

<sup>6</sup> Source: <https://www.psl dhaka.net/mwp-captive-solar-pv-plant-in-far-east-spinning-industries-ltd-at-habiganjylhet/>

<sup>7</sup> Mohammad Alauddin, "Rooftop solar power: The go-to option for industrial consumers", The Financial Express, 10 Dec 2019: <https://thefinancialexpress.com.bd/views/views/rooftop-solar-power-the-go-to-option-for-industrial-consumers-1575903054>

## 2.2.2 Opportunities for foreign companies

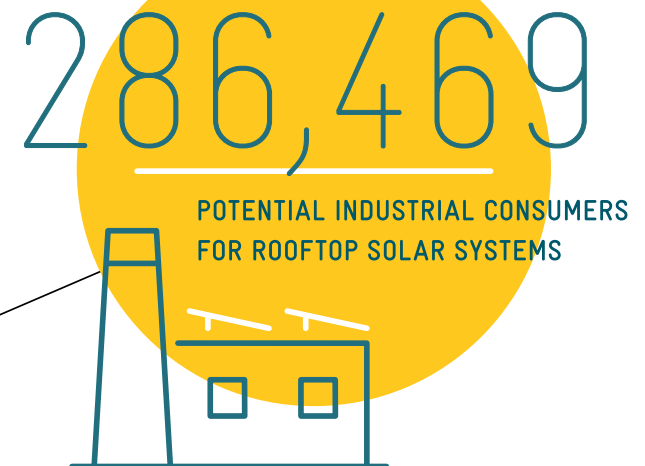
Bangladesh is open to foreign investments in renewable energy (RE), although most people are unaware of the benefits and available opportunities when it comes to using solar and other RE sources. The renewable energy market in Bangladesh is highly competitive, with many local and foreign players, and the energy sector is subsidised by the government. However, the country's local capacity to develop and apply renewable technologies is limited and is not considered as sufficient to handle the needs of time. Foreign investments, grants and technical support are welcomed by the government and other public/private bodies. The requirements, regulations and policies are business-friendly and easy to maintain or comply. Rooftop solar PV systems are also encouraged in the country due to the scarcity of land. To offset the perceived risk, many industries prefer the third-party model – which is sometimes referred to as the “Third-Party Ownership (TPO)” model. This creates value for the consumer and allows the third party to earn money.

## 2.2.3 Rooftop solar power prospects

In Bangladesh, around 286,469 industrial consumers could adopt rooftop solar systems, providing a practical solution given the land shortage<sup>8</sup> (Alauddin, 2019). These modular PV systems are easily adaptable to roofs, granting industries an efficient means to harness solar power, reduce grid electricity reliance and minimise maintenance needs. Roughly 10 square metres of roof space is needed for each 1 kWp rooftop solar system.

Gas and coal prices have surged, threatening to increase Bangladesh's average power generation cost from BDT 8.84 per kWh in FY 2021-22 to a double-digit figure in FY 2022-23. This puts considerable financial strain on the Bangladesh Power Development Board (BPDB), which had an average electricity purchase cost of BDT 11.55 per kWh from Independent Power Producers (IPPs) in FY 2021-22. Coupled with a growing subsidy burden, these factors hint at increased electricity costs for consumers. The 88% hike in gas prices has made captive power generation expensive, with the cost per kWh rising to BDT 6.58, from approximately BDT 3.5 in January 2023<sup>9</sup> (Alam, 2023). Consequently, solar power is becoming a cost-effective alternative for industrial consumers compared to grid electricity and captive generation.

Industrial manufacturers in Bangladesh, in textiles, glass, ceramics and other sectors in particular, often have ample rooftop space and substantial electricity needs. This allows them to adopt solar systems, showcasing their commitment to sustainability and attracting investment and clients. Smaller manufacturers, such as RMG and leather factories, with peak loads of 800 kW to 2 MW, can also benefit from rooftop solar installations. Even small-sized producers, including poultry and agro-processing companies, can find value in adopting rooftop solar solutions, making them viable partners for foreign companies looking to invest in solar power generation through third-party arrangements.

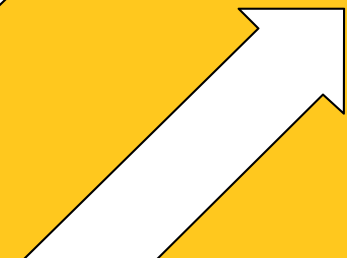
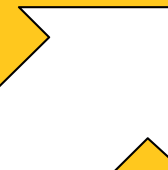
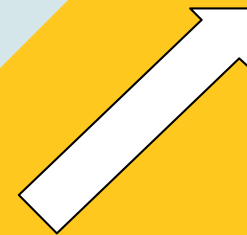


<sup>8</sup> Ibid.

<sup>9</sup> Shafiqul Alam, “Clean energy will reduce our fiscal burden”, The Daily Star, 16 Feb 2023

# 3

Target group in the  
German energy industry



In a world marked by constant technological evolution and sustainable development, the dynamics of business expansion and collaboration have significantly evolved. The solar PV market dynamics in Bangladesh have also been undergoing significant changes and creating massive traction in the adoption of solar PV technology, opening up new opportunities for the solution providers. An energy trade mission tailored to the target group providing solar PV solutions has been designed to cater to the need for solution providers to explore the market. This initiative delves into an exploration of the heart of Bangladesh's burgeoning solar PV industry, with a focus on the Commercial and Industrial (C&I) sector. As we unravel the intricacies of this unique business excursion, we will also explore the technologies, experiences and know-how that are in high demand within the country.

### 3.1 German SMEs in the solar PV sector

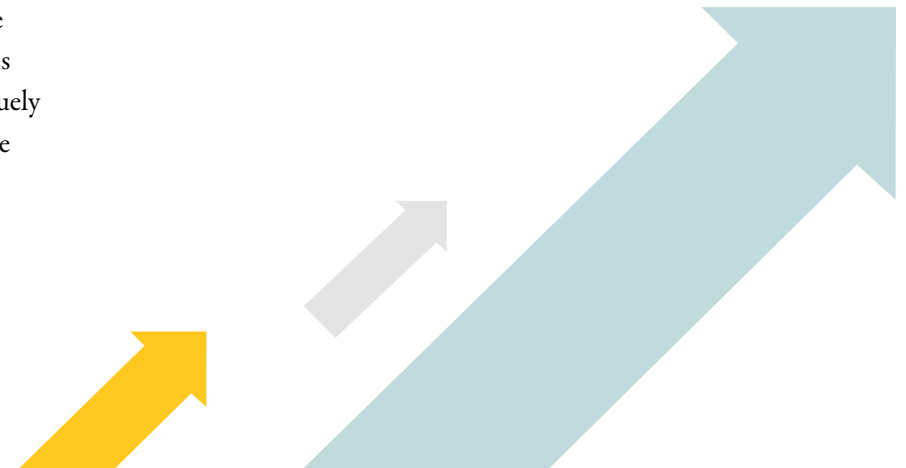
The primary objective of the virtual energy trade mission is to cater to a specific audience –which is specialising in solar PV solutions. Bangladesh's energy landscape has undergone a substantial transformation in recent years, making it an attractive destination for German SMEs seeking growth opportunities. One of the key driving factors is the significant increase in energy prices in Bangladesh, creating a compelling business case for onsite solar PV projects.

The structural shift in energy demand in Bangladesh has been nothing short of remarkable. With the nation's emergence as a favoured sourcing hub for global apparel brands, home to thousands of garment and textile factories, the need for sustainable energy solutions has become paramount. The booming economy predominantly evolving around these industries is now actively seeking ways to reduce energy costs, ensure energy security and align with the climate goals set by international apparel brands. In essence, the virtual energy trade mission targets German SMEs specialising in solar PV solutions, as they are uniquely positioned to provide the much-needed sustainable energy solutions to this booming sector.

### 3.2 The demand for solar PV technology

Within Bangladesh, solar PV technology stands as the cornerstone of the energy trade mission's focus. The forecast for exponential growth in solar PV project implementation in coming years makes this an opportune moment for German SMEs to establish their market presence. Solar PV technology is not just a solution – it's a transformational force that addresses pressing energy challenges while simultaneously contributing to environmental sustainability.

The potential for solar PV technology in Bangladesh extends far beyond traditional applications. Its integration into the Commercial and Industrial sector brings forth a myriad of opportunities. Solar PV systems can power factories, warehouses and commercial buildings, offering a reliable and cost-effective energy source. As businesses seek to reduce their carbon footprint and align with global sustainability initiatives, solar PV technology becomes a critical component in their energy transition.

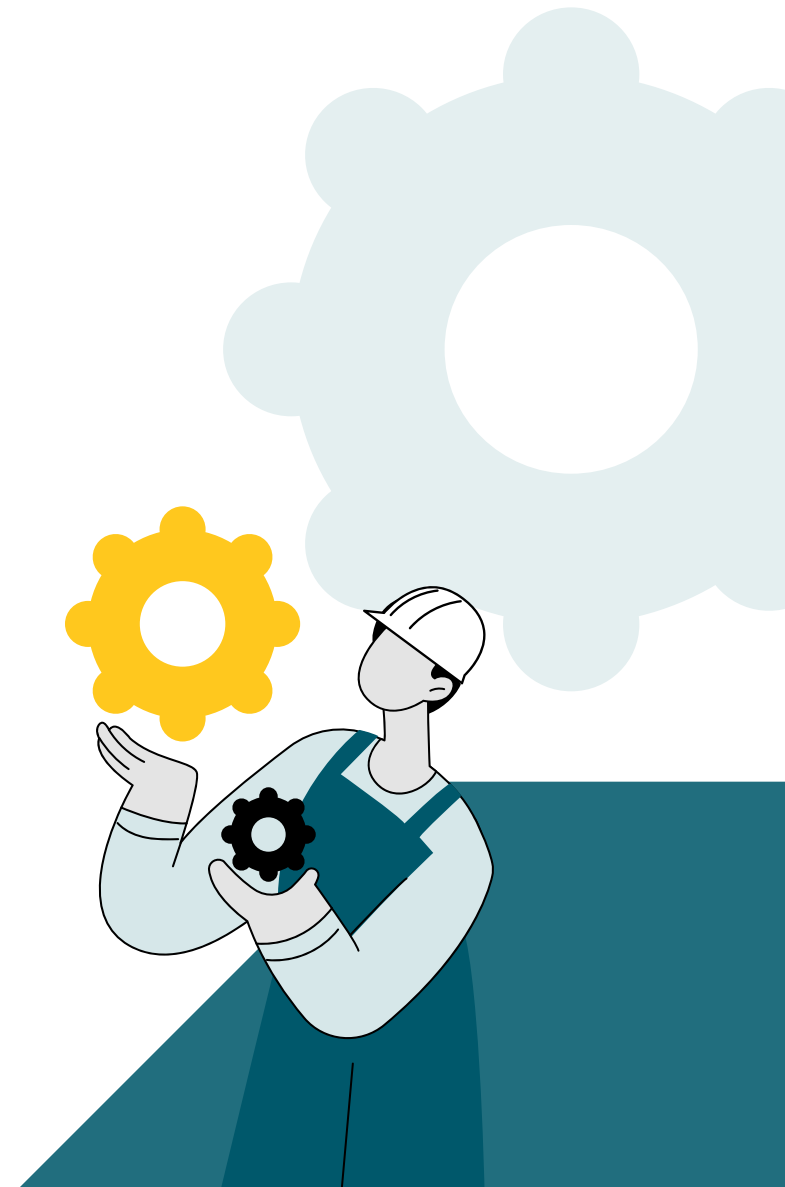


### 3.3 Experience and know-how in demand

Apart from cutting-edge technology, the energy trade mission also places significant emphasis on sharing experiences and know-how. German SMEs specialising in solar PV solutions bring with them a wealth of experience in designing, implementing and maintaining solar PV projects. This expertise is highly sought after in Bangladesh, where the solar PV industry is still evolving.

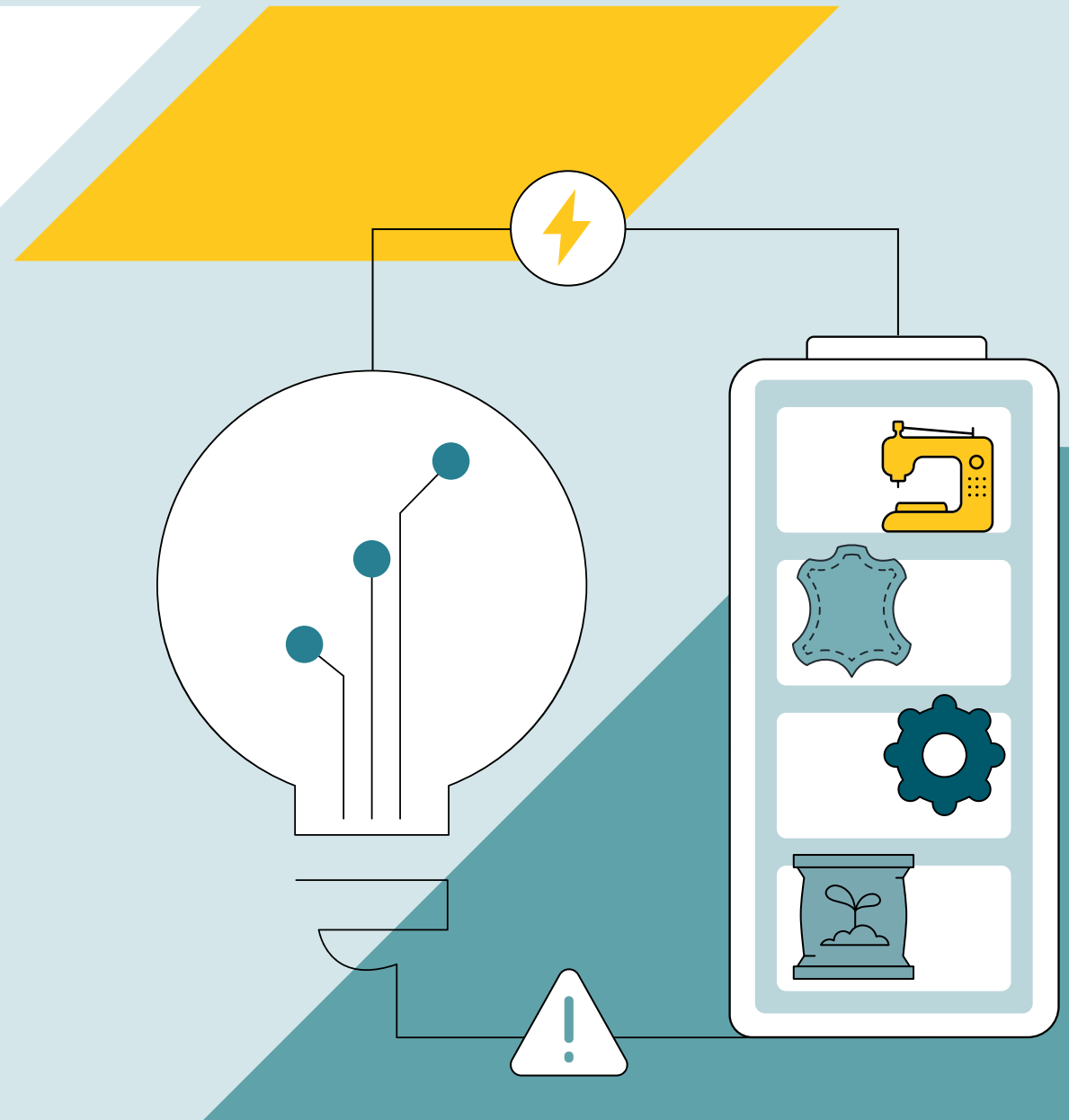
In addition to technical knowledge, the mission provides a platform for cross-cultural exchange and collaboration. Building partnerships and fostering relationships between German SMEs and local stakeholders is crucial to the successful growth of the solar PV industry in Bangladesh. This cultural exchange of experiences and insights enriches both sides, leading to more robust and innovative solutions.

The energy trade mission to Bangladesh is a unique opportunity tailored to German SMEs specialising in solar PV solutions. The target audience comprises those who can provide sustainable energy solutions to the growing Commercial and Industrial sector in Bangladesh. The focus technology is solar PV, which is set to experience exponential growth in coming years. Moreover, the mission emphasises the importance of sharing experiences and know-how, fostering collaborations and contributing to the development of a thriving solar PV industry in Bangladesh. As these German SMEs embark on this journey, they not only tap into a burgeoning market but also play a vital role in shaping the future of sustainable energy in Bangladesh.



## 4

Potential partners and  
competitive environment





## 4.1 Potential partners

The industrial and commercial sectors are the two main electricity consumer classes in Bangladesh. In FY 2021-22, the industrial sector was the second greatest consumer of electricity (28.17%), while the commercial sector was the third (10.86%).

### 4.1.1 Industrial sector

The industrial sector, particularly the manufacturing sector, is the main contributor to economic growth in the country. In its Eighth Five Year Plan (8<sup>th</sup> FYP) (2020-2025), the government articulated plans to increase national employment by creating more job opportunities in the manufacturing sector. To achieve this, the government developed several special Economic Zones (EZs) and Export Processing Zones (EPZs) to attract more investment to the manufacturing sector.



TABLE 1. Manufacturing sector overview

SIZE/CLASS OF MANUFACTURING FACTORIES (Persons engaged)	MICRO (10-24)	SMALL (25-99)	MEDIUM (100-250)	LARGE (250+)	TOTAL
No. of manufacturing enterprises	16,770	23,306	3,178	2,856	46,110
Total persons engaged	259,697	1,043,672	491,870	3,669,923	5,465,162
Electricity & fuel consumption (USD million)	28,419	228,465	192,385	352,175	801,444

Source: BBS, "Survey of Manufacturing Industries-2019", July 2020 ([https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b343a8b4\\_956b\\_45ca\\_872f\\_4cf9b2f1a6e0/2022-02-24-04-32-b25cbe0e82109a3b6eb0b4c76553d206.pdf](https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b343a8b4_956b_45ca_872f_4cf9b2f1a6e0/2022-02-24-04-32-b25cbe0e82109a3b6eb0b4c76553d206.pdf)) (Accessed 26 June 2023)

#### 4.1.1.1 MANUFACTURING SECTOR OVERVIEW

The development of the manufacturing sector has routinely been recognised as the key to inclusive economic growth in Bangladesh. In 2020, the majority of manufacturing industries were either micro or small. Table 1 presents an overview of the country's manufacturing sector, including employment generation, electricity and fuel consumption. Notably, 6 of Bangladesh's top 10 exported items in 2023 – Knitwear, Woven Garments, Leather & Leather Products, Home Textile, Jute & Jute Goods, Engineering Products – hailed from the manufacturing sector (source: Commodity wise export shipments, 2022-23, Bangladesh Bank).

#### 4.1.1.2 ECONOMIC ZONES

A total of 88 EZs have been approved across the country (59 government-owned, 29 private-owned) in a bid to attract more investment and generate more employment. Industries already in operation or being set up in these zones include: garment and garment-supporting industries; agro-products and agro-processing products; leather and leather products; ship building; motor vehicle parts assembly; paint and resin; packaged food and beverages; paper products; plastics; light engineering; pharmaceutical products; power generation; solar parks; construction material production; and IT industries.

Additionally, special tourism parks such as Sabrang Tourism Park, Naf Tourism Park and Sonadia Tourism Park on Sonadia Island, Cox's Bazar, are being developed to accommodate industries as well as eco-tourism. Despite the large number of EZs in operation or being developed, the Bangladesh Economic Zones Authority (BEZA) has not yet made comprehensive statistics on employment, investment, export value and energy and fuel consumption in EZs available for study.

#### 4.1.1.3 EXPORT PROCESSING ZONES (EPZS)

There are eight EPZs scattered across Bangladesh. While data concerning the sizes of individual enterprises is unavailable, the Employee-to-Enterprise (E-to-E) ratio in Table 2 suggests that the majority of EPZs house large industries, assuming that employment distribution among enterprises is equal.

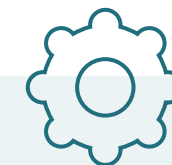


TABLE 2. EPZ overview

NAME OF EPZs	NUMBER OF INDUSTRIES		EXPORT (USD MILLION)	EMPLOYEES	E-TO-E RATIO
	IN OPERATION	UNDER IMPLEMENTATION			
Chattogram EPZ	154	12	36,989.67	170,247	1,106
Dhaka EPZ	92	7	31,645.29	74,374	808
Adamjee EPZ	47	14	6,452.42	57,705	1,228
Cumilla EPZ	46	9	4,409.78	44,255	962
Karnaphuli EPZ	40	5	8,660.51	77,879	1,947
Ishwardi EPZ	20	17	1,224.12	14,948	747
Mongla EPZ	31	8	902.14	8,373	270
Uttara EPZ	24	5	1,768.03	32,359	1,348
Total	454	77	92,051.96	480,140	1,058

Source: Bangladesh Economic Review 2022, Ministry of Finance (<https://mof.gov.bd/site/page/44e399b3-d378-41aa-86ff-8c4277eb0990/BangladeshEconomicReview>) (Accessed 26 June 2023)

#### 4.1.1.4 RMG AND TEXTILE INDUSTRY

Bangladesh's exports are primarily driven by the RMG and textile sector with 4,500 RMG and 1,780 textile industries. Moreover, each of the sectors employs 4 million people. The country exports a large variety of clothing items to nations in many different geographical areas, including North America, Europe, Asia and others. Woven and knitwear are the two main categories into which export goods may often be divided. Notably, the RMG and textile industries together consume 3,740 KTOE of energy annually.

### 4.1.2 Commercial sector

There are as many as 628,000 units of listed domestic companies in Bangladesh<sup>10</sup> (CEIC). However, around 272,598 companies had been registered with the office of the Registrar of Joint Stock Companies (RJSC) as of 30 June 2022. They include 3,631 public limited companies, 197,564 private limited companies, 1,013 liaison offices of foreign companies, 53,600 partnership firms, 1,159 trade organisations and 15,507 societies. Again, many more shops and tiny establishments are operating within the country at grassroots level without registering as a company. They have to obtain trade licences from local government bodies such as city corporations, municipalities and union councils.

Once again, the Wholesale and Retail Trade Survey 2021 provides data on the commercial sector holding the greatest share of contributions to the service sector. The survey focused on the estimates of annual gross output, intermediate consumption, operating cost and the relevant cost of employment and fixed assets as well as capital expenditure. The findings from this survey revealed that there were 2.54 million establishments in this sector. The total number of persons engaged was more than 9 million and the average establishment size was 3.62 persons.

Many commercial businesses in Bangladesh operate from small rented or owned spaces within commercial complexes, which makes promoting rooftop solar energy challenging, as they often lack awareness of its benefits and are not easily identifiable as potential stakeholders.

However, there is great potential for rooftops in large commercial establishments such as universities, hospitals, hotels, etc. There are 84 general universities, 11 science and technology universities and 7 specialised private universities. Following the instructions of the University Grants Commission, each university has a large independent campus with thousands of square feet in roof space. A few universities have moderate rooftop solar systems, while two others, when contacted, expressed a keen interest in going away with such an installation.

In Bangladesh, there are 255 government hospitals, around 5,000 private hospitals and clinics and approximately 10,000 diagnostic centres. Government hospitals are crucial for negotiation. Among private facilities, smaller ones in rented spaces are unsuitable for rooftop solar systems. The focus should be on large multi-speciality hospitals, foundation-run specialised hospitals and private medical college hospitals. There are approximately 150 large, profitable, private tertiary care hospitals, and two in Dhaka have expressed an interest in collaborating with German companies for rooftop solar installations.

Furthermore, according to the Hotel and Restaurant Cell of the Ministry of Civil Aviation and Tourism (MOCAT), 17 five-star hotels and 594 2-, 3- and 4-star hotels and resorts are currently running in Bangladesh. The majority of them are situated in independent buildings and, in some cases, in large areas with a beautiful landscape. Many of them are expected to be interested in installing solar PV systems on their rooftops to create a reliable source of electricity – primarily to meet their regular demands.

<sup>10</sup> Source: CEIC Data: <https://www.ceicdata.com/en/bangladesh/financial-sector/bd-no-of-listed-domestic-companies-total>

### 4.1.3 Potential partner in the C&I sector – garment and textile sectors

The growth of Bangladesh's garment and textile industry relied on low-cost natural gas and electricity, alongside a competitive edge from abundant cheap labour. In early 2023, electricity prices surged three times, up by approximately 29% on pre-pandemic levels (March 2020). The cost of natural gas for captive power rose by 88% in January 2023. Large, medium and small and cottage industries faced even steeper gas price hikes of 150%, 155% and 178%, respectively. Diesel prices also surged by 42.50%. These substantial energy price increases are significantly inflating production and transportation costs in the garment and textile sectors. The industry grapples with reduced overseas demand and this escalating production cost, with the latter posing a more significant threat.

Moreover, the power crisis situation has abundantly amplified the problem. In fact, the garment and textile sectors are struggling to continue operating manufacturing units as the energy crisis and frequent power outages hit the industrial sector across the country. The factories cannot be run properly and many production lines remain idle because of power supply shortages. Consequently, the factories end up cutting down production by almost 50% due to frequent load shedding. The pinch can even be felt in Dhaka, while the situation is worse outside the capital.

This energy crunch created by exorbitant price hikes and frequently interrupted services is severely damaging the RMG and textile industry as production costs are spiralling. In addition, there is a challenge for the apparel industries to present themselves to the buyers as an acceptable, reliable and green platform. Despite the challenges above, garment owners are motivated by green garments for the purposes of environmental safety, safe workspaces, reduced energy consumption and factory reputation. Buyers anticipate that apparel manufacturers should prepare to address the environmental consequences of a rapidly expanding industry. Factories should operate effluent treatment plants (ETPs), use renewable energy and install energy-effective technology to render the business environmentally friendly. In compliance, the garment's entrepreneurs understand that green practice is one of the best effective methods.

Several RMG manufacturers embraced eco-friendly practices and efficient production technology, spearheaded by the BGMEA. The "Towards Resource Efficient and Environmental Sustainability (TREES)" programme, launched in 2014 in partnership with GIZ Bangladesh, marked a significant step. In recognition of its commitment to green development, BGMEA was honoured with the "USGBC Leadership Award" from the United States Green Building

Council (USGBC) in 2021<sup>11</sup> (Alam, How efficiency, renewable energy can help RMG industry retain post-LDC competitiveness, 2021). More than 200 RMG establishments are now certified under the Leadership in Energy and Environmental Design (LEED) and, reportedly, several other RMGs are expected to achieve this feat in the foreseeable future. Green garment factories in Bangladesh rely on solar power and leverage net metering for enhanced efficiency. They are actively adopting advanced techniques for renewable energy, emphasising the significance of renewable power facilities in achieving green factory certification.

The findings of a study conducted by Finland's University of Jyväskylä suggest that garment owners are mainly motivated to achieve green garments for the purposes of environmental safety, safe workspaces, reduced energy consumption and factory reputation. The collective efforts made by producers, buyers, international agencies and the government can make the sector green and sustainable<sup>12</sup> (Kaizer, 2020).

11 Shafiqul Alam, "How efficiency, renewable energy can help RMG industry retain post-LDC competitiveness", *The Business Standard*, 10 August 2021: <https://www.tbsnews.net/features/panorama/how-efficiency-renewable-energy-can-help-rmq-industry-retain-post-ldc>

12 THM Kaizer, "Green Garment Factories in Bangladesh: Motivation and Challenges", School of Business and Economics, University of Jyväskylä, Finland, 2020: <https://jyx.jyu.fi/bitstream/handle/123456789/69301/1/URN:NBN:fi:jyu-202005283558.pdf>

## 4.2 Competitive environment – local capacity for the implementation of solar PV projects

In Bangladesh, all proposals for large-scale ground-mounted PV projects require mandatory Engineering, Procurement and Construction (EPC) partner(s) to have some specific experience to qualify. As a result, owing to contractual obligations there are EPC partners from overseas; however, in addition, local technology companies have played an active role in installation and commissioning.

Over the last 10 years, engineering companies with a focus on Solar PV have developed themselves to compete with global standards. Some of them have already participated in installations in other countries. They have developed a team of technical personnel with the necessary knowledge and skill for Installation and Commissioning (I&C) as well as Operation and Maintenance (O&M). Most of the EPCs have developed themselves with the capacity to execute multiple projects with active support from equipment manufacturers.

### 4.2.1 EPC services

As already mentioned, solar PV has continued to become cost-competitive and the industry is experiencing a significant rise throughout the world. At the same time, solar PV has established itself as the leading source in “new” electricity generation technologies with over 100 GW of new capacity additions worldwide in each of the last three years<sup>13</sup> (Chowdhury, 2021). Bangladesh is also not lagging behind. It has set ambitious targets to increase its share of the contribution to renewable energy, particularly solar PV, in its total power generation portfolio. However, the availability of comprehensive EPC services is a matter of great concern for Bangladesh.

The Sustainable Renewable Energy Development Authority (SREDA) lists as many as 51 EPC service providers for solar installations in Bangladesh. A link to access the list is provided in [Annex 8](#). Out of the 51 EPC companies, the list appears to include only one company of foreign origin. That is Supernova enterprise from Dubai, United Arab Emirates (UAE). Although there is no reliable information available, it is understood that two thirds of the EPC companies listed by SREDA are not regularly active in the

field. Experts feel that the available EPC capacity in Bangladesh is very limited. Notably, as per the Mujib Climate Prosperity Plan 2022-2041 published in 2022, the country targets 16 GW RE capacity (target of 30%) in 2031 and 40 GW RE capacity (target of 40%) in 2041. Subsequently, in January 2023, State Minister to the Ministry of Power, Energy and Mineral Resources Nasrul Hamid announced that the government aims for 40% clean energy by 2041, with 10% coming from RE sources. Industry experts believe the recent statement from the government is practical and realistic, considering 820 MWp on-grid solar system has been installed so far. In order to achieve these targets, the demand for EPC services in future will increase manifold, and the local EPC service providers will be unable to cope with the situation. The government also recognises the problem and invites international service providers of EPC services to solar PV projects.

In fact, the government plans to create a sustainability culture through all of its energy initiatives. Training programmes and capacity-building initiatives should empower local experts, engineers, policy-makers and researchers with the necessary skills and knowledge in RE technologies, project management, policy analysis and market forecasting. These initiatives are also expected to promote gender inclusivity – equal opportunities for women in the energy sector.

13 Shahriar Ahmed Chowdhury, “Draft Solar Energy Roadmap 2021–41: Even More Ambitious Target can be Achieved”, Energy & Power Magazine, 20 March 2021: <https://ep-bd.com/view/details/article/NTkyNg%3D%3D/title?q=Draft+Solar+Energy+Roadmap+2021-41%3A++Even+More+Ambitious+Target+Can+Be+Achieved>

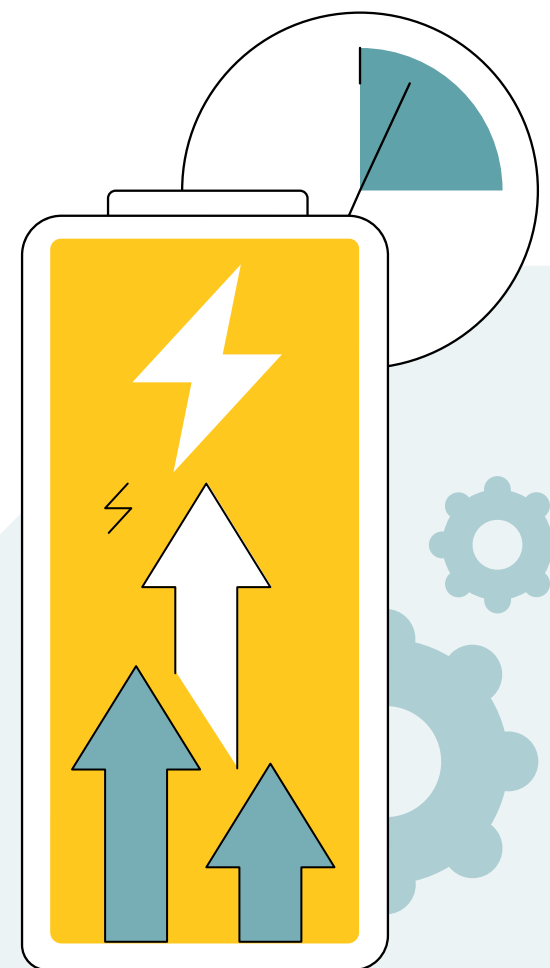
### 4.2.2 O&M services

Dependable operation and maintenance (O&M) staff, strategies and practices are essential to the reliability, performance and profitability of solar PV power plants. The owners and investors of solar power plants depend on qualified contractors to provide qualified O&M services to keep plants up and running. However, solar power plants require very little maintenance as there are no moving parts. Notably, the EPCs also offer O&M services to the project sponsors who wish to outsource O&M contracts. With Bangladesh being the emerging market for solar PV, all of the global equipment/EPCs are taking interest in this market. Some of the renowned equipment manufacturers have either their own presence or local agents with the required skilled manpower. Most of them are from China, such as SUNGROW, TBEA, HUAWEI, etc. European inverter manufacturers such as SMA Solar Technology AG from Germany, FRONIUS PRIMO from Austria, Asea Brown Boveri (ABB) and Fimer S.P.A., a Sweden-Italy joint venture, etc., have their own partners with the required skill set.

Local EPC contractors act as official dealers of the equipment and provide end-to-end turnkey project execution. Demand for European products persists<sup>14</sup> (Kaisar, 2023). However, an unsatisfactory after-sales service has hampered the demand for the products.

### 4.2.3 Prospects of value addition in a competitive environment

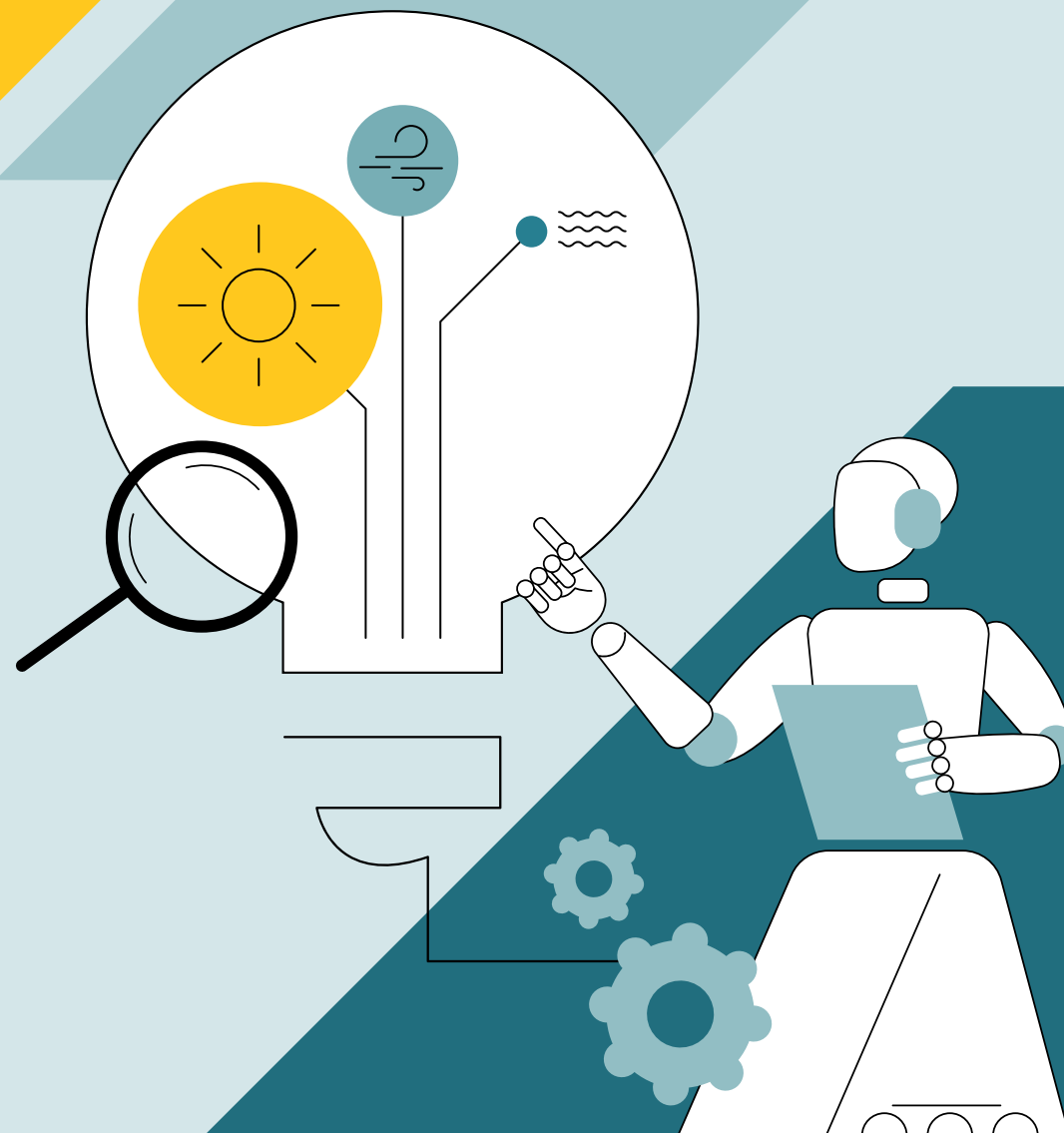
As Bangladesh strides towards its renewable energy goals, the competitive landscape in the solar PV sector is rapidly evolving. The emergence of local engineering companies and EPC service providers with global standards of excellence signifies the country's growing expertise in renewable energy. However, there remains a pressing need to expand EPC capacity to meet the surging demand, given the ambitious targets set by the government. Additionally, reliable O&M services are vital to ensure the longevity and efficiency of solar power plants. With both local and international players vying for a share of this burgeoning market, Bangladesh stands at a crossroads of opportunity and challenge. Strengthening local capacity while fostering international collaboration will be instrumental in propelling the nation toward its sustainable energy aspirations.



<sup>14</sup> Fahmid Kaisar, LightCastle Analytics Wing, "Solar Energy Landscape of Bangladesh", LightCastle Partners, 7 March 2023: <https://www.lightcastlebd.com/insights/2023/03/solar-energy-landscape-of-bangladesh/>

# 5

## Technical solutions





The consideration of solar energy as a technical solution has emerged as a pivotal response to Bangladesh's pressing energy challenges. With a total installed capacity of 1,183.65 MW, renewable energy, particularly solar power, has gained prominence as a means to address the nation's energy demands while simultaneously addressing macroeconomic factors. This section explores why solar energy is at the forefront of technical solutions, shedding light on its potential to revolutionise the country's energy landscape.

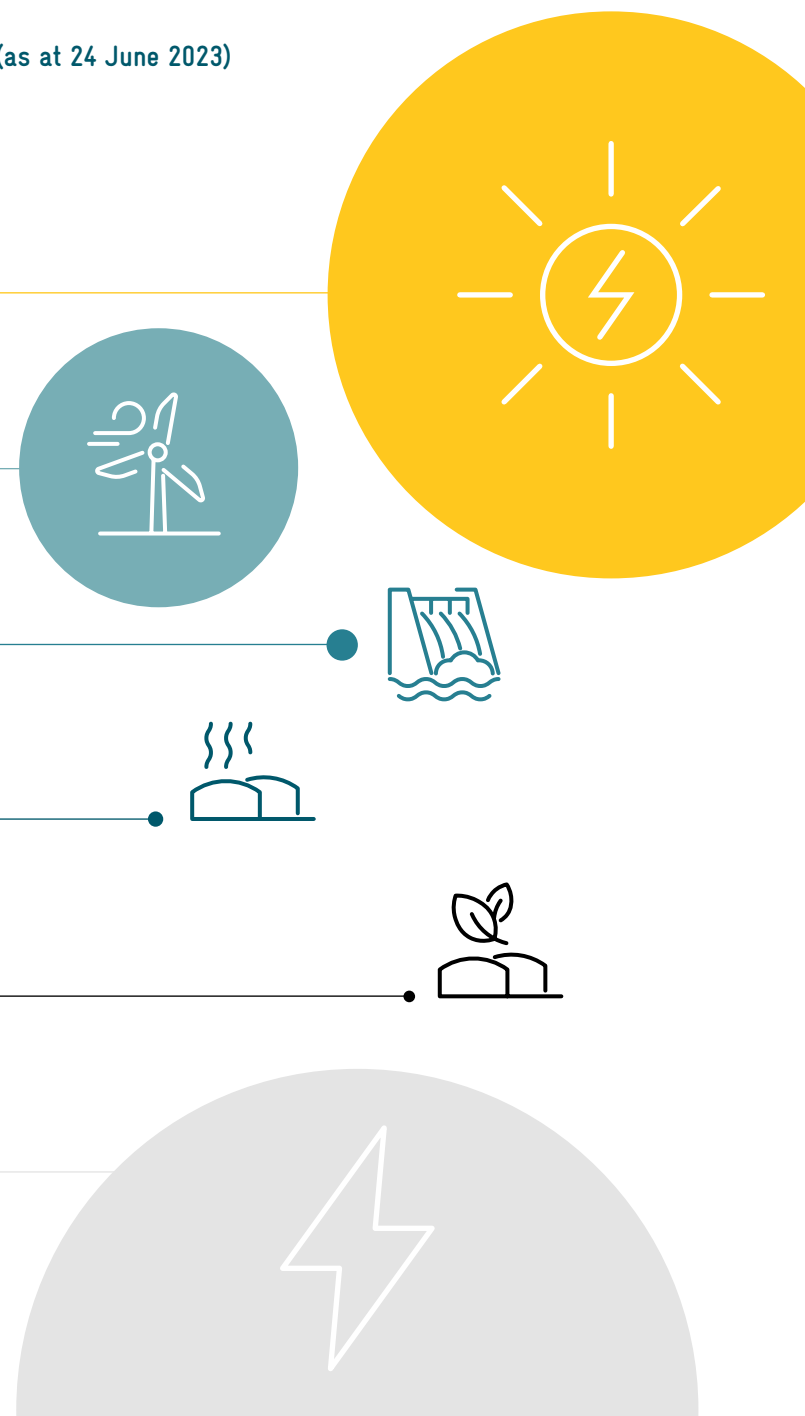
## 5.1 Renewable energy in Bangladesh

The total installed capacity of renewable energy (in all forms) in Bangladesh is 1,183.65 MW, of which 368.60 MW is off-grid and 815.05 MW is grid-connected. The installed capacity for renewable-based power generation in Bangladesh is presented in Table 3.

**TABLE 3. Renewable energy installed capacity in Bangladesh (as at 24 June 2023)**

TECHNOLOGY	OFF-GRID (MW)	ON-GRID (MW)	TOTAL (MW)
SOLAR	365.51	584.15	949.66
WIND	2.00	0.90	2.90
HYDRO	0	230.00	230.00
BIOGAS TO ELECTRICITY	0.69	0	0.69
BIOMASS TO ELECTRICITY	0.40	0	0.40
<b>TOTAL</b>	<b>368.60</b>	<b>815.05</b>	<b>1,183.65</b>

Source: BSREDA: <http://www.renewableenergy.gov.bd/> (Accessed 16 July 2023)



### 5.1.1 Macroeconomic advantages of solar PV

Among the different forms of RE potential, at present, solar energy seems to have the greatest potential with biomass and biogas having some limited applications. Encouraged by the success of Solar Home Systems (SHS), the government initiated several programmes such as Solar Irrigation, Solar Mini/Microgrid, Solar Park, Roof-top solar, Solar PV based Boats and so on. The macroeconomic advantages of the solar PV sector in Bangladesh are briefly mentioned as follows.

#### 5.1.1.1 ADDRESSING THE INCREASING ENERGY DEMAND IN FUTURE

The future demand for electricity in the country will be radically shifted upwards. According to the PSMP-2016, the structure and composition of electricity demand will be transformed with the changes in economic activities. The transition in power demand at intervals of five years from 2015 to 2041 suggests that there is a rise in power demand, and a change from the daily power demand of evening peak to the daily power demand of daytime peak in conformity with the changes in the daily load curve as shown in Figure 4.

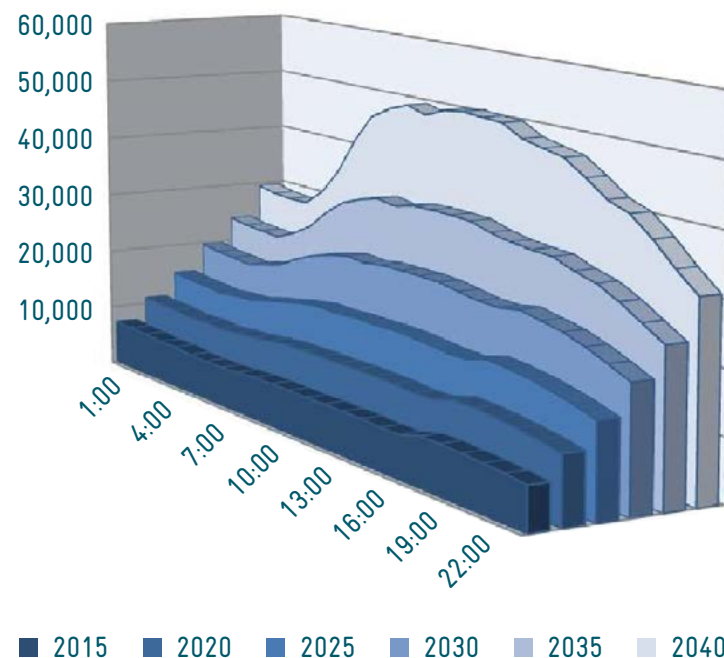
### 5.1.1.2 DEPENDENCE ON ELECTRICITY IMPORTS FROM NEIGHBOURING STATES

Owing to the limitations of the primary fuel resources, Bangladesh has decided to diversify its power generation capacity to ensure security of supply. Regional energy import is a big part of that diversity and in the Power System Master Plan 2016 it is set to be around 15% of the total energy mix. The government considers cross-border electricity trade as a win-win solution. As part of the energy mix policy up to 2041, the country has planned to import around 9,000 MW of electricity from neighbouring countries under the umbrella of cross-border cooperation.

Bangladesh imported a total of 1,160 MW of electricity from India in FY 2021-22. Of late, it has started to import another 1,600 MW of electricity from Adani Godda coal-fired power plant in Jharkhand, India. Another purchase agreement is in its final stage, with the aim of importing 500 MW of electricity from Nepal's 900 MW hydroelectric power plant to be developed by India's GMR Group.

Thus, power imports have seen a spike, although about 44% of the installed capacity remained unused in FY 2020-21. Moreover, in the seven years following the beginning of imports until 2020-21, Bangladesh spent BDT 18,128 crore on purchasing electricity and about BDT 6,000 crore on paying the fixed cost for power plants that have never been used, all in

FIGURE 4. Estimated power demand in Bangladesh (unit: MW), 2015-2041



Source: PSMP 2016 ([https://powerdivision.portal.gov.bd/sites/default/files/files/powerdivision.portal.gov.bd/page/4f81bf4d\\_1180\\_4c53\\_b27c\\_8fa0eb11e2c1/\(E\)\\_FR\\_PSMP2016\\_Summary\\_revised.pdf](https://powerdivision.portal.gov.bd/sites/default/files/files/powerdivision.portal.gov.bd/page/4f81bf4d_1180_4c53_b27c_8fa0eb11e2c1/(E)_FR_PSMP2016_Summary_revised.pdf)) (Accessed 16 July 2023)

foreign currency. In view of the currently strained situation in the case of forex reserves, it is unlikely that Bangladesh will be able to bear the burden of making payments in foreign currency in future. In addition, the average imported electricity price is going up, with Adani Power going on line.

### 5.1.1.3 UNSTABLE FOSSIL FUEL PRICES

The COVID-19 pandemic and the Russia-Ukraine war have significantly impacted the global market by driving prices of fossil fuels to record levels. Crude oil topped USD 104.79 per barrel on 7 July 2022, while the open market price of Liquefied Natural Gas (LNG) rose more than sixfold to USD 36 per MMBtu on 24 February 2021. This has created unbearable pressure on the already strained Bangladesh forex reserve, and has surely highlighted the risks associated with fossil fuel reliance and the need for local renewable energy production. More importantly, the oil price shocks from the 1956 Suez crisis to OPEC's decision to cut production at the start of the COVID-19 pandemic in 2020, and many instances in between, were typically the result of geopolitical conflicts or global supply shortages.

Currently, Bangladesh is dealing with an energy supply deficit created by a heavy reliance on fossil fuels. The government stopped buying LNG in June, affecting the gas supply to power plants and leading to rolling blackouts. It is also working to curb electricity demand to meet production. Shops and shopping centres have been ordered to close by 8 p.m., and government offices have been told to reduce electricity consumption by 25%. However, for a developing nation that relies on exporting consumer goods, curbing power consumption has directly impacted its productivity. Bangladesh, like other countries in

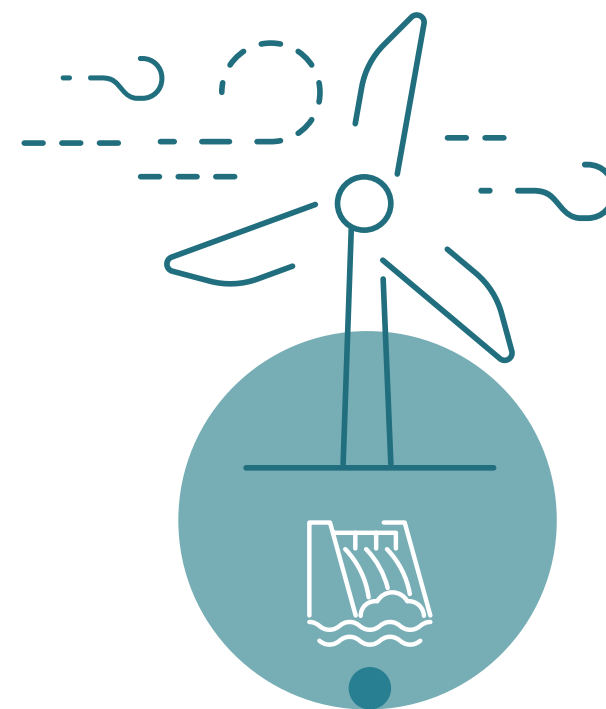
the region and farther afield, has felt the impacts of fossil-fuel dependency. The inherent lack of energy security and the price volatility of fossil fuels is more apparent than ever. In this context, Bangladesh needs to diversify its energy mix and invest more in renewables<sup>15</sup> (Koons, 2023).

### 5.1.1.4 LIMITED POTENTIAL OF HYDRO POWER AND WIND POWER

Due to its geography and topography, Bangladesh is not endowed with much hydropower potential, especially in its predominately flat terrain. Thus, plains and a lack of available (water) heads have restricted hydropower development in the country<sup>16</sup> (Ahmed, 2008). Furthermore, wind has always been a problematic resource to evaluate in the context of Bangladesh. Experts believe that the wind potential in Bangladesh, especially onshore, is limited, and the offshore potential is unknown, even though there has been mention of unsubstantiated claims of huge potential<sup>17</sup> (Ijaz Hossain, 2022). In financial terms, it is difficult to comment on this in the absence of comprehensive environmental and technical in-

vestment-grade studies on offshore wind potential. However, according to SREDA, the potential for wind energy is still being studied<sup>18</sup> (SREDA, 2021) and wind data are being collected from 13 locations across the country.

Thus, renewable energy provides many direct and indirect economic benefits at both micro and macro level, from allowing consumers to obtain uninterrupted clean electricity supply, reducing grid consumption of electricity, reducing fossil fuel costs,



15 Eric Koons, "Energy Crisis in Bangladesh Highlights Risks of Fossil Fuels", Energy Tracker Asia, 21 March 2023: <https://energytracker.asia/energy-crisis-in-bangladesh-highlights-risks-of-fossil-fuels/>

16 M. A. Wazed and S. Ahmed, "Micro Hydro Energy Resources in Bangladesh: A Review", Australian Journal of Basic and Applied Sciences, 2008: <http://www.ajbasweb.com/old/ajbas/2008/1209-1222.pdf>

17 Dr Ijaz Hossain and Ishtiaq A. Chisti, "The future of renewable energy in Bangladesh", The Daily Star, 19 February 2022: <https://www.thedailystar.net/recovering-covid-reinventing-our-future/developing-inclusive-and-democratic-bangladesh/news/the-future-renewable-energy-bangladesh-2965606>

18 Source: SREDA: <http://www.sreda.gov.bd/site/page/e2e11971-0e8e-4ef7-b764-f5e09d21f73b/->

reducing the carbon footprint, reduced dependence on power imports from neighbouring countries and, at the same time, being hedged to an extent resulting from the instability of the volatility of the global fossil fuel prices. Notably, renewable energy sources have qualities that make them a more stable source of energy than petroleum and natural gas, which can in turn have a positive impact on overall price stability<sup>19</sup> (Karlsson, 2022), as explained below:

First, while petroleum must constantly be discovered and extracted, renewable energy is, by definition, naturally replenishing – the sun shines and the wind blows every day. Once capital is invested in the infrastructure to capture renewable energy and convert it into electricity, there are no fuel costs.

Second, universal and widespread access to sun and wind limits the possibility that expanding renewable energy production would mimic the geopolitics of the fossil fuel industry – the cause of a great deal of fossil fuel production and price volatility.

Lastly, rapid transition to renewable energy will slow and minimise further warming of the climate.

### 5.1.2 Natural solar resources in Bangladesh

Due to the favourable geographical location and direct sunlight all year round, research on solar energy implementation in Bangladesh is highly lucrative. Bangladesh has the potential to generate electricity from solar resources due to its geographical location. An ongoing report directed by the Renewable Energy Research Centre found that Bangladesh receives the most extreme solar radiation during spring (March–April), with the lowest levels in winter (December–January). The average national solar radiation ranges from 4–6.5 kWh/m<sup>2</sup> per day<sup>20</sup> (Rahman, 2021). Figure 5 shows a solar map of Bangladesh, demonstrating that solar radiation is in the range of 4–5 kWh/m<sup>2</sup> per day in approximately 94% of Bangladesh. Approximately 6.5 hours of daylight are available throughout the day, and the national average solar radiation is 0.2 kW/m<sup>2</sup> per year<sup>21</sup> (Denich, 2010). Accordingly, the nation's yearly theoretical solar energy capacity is 70,000 terawatt-hours (TWh), surpassing the current production capacity by 1,500 times<sup>22</sup> (Md. Alam Hossain Mondal, 2010).

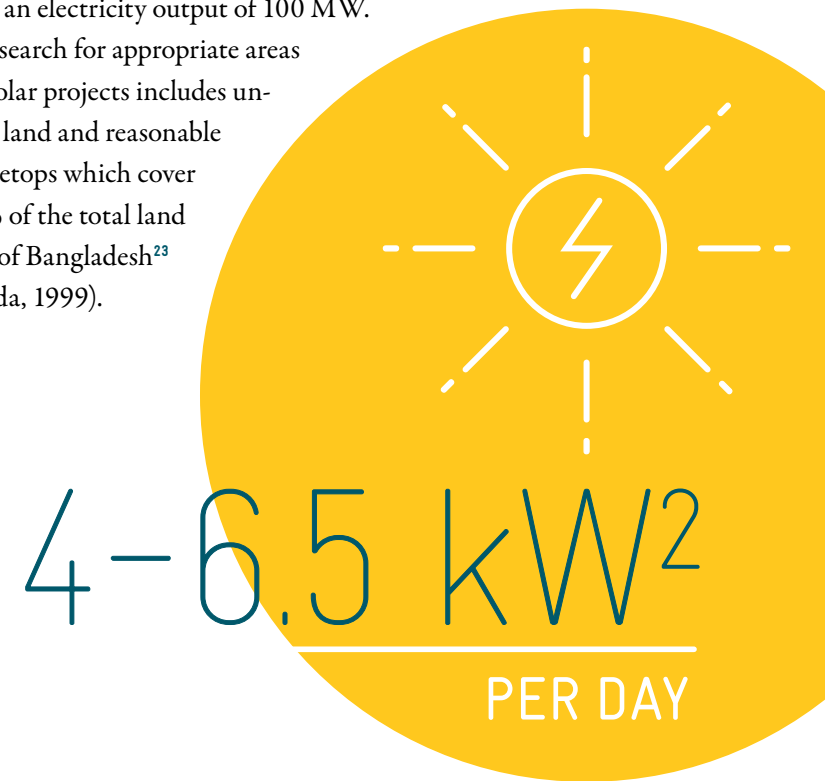
20 S. Hossain and M. M. Rahman, "Solar Energy Prospects in Bangladesh: Target and Current Status", *Energy Power Engineering*, 2021: <https://www.scirp.org/journal/paperinformation.aspx?paperid=111249>

21 M. A. H. Mondal and M. Denich, "Assessment of Renewable Energy Resources Potential for Electricity Generation in Bangladesh", *Renewable and Sustainable Energy Review*, 2010: <https://www.sciencedirect.com/science/article/abs/pii/S1364032110001449>

22 M. Alam Hossain Mondal, L.M. Kamp and N.I. Pachova, "Drivers, Barriers, and Strategies for Implementation of Renewable Energy Technologies in Rural Areas in Bangladesh – An Innovation System Analysis", *Energy Policy*, 2010: <https://www.sciencedirect.com/science/article/abs/pii/S0301421510002922>

The figure represents long-term average values between 1999 and 2018. The southeastern part of the country (including the Kaptai Lake area) has greater potential compared to the rest of the country. The southern coastal belt, especially the Meghna Estuary region, also has considerable PV potential. The mean yearly power density of solar radiation is 100–300 W/m<sup>2</sup>. As a result, an area of 3–10 km<sup>2</sup> is needed to produce an electricity output of 100 MW.

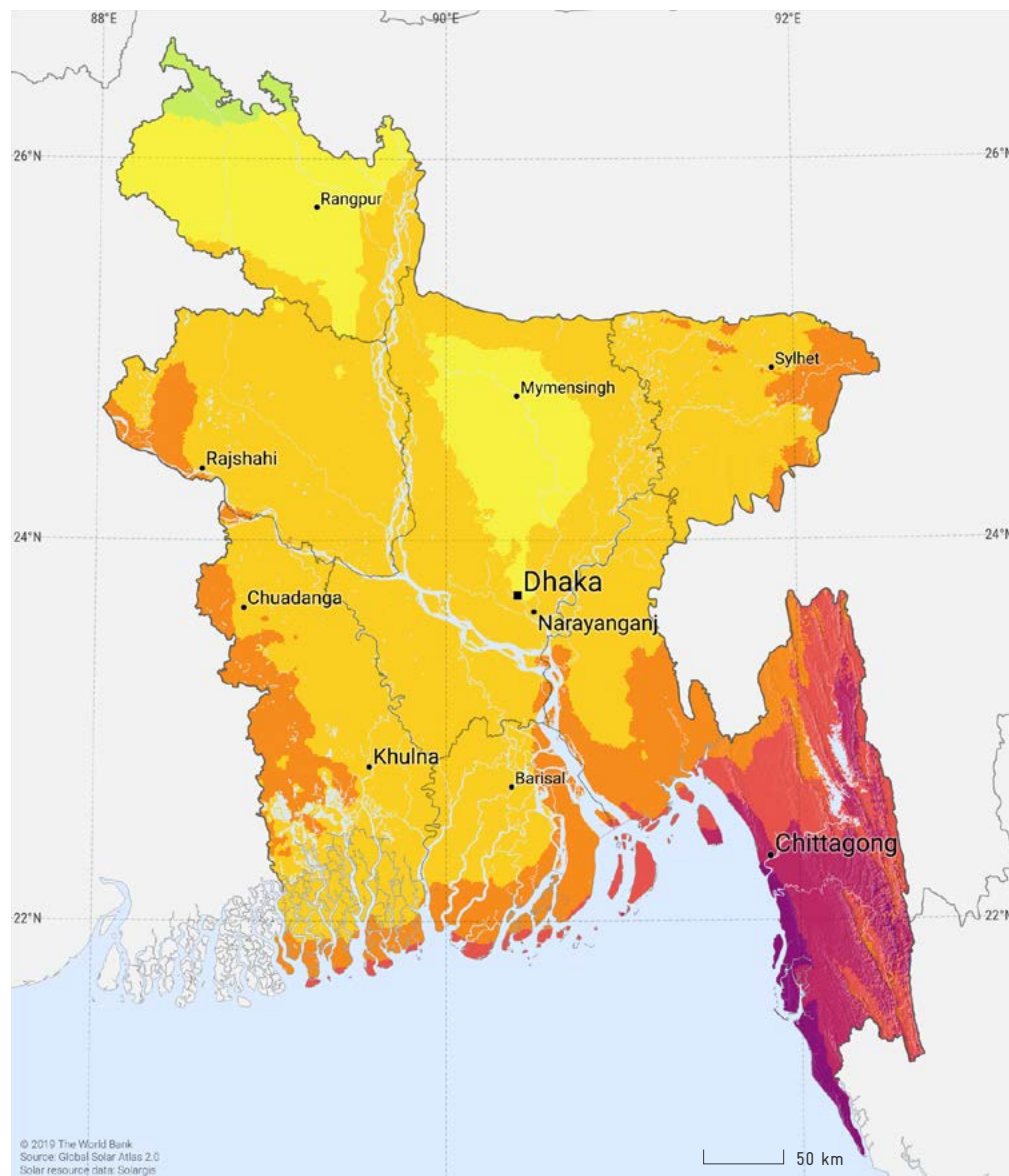
The search for appropriate areas for solar projects includes unused land and reasonable housetops which cover 3.2% of the total land area of Bangladesh<sup>23</sup> (Huda, 1999).



19 Lauren Melodia and Kristina Karlsson, "Energy Price Stability: The Peril of Fossil Fuels and the Promise of Renewables", *Roosevelt Institute*, Issue Brief, May 2022: <https://rooseveltinstitute.org/publications/energy-price-stability/>

23 Islam and A. Huda, "Technical Note - Proper utilization of solar energy in Bangladesh: Effect on the environment, food supply and the standard of living", *Renewable Energy*, 1999: <https://www.sciencedirect.com/science/article/abs/pii/S0960148198001207>

**FIGURE 5. Solar PV power potential across Bangladesh (ESMAP 2021)**



Long-term average of PVOUT, period 1999–2018

Daily totals: | Yearly totals:



kWh/kWp

Another investigation suggested that to reduce or tackle the interest in the power issue of 3,000 kWh/capita per year, 6.8% of the entire country’s land is required for power production from sunlight-based solutions<sup>24</sup> (Md. Tasbirul Islam, 2014). Approximately 7.86% of land in Dhaka city can be used for PV-based power generation, and it is accepted that considering the accessibility of the grid, 1.7% of the land area of the entire nation is appropriate for PV-based power generation<sup>25</sup> (Md. Humayun Kabir, 2010). In the GEF-funded project “Development of Sustainable Renewable Energy Power Generation (SREPGen)”, the government is installing 10 solar irradiance monitoring station across Bangladesh. It is expected that the ground-based monitoring networks of surface solar irradiance could provide valuable scientific results and be useful for accurate monitoring and efficient planning of solar energy applications.

Although the total generation numbers are lacklustre, solar power is playing a major role in overall electrification rates, and solar capacity showed an increasing trend. Until now, as many as 10 utility-scale solar power projects with a total capacity of around 430 MWp have been commissioned and connected to the national grid. Detailed information on these projects

24 M.T. Islam, S.A. Shahir, T.M.I. Uddin and A.Z.A. Saifullah, “Current Energy Scenario and Future Prospect of Renewable Energy in Bangladesh”, *Renewable Sustainable Energy Review*, 2014: <https://www.sciencedirect.com/science/article/abs/pii/S1364032114006017>

25 M.H. Kabir, W. Endlicher and J. Jägermeyr, “Calculation of Bright Roof-Tops for Solar PV Applications in Dhaka Megacity, Bangladesh”, *Renewable Energy*, 2010: <https://www.sciencedirect.com/science/article/abs/pii/S0960148109004923>



can be accessed via the link provided in [Annex 7](#). Another 8 projects with a total capacity of 435.32 MWp are currently under construction (detailed information via link provided in [Annex 7](#)). Furthermore, some 24 projects worth 1,510.34 MWp are at the planning stage, with details provided via the link in [Annex 7](#). Construction of those solar PV power plants is due to commence shortly.

Notably, the sponsors of the aforementioned projects under construction and planned involve reputed local and foreign companies, also including a number of German companies. Some of the projects are financed by the World Bank, Japan International Cooperation Agency (JICA), etc.

Furthermore, there have been 1,940 net metering rooftop solar systems implemented with a total capacity of 84.588 MWp as of 12 July 2023<sup>26</sup> (SREDA, n.d.). The largest system of 8.738 MWp has been installed by Korean EPZ Corporation in Patiya Upazila (sub-district) of the Chattogram district. A list of net metering rooftop solar projects can be accessed via the link provided in [Annex 7](#). There were also 221 rooftop solar projects without Net Energy Metering (NEM) with a total capacity of 69.93 MWp as of 12 July 2023<sup>27</sup> (SREDA, n.d.). Another list of the 20 top projects except net metering is also attached in [Annex 7](#).

26 Source: <http://www.renewableenergy.gov.bd/index.php?id=01&i=3&s=&ag=&di=&ps=&sg=&fs=&ob=3&submit=Search>

27 Source: SREDA - <http://www.renewableenergy.gov.bd/index.php?id=1&i=2>

Generally, the rooftop solar systems with net metering facilities are installed on the rooftops and premises of different industries. The RMG and textile industries are some of the top implementers and prospective customers of net metering rooftop solar PV technology. Apart from self-financing, the World Bank and the Kreditanstalt für Wiederaufbau (KfW) had come up with sizeable investments of USD 185 million and USD 60 million, respectively, as of January 2020<sup>28</sup> (Nguyen, 2020). IDCOL also provided soft loans for net metering rooftop solar projects.

### 5.1.3 Market price of solar PV systems in Bangladesh

Solar panel prices in Bangladesh have been on the rise in recent years. This is likely due to increasing demand, as well as local production of solar panels. The price of the panel usually depends on the total strength, the quality of the panel and its ability to withstand natural disasters. The following Table presents the approximate price of solar system for July 2023:

28 Trang Nguyen, Project Development Programme, "Bangladesh: Financing options for Rooftop Solar PV projects", Powerpoint Presentation, 28 January 2020: [https://www.german-energy-solutions.de/GES/Redaktion/DE/Publikationen/Praesentationen/2020/200128-iv-pep-bangladesh-pakistan-praes4.pdf?\\_\\_blob=publicationFile&v=1](https://www.german-energy-solutions.de/GES/Redaktion/DE/Publikationen/Praesentationen/2020/200128-iv-pep-bangladesh-pakistan-praes4.pdf?__blob=publicationFile&v=1)

**TABLE 4. Approximate solar system price in Bangladesh for July 2023**

PRODUCT	PRICE IN BDT	PRICE IN USD
<a href="#">Ensysco Mini 30 Watt Solar Power Home System</a>	₹22,000	\$202.30
<a href="#">Rich 200 Watt Monocrystalline Solar Panel</a>	₹12,800	\$117.70
<a href="#">Rich 165 Watt Off-Grid Solar Panel</a>	₹10,560	\$97.10
<a href="#">Longi 550 Watt Solar Panel</a>	₹38,500	\$354.02
<a href="#">Rich 100 Watt Monocrystalline Solar Panel</a>	₹6,400	\$58.85
<a href="#">0.5 KW Off-Grid Solar System 10 h Backup</a>	₹88,999	\$818.38
<a href="#">1 KW Off-Grid Solar System 10 h Backup</a>	₹159,999	\$1,471.25
<a href="#">30 KW On-Grid Solar Panel System</a>	₹2,700,000	\$24,827.58
<a href="#">50 KW Industrial Solar System</a>	₹4,000,000	\$36,781.61
<a href="#">10 KW Hybrid Rooftop Solar Panel</a>	₹1,500,000	\$13,793.10

**EXCHANGE RATE:**  
USD 1.00 = BDT 108.75  
as at 13 July 2023

Source: <https://www.bd stall.com/solar-panel/> (Accessed 19 July 2023)

Furthermore, the prices of solar equipment, as demonstrated by another distributor, can be seen in the following table.

Bangladesh is a low-cost country for solar energy, with a good number of geographic locations that receive ample sunlight throughout the day. Solar panel prices in Bangladesh are much lower than those in other developed countries. Of course, there are many solar companies in the country, and they are all competing for consumers' attention.

## 5.2 German reference project

In the dynamic landscape of solar energy development in Bangladesh, an inspiring narrative of collaboration unfolds, featuring German SMEs working hand in hand with local partners. These alliances have resulted in the successful realisation of notable solar projects, encompassing installations at Knit Concern Limited (262 kWp), IRIS Fabrics Limited (145 kWp), Hamza (1.2 MWp), Snowtex (245.7 kWp), AKM Knitwear (210 kWp), JKL 2 (453.6

kWp), MAF Shoes (250.6 kWp) and Amigo Bangladesh (1.2 MWp), among others. These initiatives not only underscore a profound commitment to environmental sustainability but also contribute significantly to enhancing grid reliability.

German SMEs, building on solar project successes, have secured significant contracts. For example, Raach Solar partnered with Power Utility Bangladesh Ltd. to secure \$9 million in contracts for 705 solar-powered irrigation pumps in the Bogra district, supported by the Asian Development Bank. This showcases their proactive role in driving Bangladesh's clean energy transformation.

**TABLE 5.** Prices of solar equipment in Bangladesh as at 13 July 2023

MODEL	PRICE IN BDT	PRICE IN USD
Industrial 20 KW Solar Power System	₹1,400,000	\$12,873.56
On Grid 1.5 KW Solar Power System	₹112,500	\$1,034.48
Toenergy 290 W Solar Panel	₹7,500	\$68.96
Commercial 15 KW Solar Power Plant	₹1,050,000	\$9,655.17
Commercial 6 KW Solar Power Plant	₹450,000	\$4,137.93
Commercial 3 KW On-Grid Solar Power System	₹225,000	\$2,068.96
Commercial 5 KW Solar Power Plant	₹375,000	\$3,448.27

**EXCHANGE RATE:**  
USD 1.00 = BDT 108.75  
as at 13 July 2023

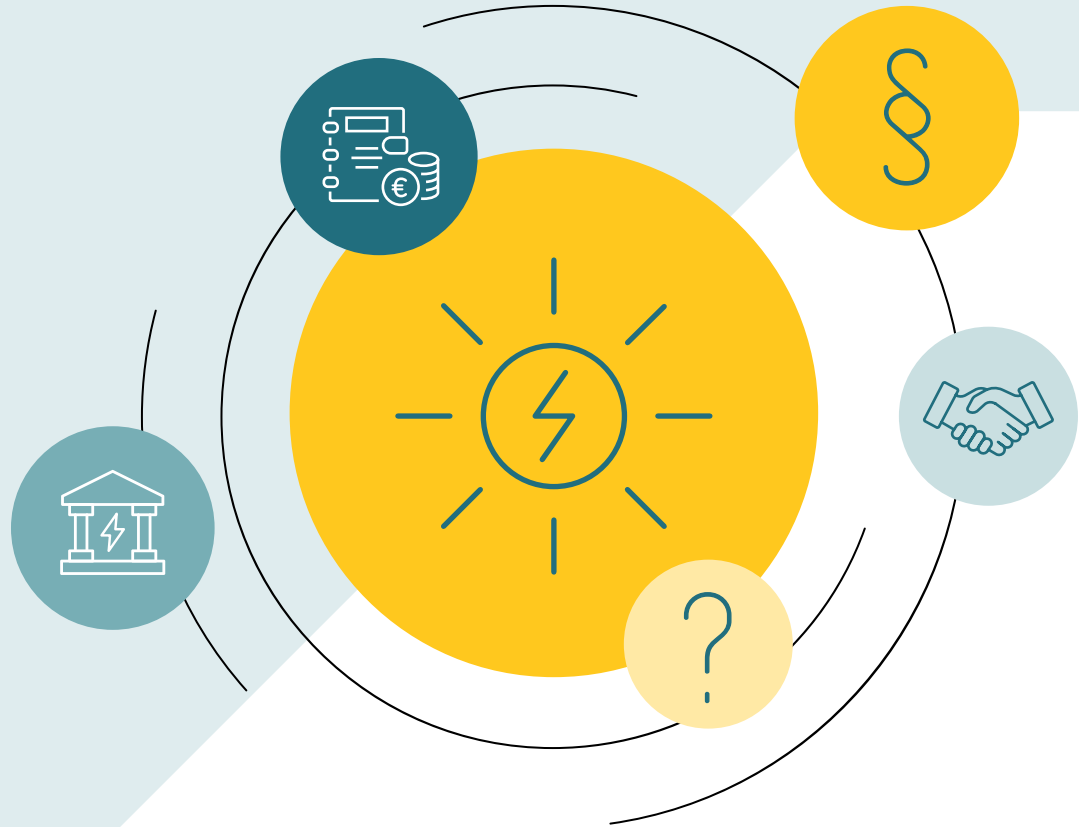
## 5.3 Solar power – leading the transition

The emphasis on solar energy as a technical solution is paramount to understanding Bangladesh's energy transformation. Solar power's ability to meet energy demands, reduce reliance on electricity imports, mitigate volatile fossil fuel prices and overcome the limitations of other energy sources underscores its pivotal role. As the nation continues to invest in solar initiatives, it harnesses the power of the sun to usher in a cleaner, more sustainable energy era, marking a significant step forward in addressing its energy needs and environmental concerns.



# 6

## Legal and economic framework conditions



## 6.1 Policy framework

The key legal and policy instruments through which the solar PV energy sector in Bangladesh is governed are illustrated in the next table:

TABLE 6. Legal and policy framework for the solar PV sector

LAW/POLICY	OVERVIEW
Electricity Act 2018 (Act No. VII of 2018)	The Act aims to repeal and re-enact the Electricity Act of 1910, with modifications for developing and reforming the power generation, transmission, supply and distribution sectors.
Sustainable & Renewable Energy Development Authority Act 2012 (Act No. XLVIII of 2012)	The Act, predicated on the aim of increasing energy security, creates an independent authority, the SREDA, to promote the development and use of renewable energy, and to ensure energy security and mitigate risks associated with natural calamities stemming from global warming. SREDA came into being in 2014 and is now fully functional as a government agency.
Quick Enhancement of Electricity & Energy Supply (Special Provisions) Act 2010 (Act No. LIV of 2010)	The Act facilitates rapid improvement in energy generation and distribution to meet agricultural, industrial and domestic needs. It includes provisions for importing energy and extracting minerals, and was extended until 2026.
Bangladesh Energy Regulatory Commission Act 2003 (Act No. XIII of 2003)	The Act establishes an impartial energy regulatory commission for efficient energy use, quality services, tariff setting and environmental standards enforcement. It resolves disputes, enforces standards and controls energy quality under existing laws.
Renewable Energy Policy of Bangladesh 2008	The policy aims for developing RE resources to meet its declared goal of 5% of the total power demand by 2015 and 10% by 2020.
Private Sector Power Generation Policy (PSPGP) of Bangladesh 1996	With a view to accelerating the pace of power development in the country, the Private Sector Power Generation Policy of Bangladesh, popularly known as the IPP Policy, was approved by the government in 1996 to boost private sector power generation in the country.
The Mujib Climate Prosperity Plan (MCPP)	The MCPP shifts Bangladesh's trajectory from one of vulnerability to resilience to prosperity (VRP). Under the plan, Bangladesh has set a revised target of achieving 30% energy from renewable sources by 2030.
Bangladesh Perspective Plan 2021-2041	The Bangladesh Vision 2041 aims to eliminate extreme poverty and attain the status of upper middle-income country by 2031, and of high-income country by 2041. The targets set by this document include the capacity to meet the demands of an upper middle- and high-income economy, sustained and universal access, ensure efficient supply of electricity at a competitive price and achieve 100% energy security.
Bangladesh Delta Plan 2100	The BDP 2100 focuses on RE technologies, in particular, and recognises the country's significant potential to make use of these in the future. It proposes a target to generate 30% of the total energy from renewable sources by 2041.

Source: Authors' own compilation, Keystone Business Support Company Limited (2023)

Two key policies directly relate to solar energy development: (a) Guidelines for the Implementation of Solar Power Development Program 2013; and (b) Bangladesh Net Metering Guidelines – 2018. The former concerns solar power development as a whole, while the latter relates only to those renewable energy or solar projects that connect to the grid to add surplus power. In addition, a draft solar energy roadmap is being prepared, which is expected to be finalised soon. Thus, the policy framework for the solar energy sector is as follows:

**TABLE 7. Policy framework for the solar energy sector**

POLICIES	OVERVIEW
Guidelines for the Implementation of the Solar Power Development Program (2013)	<ul style="list-style-type: none"> <li>Established guidelines for implementing solar parks, solar mini-grids, solar rooftop systems and solar irrigation pumps</li> <li>Goal of enhancing and improving solar technology, and attracting donor organisations and private investors to advance the utilisation of sustainable power sources to mitigate dependency on fossil fuels</li> </ul>
Bangladesh Net Metering Guidelines – 2018	To promote renewable energy through the installation of rooftop solar systems.
National Solar Energy Roadmap 2021-2041 (Draft)	20-year roadmap envisages almost 40 GW of renewable energy generation capacity including 30 GW of solar PV capacity in 2041.

Source: Authors' own compilation, Keystone Business Support Company Limited (2023)

### 6.1.1 Guidelines for the Implementation of the Solar Power Development Program (2013)

With a view to promoting renewable energy development in Bangladesh, the government published the “Guidelines for the Implementation of the Solar Power Development Program” in 2013. The principal objective is to promote environmentally friendly power generation in the country, and to enhance and improve solar technology.

There are commercial and social means by which the programme is being implemented. The commercial type will be in the form of a solar park, solar mini grid, solar water pump, etc., while the social type will be implemented in community health centres, union information centres, religious installations, railway stations, etc.

The commercial solar power projects will be implemented by the private sector and will mainly run on a business model with the service charges primarily provided by the beneficiaries. On the other hand, the social solar power projects will be based on grants and will be developed by the government. Solar rooftop power generation projects in residential, commercial and industrial buildings are identified under the guidelines as falling within the commercial category.

### 6.1.2 Guidelines for net energy metering in Bangladesh, 2018

As part of its initiatives to encourage the use of renewable energy in the country, the government approved the “Net Metering Guidelines” in July 2018. Net Energy Metering (NEM) allows any excess electricity after self-consumption that is generated by rooftop solar system to be supplied to the distribution grid, and in exchange the prosumer (the consumer who also produces electricity) can either import an equal amount of electricity from the grid or receive the price of the net amount of exported electricity at the end of the settlement period as per this guideline. The maximum output capacity of the installed RE system on the AC side of the inverters cannot be more than 10 MW. A consumer must fulfil some basic requirements for the net metering connection. Such features include the following:

- All three-phase consumers are considered eligible for the net metering system.
- The maximum output capacity of the installed RE system on the AC side of the inverters can be 70% of the consumer’s sanctioned load.
- In the case of medium-voltage (MV) consumers, the installed capacity of the renewable energy system cannot be more than 70% of the rated capacity of the distribution transformer or cumulative capacity of the distribution transformers.

There are some restrictions observed in the guideline that discourage many NEM enthusiasts<sup>29</sup> (Khan, 2020). They are as follows:

1. Only three-phase electricity consumers are eligible for the net metering system, which effectively excludes single-phase consumers.
2. The provision that the output AC capacity of the converter can be a maximum of 70% with respect to the consumer's sanctioned load is also restrictive.
3. The maximum output AC capacity of the installed renewable energy system for NEM cannot be more than 10 MW.
4. If the distribution utility has to upgrade its system in order to integrate renewable energy, the NEM applicant will have to bear related expenses.
5. An OPEX operator with a net energy metering facility cannot sell excess electricity to any other consumer by adding a wheeling charge to the utility.

### 6.1.3 National Solar Energy Roadmap 2021-2041

Under the aforementioned SREPGen project, the government has prepared a draft “National Solar Energy Roadmap 2021-2041”, by appointing an independent consultant. The draft was submitted to the government on 14 December 2020, but is yet to be finalised.

The roadmap proposes component-wise solar PV capacity targets for the year 2041. Three scenarios are presented for the future of solar energy in Bangladesh, i.e. the Business-As-Usual (BAU) case (6 GW), the medium case (20 GW) and the high-deployment scenario (30 GW) by 2041. The most ambitious high-deployment scenario target is proposed as comprising large “solar hubs” (11 GW), electric utilities (4 GW), private developers (5 GW) and rooftop installations (8 GW). Other minor contributions will come from irrigation pumps (1.5 GW), individual-household SHS (285 MW) and around 16 MW from mini- and microgrids and other off-grid installations.

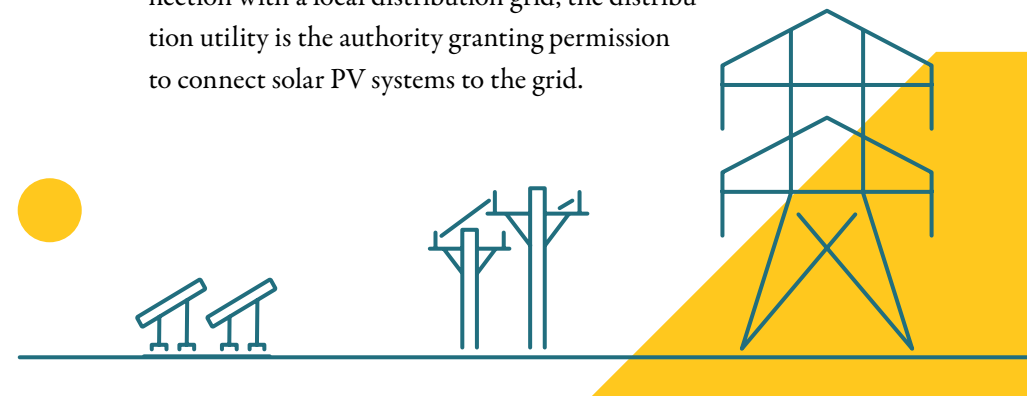
## 6.2 Grid interconnections

In order to obtain an interconnection with the grid, local distribution grid or the transmission grid, there are detailed procedures for the submission of applications and the disposal process for those applications.

### 6.2.1 Application under NEM

Each eligible consumer who intends to install and/or connect their renewable energy generation systems to the local distribution grid and benefit from net metering should apply in writing for a net metering agreement, together with the necessary supporting documents, to the distribution utility concerned. The applicant should agree with the utility on the detailed work plan, including the physical installation of the system (for new installations), the establishment of interconnection, checking and verification, approval and signing of the NEM contract. Upon successful completion of all the necessary steps, the utility shall issue the NEM approval. The application procedure under NEM is provided in [Annex 2](#). For interconnection with a local distribution grid, the distribution utility is the authority granting permission to connect solar PV systems to the grid.

29 Shahriar Ahmed Chowdhury and Md. Ziaur Rahman Khan, “The Net Metering Guideline of Bangladesh – Potential and Way Forward”, Conference Paper, Dec 2020; DOI: 10.1109/ICECE51571.2020.9393148; <https://ieeexplore.ieee.org/document/9393148?denied=>



## 6.2.2 Application under the Grid Code

With a view to establishing a new connection to and/or use of the Transmission System, an application must be submitted to the Transmission Licensee along with the following report, data and undertaking:

- Power Purchase Agreement (PPA) with the Single Buyer along with a report stating the purpose of establishing the proposed connection;
- concurrence from the Single Buyer for the proposed Connection, Connection site, description of Apparatus to be connected;
- data as applicable and as listed in the Data Registration Section;
- confirmation that the prospective installation complies with the provisions in the Electricity Act 2018;
- construction schedule and target completion date;
- undertaking that the User shall abide by Grid Code and provisions of the Electricity Rules 2020 and revisions thereof for installation and operation of the Apparatus.

The detailed procedure for applications for connection to and use of the Transmission System as mentioned in the Grid Code 2019 is attached in [Annex 3](#). The transmission utility is authorised to sanction the above application for a connection to the grid.

## 6.3 Technical standards

Any user of a rooftop solar PV power generating system must follow the technical standards set by SREDA. In addition, the prosumer must also abide by the technical requirements and safety regulations set by the authority concerned while establishing interconnections with the local distribution grid or the transmission grid. The interconnection process, the mechanism by which net metered distributed energy systems may be legally and safely connected to the electricity grid, is critical to the success of net metering programmes. Interconnection standards are fundamental to the development of the NEM policy.

For the solar energy industry, a number of international standards relating to PV plant operation and maintenance have been defined. Of these standards, some are applicable to the design, procurement and construction phases of PV plants. In Bangladesh, different standards are developed which are necessarily compatible with international standards. This is indicative of the fact that the Bangladeshi standards' identification mark includes IEC, the International Electrotechnical Commission, which publishes international standards for PV systems including those for all elements in the entire PV energy chain.

Notably, the Bangladesh Standards and Testing Institution (BSTI), the National Standards Body (NSB) in Bangladesh, has been a member of the Interna-

tional Organization for Standardization (ISO) since 1974, an IEC Affiliate Plus member since 2012 and National Codex Contact Point (NCCP) of the Codex Alimentarius Commission in Bangladesh since 1975, as well as a member of the South Asian Regional Standards Organisation (SARSO), which is the regional standards organisation for countries in the South Asian Association for Regional Cooperation (SAARC). Apart from the development of national standards, the BSTI also emphasises the periodic review of standards to keep them on par with updated technological developments, and to harmonise international and regional standards.

### 6.3.1 SREDA standards for solar appliances

SREDA has determined technical standards for different solar appliances, such as Solar Module/Panel, Inverter, Solar Charge Controller, Battery, etc. The applicable technical standards for solar PV systems and components can be found in [Annex 4](#).



### 6.3.2 Interconnection to the distribution grid

The Net Metering Guidelines published in 2018 contain provisions regarding the requirements for interconnection of any indirect renewable energy system<sup>30</sup> to the local distribution grid. It also focuses on equipment standards and types of connections. Details can be found in [Annex 5](#).

### 6.3.3 Requirements for VRE generators for grid connection

The Electricity Grid Code 2019 sets out the technical requirements to be met by those who are connected to the Transmission System, particularly for the Variable Renewable Energy (VRE) generators. According to the provisions of the code, a VRE Generating Unit should be capable of generating at maximum power output within the frequency range of 49.5-50.5 Hz. They should also be capable of generating at maximum power output, and the interchange of Reactive Power at the Connection Point, within the voltage variations and the standard limits for normal operating conditions. Detailed requirements for VRE generators to be connected to the grid are provided in [Annex 6](#).

<sup>30</sup> Indirect connection means the connection of a renewable energy installation to a supply line indirectly through the internal distribution board of the consumer where the renewable energy installation is connected to an electrical point within the premises of the consumer instead of the point of common connection.



## 6.4 Electricity tariff for consumers with a solar PV system

### 6.4.1 Tariff structure in the NEM Guidelines

The rate at which the customer is billed is determined by various factors such as the consumer tariff class, type of renewable energy technology, installed capacity and export limitations. Section 3.5 of the NEM Guidelines provides specific provisions on tariff structures for NEM. The tariff structure, according to which the utility will prepare the bill and settle accounts either via proper adjustment or by collecting dues at the end of every billing period and at the end of the settlement period, are described in this section.

For each billing period, the utility conducts the energy accounting and appropriate adjustment activities based on the tariff order issued by the Bangladesh Energy Regulatory Commission (BERC). The electricity bill for prosumers is calculated based on any of the three possibilities mentioned:

1. If the amount of imported and exported electricity is equal, then the prosumer shall pay only the demand charge and other fixed charges.
2. If the prosumer remains a net exporter, then the excess kilowatt hours are carried over to the next billing period. For the current billing period, the prosumer pays only the demand charge and other fixed charges.
3. After adjusting with any carry-over credit from the previous billing period (if any), the prosumer becomes a net importer, then the prosumer shall pay for the additional consumption along with the demand charges and other fixed charges.

At the end of the settlement period (June of each year), the utility pays all consumers classes (residential, commercial and industrial) for any accumulated kilowatt hour unit of electricity at the bulk rate. In such cases, the bulk tariff rate for 33 kV lines determined by the BERC is applicable.



### 6.4.2 Feed-in-Tariff (FiT)

In Bangladesh, the BERC produced and published a draft FiT regulation titled “Bangladesh Energy Regulatory Commission (Tariff for Roof Top Solar PV Electricity) Regulations” in 2016. Unfortunately, this is still yet to be finalised – even after a lapse of seven long years. However, it can be sincerely expected that the BERC will expedite its efforts to finally approve the draft regulations and introduce a feed-in-tariff in the country.

Notably, there is no electricity tariff for consumers with a solar PV system. However, energy is a necessary input for the daily subsistence of households and most business operations. Consumers and businesses have no choice but to pay higher energy prices, which impacts their spending in other sectors. This reduced consumer spending depresses aggregate output in the economy and can be the tipping point for a recession. On the supply side, many business operations rely on energy as a factor in the production and distribution of goods and services. Increased fuel costs across the economy reduce business revenue and profits, which could otherwise be reinvested in a productive capacity.

## 6.5 Incentives for solar PV projects by the government

The Renewable Energy Policy of Bangladesh (2008), the Private Sector Power Generation Policy of Bangladesh (1996), the Guidelines for the Implementation of the Solar Power Development Program (2013), etc. include several incentives offered to the renewable energy-based power plants. In summary, the incentives are generally one of two types, as follows.

### 6.5.1 Financial incentives

The first type are the financial incentives for the entrepreneurs of solar power generation companies that include the following:

- All renewable energy equipment and related raw materials in producing renewable energy equipment are exempted from charging 15% VAT.
- Private sector participation, including joint venture initiatives, in renewable energy development will be encouraged and promoted.
- The government assists in locating the project(s) and also in acquiring land for renewable energy project(s).
- The renewable energy project investors are exempted from corporate income tax for a period of 5 years.
- Renewable energy project(s) are not required to obtain power generation licences from the BERC if the capacity of the project(s) is 5 MW or less.
- The private power companies are exempt from corporate income tax for a period of 15 years.
- The companies are allowed to import plants and equipment and spare parts up to a maximum of 10% of the original value of the total plants and equipment within a period of 12 years of commercial operation without payment of customs duties, VAT and any other surcharges as well as import permit fees, except for indigenously produced equipment manufactured according to international standards.
- Repatriation of equity along with dividends is freely permitted.
- Foreign lenders to such companies are exempted from income tax in Bangladesh.
- Foreign investors are free to enter into joint ventures.
- Private power companies are allowed to buy insurance of their choice as per requirements of the lenders and the utilities.
- The instruments and deeds required to be reg-

istered under local regulations will be exempted from stamp duty payments.

- Power generation has been declared as an industry and the companies are eligible for all other concessions available to industrial projects.
- Any foreign company registered in Bangladesh is allowed to raise funds locally as per the regulations of the Bangladesh Investment Development Authority (BIDA).

### 6.5.2 Special incentives

The second type are other incentives or special incentives offered to foreign investors, and include:

- tax exemptions on royalties, technical know-how and technical assistance fees, and facilities for their repatriation;
- tax exemption for interest on foreign loans;
- tax exemption for capital gains from transfers of shares by the investing company;
- avoidance of double taxation in case of foreign investors on the basis of bilateral agreements;
- exemption of income tax for up to three years for expatriate personnel employed under the approved industry;

- remittance of up to 50% of the salary of foreigners employed in Bangladesh and facilities for repatriation of their savings and retirement benefits at the time of their return;
- no restrictions on the issuance of work permits to project-related foreign nationals and employees;
- facilities for repatriation of invested capital, profits and dividends;
- provision of transfer of shares held by foreign shareholders to local shareholders/ investors;
- re-investment of remittable dividends treated as new foreign investment;
- local company registration by the foreign investor exempt from stamp duty;
- taxes not applicable to earnings of the capital gain from selling shares.

Furthermore, the government issued a circular on 2 January 2020 on the introduction of tax exemption incentives for power generation companies as part of efforts to improve the country's power sector and promote renewable energy, which include<sup>31</sup> (Orbitax, 2020):

- a 100% corporate income tax exemption on income from power generation businesses from the beginning of operations until 2034;
- tax exemption for interest payments by power generation companies on foreign loans;
- tax exemption on payments for royalties, technical know-how and technical assistance fees by power generation companies;
- an individual income tax exemption for the salary of foreign employees of power generation companies for three years beginning on the date of arrival in Bangladesh;
- tax exemption on gains from the trading of shares in power generation companies.



31 Orbitax Tax News and Alerts, "Bangladesh Introduces Tax Exemption Incentives for Power Generation Companies", 29 January 2020: <https://orbitax.com/news/archive.php/Bangladesh-Introduces-Tax-Exem-40729>



### 6.5.3 Incentives for exporters of solar modules

Under a scheme announced in 2019 by the Bangladesh Bank, the government pays solar manufacturers 10% of the value of their exports as an incentive to foster a domestic PV industry<sup>32</sup> (ISLAM, 2019). Notably, Bangladesh has a small panel manufacturing industry with an annual production capacity of 250 MW. Bangladeshi manufacturers claim that their products, which are primarily shipped to Nepal and the Philippines, can generate 320 W and boast 19.5% efficiency.

However, the Solar Module Manufacturers Association of Bangladesh (SMMAB) claims an 18% cash incentive linked to export value like in India. It also claims a 30% local content requirement for modules used in public solar projects and installation programmes. It cited the example of neighbouring India, where locally made panels have been allocated 2.5 GW of 10 GW of government-driven solar power project capacity. In China, local content requirements make it near impossible for foreign panels to get a foothold in the market.

32 Syful Islam, "Bangladesh extends incentive scheme for domestic solar industry", PV Magazine, October 29, 2019: <https://www.pv-magazine.com/2019/10/29/bangladesh-extends-incentive-scheme-for-domestic-solar-industry/>

## 6.6 Local financing schemes and programmes for rooftop solar projects

### 6.6.1 Local financing schemes to spearhead solar PV

There are few options for financing renewable energy in Bangladesh. Bangladesh Bank (BB), the central bank of Bangladesh, plays a key role in making funds available for investors as well as the commercial banks and financial institutions (FIs) to set up or finance renewable energy projects. BB provides funds to private commercial banks under agreements through which they can finance certain products/services. In addition, IDCOL has been promoting renewable energy technologies and pioneering financing within the sector.

#### 6.6.1.1 BANGLADESH BANK'S SUSTAINABLE FINANCE POLICY FOR BANKS AND FINANCIAL INSTITUTIONS

The main theme of the Sustainable Finance Policy for Banks and Financial Institutions is that the financial service sector, Banks & FIs, as a key economic player, must make an appropriate contribution to sustainability. The policy is not confined to green taxonomy alone, but also sustainable finance taxonomy. Green taxonomy includes green banking activities, green finance policy, Environment and

Social Due Diligence (ESDD), utilisation of the Climate Risk Fund, internal environmental management including carbon footprint measurements, green marketing, disclosures, etc., whereas sustainable finance taxonomy includes sustainable agriculture, Cottage, Micro, Small & Medium Enterprises (CMSME), socially responsible financing and identification process of sustainability-linked finance, R&D for sustainable product innovation, marketing, awareness, capacity building and sustainable finance disclosure for banks & FIs, etc.

#### 6.6.1.2 BANGLADESH BANK'S GREEN TRANSFORMATION FUND

BB introduced a Green Transformation Fund (GTF) in 2016 – worth USD 200 million and EURO 200 million – to procure capital machinery and others means for green industrialisation. The areas in which the fund can be used are in the efficient use of water and wet processing, water conservation and management, waste management, resource efficiency and recycling, energy efficiency, renewable energy, heat and temperature management, air ventilation and circulation efficiency, work environment improvement initiatives and other areas as indicated by the Bangladesh Bank from time to time.

### 6.6.1.3 BANGLADESH BANK'S REFINANCE SCHEME

In December 2022, BB announced a new refinancing scheme worth BDT 50 billion to promote green industry in the export and production sectors. Under the scheme, green entrepreneurs are entitled to obtain loans at 5.0% interest. The commercial banks will have access to the fund at a rate of 1.0% and will be allowed to keep a margin of 4.0%. Green refinancing will be provided in local currency and the duration of the revolving fund will be 5-10 years.

### 6.6.1.4 GREEN BOND FINANCING

In order to tap into the potential of green bonds to minimise financial barriers to renewable energy projects and catalyse renewable energy investment at scale, the Bangladesh Bank developed the “Policy on Green Bond Financing for Banks and Financial Institutions (FIs)” in September 2022. The policy provides the necessary framework for the issuance of green bonds and utilisation of proceeds for green projects, including renewable energy.

### 6.6.1.5 INFRASTRUCTURE DEVELOPMENT COMPANY LIMITED (IDCOL)

IDCOL is the local market leader in renewable energy financing and the pioneer in mass-scale off-grid renewable energy dissemination in Bangladesh. The Rooftop Solar Project is its latest intervention in renewable energy sector financing. Under this financ-

ing scheme, IDCOL provides a concessionary loan facility, technical compliance monitoring, project development support and performance monitoring support. Eligible sectors for financing include: RMG, Textile, Glass, Pharmaceuticals, Paper & Particle Board, Sanitary & Ceramics, Cold Storage, Poultry, Automobile, Leather, Agro-processing, Plastics, Chemicals, etc. The financial package offered by IDCOL is as follows:

**TABLE 8. IDCOL financing terms**

FACILITY	TERMS
Loan amount	80% of the project cost
Tenor	10 years
Grace period	1 year (principal only)
Repayment	Quarterly
Interest rate	6% p.a. (fixed for loan tenor)
Debt Service Coverage Ratio (DSCR)	1.2
Accepted security	Varies (10-100% loan): <ul style="list-style-type: none"> <li>• Fixed and floating assets</li> <li>• Personal guarantee of the shareholders</li> <li>• Corporate guarantee</li> <li>• Lien on project account</li> <li>• Lien on shares</li> </ul>
Project size	No formal limit, prefer projects over 500 kWp
Points of financing	Signing of the Financing Agreement and injection of necessary equity into the project

Source: IDCOL ([https://idcol.org/home/r\\_lending\\_terms](https://idcol.org/home/r_lending_terms)) (Accessed 17 July 2023)

The IDCOL investment funds in local projects mainly come from two sources: the World Bank and KfW, a German state-owned investment and development bank. Both lenders combined have provided around BDT 1.5 billion to finance rooftop solar power projects. So far, IDCOL has approved several projects that will collectively generate more than 100 MW of electricity, while a number of other projects are in the pipeline. Notable projects include:

- a 2.66 MW rooftop solar power plant at the Square Textiles factory in Kashimpur union, Gazipur district;
- a 2.02 MW plant at Fakhruddin Textile Mills Ltd. in Sreepur upazila, Gazipur district;
- a 1.72 MW plant at Aswad Composite Mills Ltd. in Mawna union, Gazipur district;
- a 1.1 MW plant at Far East Spinning Industries Ltd. in Habiganj district;
- a 0.99 MW plant at Snowtex Outerwear Ltd. in Dhamrai upazila, Dhaka district;
- a 2.40 MWp rooftop solar project at Janata Jute Mills Ltd. in Boalmari upazila, Faridpur district;
- a 1.60 MWp project on the factory rooftops of Renata Ltd., located in Mirpur, Rajendrapur, Bhailuka, Keraniganj, Feni, Sylhet, Rangpur, Mymensingh, Bogra, Faridpur, Cumilla and Dhaka;

- a 2.67 MWp project on the factory rooftops of Hatil Complex Ltd., located in Kashimpur, Gazipur district.

#### 6.6.1.6 COMMERCIAL BANKS

Commercial banks and FIs also extend financing for renewable energy projects individually or in a syndication process. In fact, an increasing number of banks/Non-Bank Financial Institutions (NBFIs) are going green by providing innovative products that cover financial services to support the activities that are not hazardous to the environment and help conserve the environment. Financing packages offered by commercial banks and NBFIs is presented in the following table:

**TABLE 9. Financing terms of commercial banks**

FACILITY	TERMS
Loan amount	Up to 80% of the project cost
Tenor	10 years
Grace period	1-2 years (principal only)
Repayment	Quarterly
Interest rate	1% from Bangladesh Bank & 5% to project owners
Debt Service Coverage Ratio (DSCR)	Varied (depending on the bank and project)
Accepted security	Varied (depending on the bank and project)
Project size	300 kWp - 1.5 MWp
Points of financing	<ul style="list-style-type: none"> <li>• Procurement of components</li> <li>• Construction of the system</li> <li>• Interest during construction</li> <li>• Consultancy cost</li> </ul>

Source: Authors' own illustration, Keystone Business Support Company Limited (2023)

### 6.6.1.7 SAFETY RETROFITS AND ENVIRONMENTAL UPGRADES (SREUP)

With the support of international development partners, the government initiated the “Programme to Finance Safety Retrofits and Environmental Upgrades in the Bangladeshi Ready-Made Garment (RMG) Sector”, termed SREUP in short. The objective of the programme is to provide Bangladeshi RMG manufacturers with financial and technical assistance to undertake safety retrofits, environmental and social upgradation of their factories. The development partners and their contributions to the programme are the French Development Agency (AFD) (€50 million), the European Union (€6.3 million), KfW Development Bank (€4.0 million) and German Technical Cooperation (GIZ) (€3.0 million). The implementing agency for the programme is Bangladesh Bank and the loans are provided through selected participating financial institutions. The main features of the SREUP credit facility is presented in the following table.

The loan facility is helping a good number of RMG factories to adhere not only to national regulations but also international standards. Interestingly, the project company is entitled to an incentive grant under the programme on successful completion of the project.

**TABLE 10.** Main features of the SREUP credit facility

LOAN TYPE	NORMAL-TERM LOAN
Discount	Provision and possibility of 20% discount on the loaned amount
Loan Tenure	3–5 years in general and up to 7 years in special cases
Loan Limit	Normally up to EUR 1 million and can be increased up to EUR 3 million in special cases
Interest Rate	5% p.a. (maximum)
Grace Period, Debt: Equity Ratio, Repayment, etc.	All are subject to agreement between borrower and lender

Source: SREUP: <https://www.bb.org.bd/mediaroom/circulars/smespd/mar312019smespd01e.pdf> (Accessed on 18 July 2023)

### 6.6.1.8 OTHERS

Furthermore, the International Finance Corporation (IFC) is also providing gap funding in addition to concessional loans for the garments sector. Bangladesh Infrastructure Finance Fund Limited (BIFFL) has also come up with a business model like IDCOL. All of these low-cost financing facilities could spark a rooftop solar revolution in the country.



## 6.7 Electricity tariffs and energy costs

### 6.7.1 Determination of the electricity tariff

According to the Bangladesh Energy Regulatory Commission (BERC) Act 2003 (Act No. 13 of 2003), the BERC was established to carry out activities to create a favourable environment for electricity generation, energy transmission, transportation and marketing as well as for management, operation and long-term development of the energy sector. But the BERC is not sufficiently empowered and independent. It is widely believed that it is a subordinate office of the Ministry of Power, Energy and Mineral Resources (MPEMR), and it functions as per the desires of the government. Nevertheless, even with limited power to keep tariffs down by forcing utilities to perform better, over the last two decades the commission has been able to achieve a lot with respect to protecting consumers' rights<sup>33</sup> (Hossain, 2022).

Now a new amendment to the BERC Act implies that the energy sector will lose the independent oversight, and the vital purpose of the BERC's function to keep energy tariffs low will be lost. On 1 December 2022, the government issued an ordinance entitled the Bangladesh Energy Regulatory Commission (Amendment) Ordinance 2022 (Ordinance No.

1 of 2022), introducing an amendment to the BERC Act 2003, empowering the MPEMR to set gas and electricity prices under special circumstances. This amendment alters the BERC's position as the sole authority for fixing energy prices in the country. The Parliament later passed the Bangladesh Energy Regulatory Commission (Amendment) Act 2023 (Act No. 6 of 2023) to legitimise the Ordinance.

The government already had a fair bit of control over the BERC through the process of key appointments and other means. It should also be noted that the government never assigned the function of tariff-setting for petroleum products to the BERC. As a result, the prices of diesel and petrol could be revised whenever the government desired.

Of paramount importance to the functioning of the BERC is the sacred task of protecting consumers. However, since the government can now increase energy tariffs by any amount without any sort of public hearing or accountability, consumer rights in various sectors would be seriously threatened. and BERC's role would be greatly reduced<sup>34</sup> (Hossain, 2022).

### 6.7.2 Tariffs in the electricity sector

In Bangladesh, electricity tariffs are unbundled, reflecting the current electricity supply market. It is a two-part tariff (2PT) including a fixed (access) fee and a per-unit (usage) fee.

#### 6.7.2.1 BULK ELECTRICITY RATE

In 2021-22, the BPDB sold bulk energy of 76,667 MWh to the distribution utilities including BPDB zones as a single buyer, which was 7.27% higher than the previous year. The bulk electricity tariff for the distribution utilities is shown in the following table.

The 2023 rate was fixed by the government through notification in the official gazette, bypassing and suppressing the authority of the BERC. Following the hike in bulk electricity tariffs the state-run power distribution companies who supply electricity to the masses have to purchase electricity from the BPDB at rates around 8% higher than those of 2022.

In addition to a tariff increase, the BPDB is also proactively addressing the issues of system loss reduction (both technical and non-technical). But the increase in tariff and reduction in losses are not expected to be adequate enough to help the BPDB break even. This is attributable to the high capacity payment amount due to ever-growing overcapacity, almost double the current demand. Another important factor is the increasing dependence on generation from expensive imported LNG, coal and liquid fuels.

33 Dr Ijaz Hossain, "Curbing BERC's authority sets us up for more trouble", The Daily Star, 19 December 2022: <https://www.thedailystar.net/opinion/views/news/curbing-bercs-authority-sets-us-more-trouble-3200171>

34 Ibid.

**TABLE 11. Utility-wise bulk electricity tariff, 2015, 2020, 2022 and 2023**

SERIAL NO.	DISTRIBUTION UTILITY AND VOLTAGE LEVEL	BULK TARIFF RATE, 2015 (BDT/KWH)	BULK TARIFF RATE, 2020 (BDT/KWH)	BULK TARIFF RATE, 2022 (BDT/KWH)	BULK TARIFF RATE, 2023 (BDT/KWH)
1	<b>BPDB Distribution Zones</b>				
	230 kV	4.98	5.8200	7.6040	8.1040
	132 kV	5.06	5.8495	7.6335	8.1335
	33 kV	5.12	5.9088	6.7895	7.2895
2	<b>Palli Bidyut Samity or Bangladesh Rural Electrification Board (BREB)</b>				
	230 kV	-	-	7.6040	8.1040
	132 kV	4.17	4.3238	7.6335	8.1335
	33 kV	4.23	4.3679	5.3925	5.8925
3	<b>Dhaka Power Distribution Company</b>				
	230 kV	-	-	7.6040	8.1040
	132 kV	5.68	6.3882	7.6335	8.1335
	33 kV	5.85	6.4531	7.7200	8.2200
4	<b>Dhaka Electric Supply Company</b>				
	230 kV	-	-	7.6040	8.1040
	132 kV	5.68	6.3874	7.6335	8.1335
	33 kV	5.85	6.4523	7.7480	8.2480
5	<b>West Zone Power Distribution Company</b>				
	230 kV	-	-	7.6040	8.1040
	132 kV	4.58	5.3227	7.6335	8.1335
	33 kV	4.64	5.3771	6.6275	7.1275
6	<b>Northern Electricity Supply Company</b>				
	230 kV	-	-	7.6040	8.1040
	132 kV	-	5.0033	7.6335	8.1335
	33 kV	-	5.0544	6.2050	6.7050

Source: 2015 – BERC Memo No. BERC/Tariff/BST-05/PDB/Part-I/3057, dated 27 August 2015; 2020 – BERC Order No. 2020/02, dated 27 February 2020; 2022 – BERC Notification No. 28.01.0000.012.02.001.22.4838, dated 21 November 2022; 2023 – MPEMR SRO No. 23-Law/2023, dated 30 January 2023

**6.7.2.2 WHEELING CHARGES**

The national grid operator, the Power Grid Company of Bangladesh Limited (PGCB), is allowed to recover its costs through wheeling charges. The PGCB is paid wheeling charges by the distribution companies at the rate fixed by the BERC. The wheeling charge rates effective in 2015 and 2020 are presented in the table below:

**TABLE 12. Electricity transmission wheeling charge, 2015 and 2020**

SERIAL NO.	VOLTAGE LEVEL	TARIFF RATE (BDT/KWH) 2015	TARIFF RATE (BDT/KWH) 2020
1	233 kV	0.2744	0.2857
2	132 kV	0.2768	0.2886
3	33 kV	0.2791	0.2944

Source: 2015 – BERC Order No. 2015/02, dated 27 August 2015; 2020 – BERC Order No. 2020/03, dated 27 February 2020



### 6.7.2.3 RETAIL TARIFF

Low-voltage power distributors and suppliers are governed by retail tariff rates set by the BERC, which last approved a retail tariff structure in 2020. The government has since taken over responsibility for revising the electricity tariff by means of the Ordinance mentioned above. Accordingly, three orders were issued on 12 January 2023, 30 January 2023 and 28 February 2023 effective from January, February and March, respectively.

The tariff schedule is characterised by cross-subsidisation, with low-income households and agriculture being subsidised by high-income households, commercial and industrial customers. All distribution utilities charge similar retail rates for their customers belonging to the same category. However, there is a separate tariff for consumers at higher voltage levels (11 kV, 33 kV, 132 kV and 230 kV). The retail electricity tariff structure and electricity prices for industries are shown in table 13.

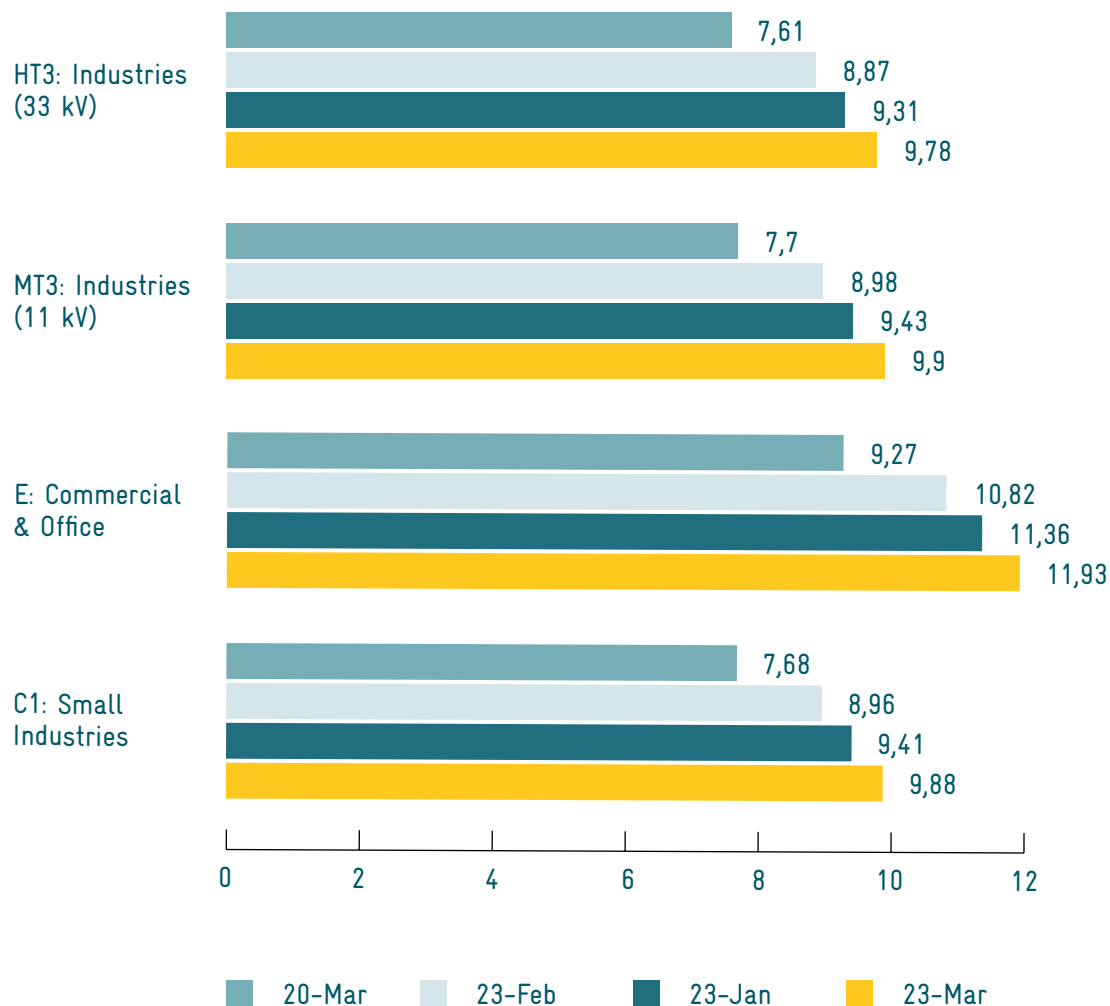
**TABLE 13. Retail electricity tariff structure**  
(Effective from March 2020, January 2023, February 2023 & March 2023)

SERIAL NO.	CONSUMER CATEGORY	MAR 2020 (BDT/KWH)	JAN 2023 BDT/KWH	FEB 2023 BDT/KWH	MAR 2023 BDT/KWH
1	<b>Category A: Residential</b>				
	a) Life Line: 1-50 units	3.75	3.94	4.14	4.35
	b) Six Steps (as per use)	4.19-11.46	4.40-12.03	4.62-12.63	4.85-13.26
2	<b>Category B: Agricultural Pumping</b>	4.16	4.37	4.59	4.82
3	<b>Category C1: Small Industries</b> (Flat Rate & Peak/Off-peak Rate)	7.68	8.96	9.41	9.88
4	<b>Category C2: Construction</b>	12.00	12.60	13.23	13.89
5	<b>Category D1: Education, Religious, Charitable, Hospital</b>	6.02	6.32	6.64	6.97
6	<b>Category D2: Road Light &amp; Water Pump</b>	7.70	8.09	8.49	8.91
7	<b>Category D3: Battery Charging Station (Flat Rate &amp; Off-peak, Super Off-peak and Peak Rate)</b>	6.11	8.02	8.42	8.84
8	<b>Category E: Commercial &amp; Office</b> (Flat Rate & Peak/Off-peak Rate)	9.27	10.82	11.36	11.93
9	<b>Category MT3: Industries (11 kV)</b> (Flat Rate & Peak/Off-peak Rate)	7.70	8.98	9.43	9.90
10	<b>Category HT3: Industries (33 kV)</b> (Flat Rate & Peak/Off-peak Rate)	7.61	8.87	9.31	9.78

i

**NOTE:**  
Industrial and commercial rates, among others, have peak and off-peak rates. Here, only the flat rate is taken.

**FIGURE 6.** Electricity prices for industries and commerce during the last four revisions (BDT/KWh) (flat rate)



Source: BERC and MPEMR Notifications (mentioned above)

It is noted that the tariff rates for commercial consumers increased by 28.69% during March 2020 to March 2023. Similar increases were observed during the same period for small industries (28.65%), MT-connected industries (28.57%) and HT-connected industries (28.52%). Figure 6 presents the steady rise in the tariff rate for the industrial and commercial enterprises.

The above-mentioned three rounds of increase in electricity tariffs in quick succession within less than two months mean the electricity cost for industries and commerce, if purchased at a flat rate, is much higher. The cost of grid electricity has reached a level that now provides a strong market signal to industries to promptly adapt rooftop solar systems to reduce operational costs<sup>35</sup> (Alam, Clean energy will reduce our fiscal burden, 2023).



35 Shafiqul Alam, Energy Analyst, Institute for Energy Economics and Financial Analysis (IEEFA), "Clean energy will reduce our fiscal burden", The Daily Star, 16 Feb 2023: <https://www.thedailystar.net/opinion/views/news/clean-energy-will-reduce-our-fiscal-burden-3248671>



### 6.7.3 Primary energy costs

The costs of primary energy, such as natural gas and diesel, for electricity generation in Bangladesh saw a steep rise this year. Notably, the industrial and commercial establishments in the country generally use natural gas and high-speed diesel for onsite electricity generation.

#### 6.7.3.1 NATURAL GAS

Using the authority assumed through the aforementioned Ordinance, the government hiked gas prices by up to 179% on 18 January 2023 – effective from 1 February – reportedly to adjust subsidies and reduce the fiscal deficit. The gas price for power, IPP and rental power generation plants was increased to BDT 14 per cubic metre from the previous BDT 5.02, while prices were hiked up to BDT 30 from BDT 16 for captive power plants, small power plants and commercial power plants. Again, the price of gas used by large, medium, small, cottage and other industries was hiked up from BDT 11.98, BDT 11.78 and BDT 10.78, respectively, to BDT 30 for all. Apart from this, the price of gas used in hotels, restaurants and other commercial areas was hiked up by BDT 3.86 to BDT 30.5 from the previous BDT 26.64<sup>36</sup> (Shamima Rita, 2023). A comparative scenario is presented in the following table:

TABLE 14. Increase in natural gas prices (per cubic metre)

SECTOR	PREVIOUS TARIFF (JUN-2022) (BDT)	NEW TARIFF (JAN-2023) (BDT)	HIKE IN %
Power	5.02	14.00	179%
Captive Power	16.00	30.00	88%
Large Industry	11.98	30.00	150%
Medium Industry	11.78	30.00	155%
Small & Cottage Industry	10.78	30.00	178%
Commercial	26.64	30.50	14%

Source: BERC (as per Notifications mentioned above)

The government embarked on imported LNG to be gasified and injected into the gas network. LNG prices lurched from record lows of under USD 2 per MMBtu in 2020 to record highs of USD 56 per MMBtu in October 2021. At one point, the high prices prompted the government to halt purchases from the spot market. The spot market price of LNG recently was USD 14.66 per MMBtu, and has currently fallen further to USD 13.69 per MMBtu. Thus, after an eight-month interval, the government began buying LNG from the spot market in February.

Bangladesh also imported six cargoes in April from long-term suppliers – Qatargas supplied four cargoes and Oman Trading International (OTI) two cargoes. Bangladesh's Brent crude-linked purchasing cost of LNG from Qatargas and OTI currently hovers around USD 10.50 per MMBtu, considering a Brent-crude price at USD 85 per barrel<sup>37</sup> (Shamima Rita, 2023). The industrial sector is already struggling due to the ongoing global economic crisis. The increase in gas prices will reduce the competitiveness of the industries. Notably, most factories are running at 60-70% capacity due to low gas pressure and low orders. In this situation, production will naturally decrease further with increased gas prices.

36 Saddam Hossain and Shamima Rita, "Gas tariff hike: Industries demand continuous supply, other benefits", The Dhaka Tribune, 20 January 2023. <https://www.dhakatribune.com/bangladesh/2023/01/20/gas-tariff-hike-industries-demand-continuous-supply-other-benefits>

37 Ibid.

### 6.7.3.2 HIGH-SPEED DIESEL

Likewise, the government hiked fuel prices by up to 51.7% on 5 August 2022, which took effect on the following day. As per the new prices, a litre of octane costs BDT 135, which is 51.7% higher than the previous rate of BDT 89. Similarly, each litre of petrol costs BDT 130, a rise of BDT 44 or 51.2%. The price of each litre of diesel and kerosene has reached BDT 114 from BDT 80, representing a 42.50% increase<sup>38</sup> (The Daily Star, 2022). This is presented in table 15:

Notably, against a backdrop of consistent demand from politicians and business circles, as well as the masses, the government reduced fuel prices by BDT 5 per litre on 29 August 2023. Experts opine that the hike in fuel prices would put extreme pressure on the economy, causing further inflation, increasing transport fares, prices of daily essentials and the production cost of goods<sup>39</sup> (The Daily Star, 2022). Notably, the inflation level in the country has been above 6% for nine consecutive months, and hit 7.48% in July 2022<sup>40</sup> (Paul, 2022).

TABLE 15. Increase in liquid fuel prices (per litre)

LIQUID FUEL	CURRENT PRICE (BDT)	NEW PRICE (BDT)	HIKE IN %
Octane	89	135	51.7%
Petrol	86	130	51.2%
Diesel	80	114	42.5%
Kerosene	80	114	42.5%

Source: MPEMR (as per notifications mentioned above)

The cost of fuel for industry and commerce has gone up owing to the sharpest fuel price hike in the country. The latest blow comes at a time when the industrial sector is already struggling because of the slowdown in orders from international buyers, lower prices of finished goods, higher raw material prices globally and the need to switch to diesel-run generators amid frequent power cuts. According to the calculation by the Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA), the overall cost of production would increase by 12-15%<sup>41</sup> (Mirdha, 2022).

38 Staff Correspondent, "Record hike in fuel prices", The Daily Star, 6 August 2022: <https://www.thedailystar.net/news/bangladesh/news/govt-raises-fuel-prices-517pc-3088736>

39 Ibid.

40 Ruma Paul, "Bangladesh announces fuel price jump, stokes inflation fears", Reuters, 6 August 2022: <https://www.reuters.com/markets/commodities/bangladesh-announces-fuel-prices-jump-stokes-inflation-fears-2022-08-06/>

41 Rafayet Ullah Mirdha, "Industries fear severe impacts of fuel price hike", The Daily Star, 7 August 2022: <https://www.thedailystar.net/business/economy/news/industries-fear-severe-impacts-fuel-price-hike-3089486>

## 6.8 Market challenges

### 6.8.1 Key challenges for solar PV investments

Realistically, there are a number of reasons restricting the expected growth of investment in the solar PV sector in Bangladesh:

1. **Challenges in accessing finance and the high cost of borrowing.** Stakeholders, such as local industries, project developers and technology providers, perceive that interest rates for clean energy projects are high and that banks are not interested in financing them for a period longer than five years. They feel that the loan disbursement process is lengthy and requires numerous documents, making many entrepreneurs and project developers less interested in the projects<sup>42</sup> (Alam, Tapping the benefits of solar rooftop projects under net metering in Bangladesh: a capacity needs assessment study, 2021).
2. **Lack of complete implementation guidelines on renewable energy.** Although Bangladesh has policies and regulations in place to promote renewable energy, their implementation and

enforcement remains challenging. The guidelines and information on necessary permissions, grid integration and the availability of substations, among other things, are inadequate.

3. **Import duties on inverters.** Applicable import duties on inverters were increased from 11% to as high as 37% in 2021, perhaps to protect the interests of local manufacturers<sup>43</sup> (Islam, 2022). But the inverters produced locally are reported to be of inferior quality compared to international standards.
4. **Technical capacity.** Bangladesh is facing technical challenges in terms of capacity and expertise in renewable energy technologies. Skilled manpower is required in areas such as the installation, operation and maintenance of renewable energy systems.
5. **Quality of renewable energy technologies.** Due to an absence of sufficient testing labs, ensuring the quality of imported panels becomes difficult, causing inconsistent expectations. The quality issue with solar panels results in a lack of confidence among private investors.
6. **Absence of a Feed-in-Tariff.** The organisations engaged in building solar PV power plants in Bangladesh opine that unless an incentive is

given for solar power tariffs, their efforts to develop the solar industry would not be economically feasible.

7. **Overcapacity in the power sector.** Bangladesh's power sector is burdened with overcapacity owing to lower capacity utilisation rates. Moreover, several other fossil fuel-based power plants are expected to be online within a short time. This might limit the space for renewable energy.
8. **Risk investment.** Bangladesh's credit rating is BB- (S&P Global Ratings), which can be perceived as discouraging by foreign investors. If the return is not high enough, foreign investors will not be encouraged to invest. The lack of project realisation information, knowledge and guidance relating to policy and regulatory compliance obligations for solar PV projects forces the developers to take risks.

42 Shafiqul Alam, "Tapping the Benefits of Solar Rooftop Projects under Net Metering in Bangladesh: A Capacity Needs Assessment Study," *Appropriate Technology* 48, no. 3 (2021): 52–55; [https://www.academia.edu/53989926/Tapping\\_the\\_benefits\\_of\\_solar\\_rooftop\\_projects\\_under\\_net\\_metering\\_in\\_Bangladesh\\_a\\_capacity\\_needs\\_assessment\\_study](https://www.academia.edu/53989926/Tapping_the_benefits_of_solar_rooftop_projects_under_net_metering_in_Bangladesh_a_capacity_needs_assessment_study)

43 Syful Islam, "Prohibitive Taxing Stymies Green Power Expansion," *Financial Express*, 12 March 2022: <https://today.thefinancialexpress.com.bd/last-page/prohibitive-taxing-stymies-green-power-expansion-1647021709>



# 7

## Market entry strategies and risks





## 7.1 Business setup

### 7.1.1 How to set up an energy business in Bangladesh

Global Climatescope<sup>44</sup> ranks Bangladesh in 41<sup>st</sup> position for all observed markets in terms of attractiveness for renewable energy investments<sup>45</sup> (Tachev, 2022). The segment in which the country is most lacking is experience. However, considering the stable fundamentals and the significant opportunities, the future of renewable energy potential in Bangladesh looks bright. Additionally, and importantly, there are high-potential investment opportunities. The country's current situation places investors in its renewable energy transition in a perfect position to be rewarded once the boom starts.

#### 7.1.1.1 LICENCE AND REGISTRATION PROCESS

A company duly registered in Bangladesh may engage in any business activities as per the object clause of the company, set out in the Memorandum and Article of Association of the Company. For foreign direct investment, there is no limitation pertaining to foreign equity participation, i.e. 100% foreign equity is allowed. Foreign investment enjoys full protection and security in Bangladesh, like other locally invested companies. Bangladesh law guarantees non-discriminatory treatment between foreign and local investment, and repatriation of proceeds from sales of shares and profit.

<sup>44</sup> Climatescope is an online market assessment tool, report and index that evaluates the relative readiness of individual nations to effectively put energy transition investment to work. It provides snapshots of current clean energy policy and finance conditions that can lead to future capital deployment and project development.

<sup>45</sup> Viktor Tachev, "Solar and Wind Power Potential in Bangladesh 2022", 14 February 2023: <https://energytracker.asia/solar-and-wind-power-potential-in-bangladesh/>

## STEPS TO FORM A COMPANY

1. Name clearance for the proposed company needs to be obtained from the RJSC, the company registration authority.
2. Drafting and signing of the following:
  - **Memorandum and Articles** of Association of the company
  - **Form I: Declaration of Registration** of the Company
  - **Form VI: Notice of Situation of the Registered Office**
  - **Form IX: Consent of Director(s) to Act**
  - **Form X: List of Personal Consenting to be Directors**
  - **Form XII: Particulars of the Directors, Manager and Managing Agents.**
3. Opening of a temporary bank account for the proposed company with any commercial bank in Bangladesh.
4. Remittance of the paid up capital amount from the account of each foreign shareholder to the bank account of the proposed company in Bangladesh.
5. Acquisition of an encashment certificate for each foreign transaction from the bank of the proposed company.
6. Submission of all required documents to the RJSC as follows:
  1. Copy of Valid Name Clearance for the proposed company
  2. Executed copy of Memorandum and Articles of Association of the Company
  3. Executed copy of Form I: Declaration of Registration of the Company
  4. Executed copy of Form VI: Notice of Situation of the Registered Office
  5. Executed copy of Form IX: Consent of Director(s) to Act
  6. Executed copy of Form X: List of Personal Consenting to be Directors
  7. Executed copy of Form XII: Particulars of the Directors, Manager and Managing Agents
  8. Copies of national ID of shareholders and directors (for Bangladeshi nationals)
  9. Copies of Tax Identification Number (TIN) Certificates for shareholders and directors (for Bangladeshi nationals)
7. Payment of government fees for registration.
8. Acquisition of the registration certificate from the Companies House.
10. Copies of passports of shareholders and directors (for foreign nationals)
11. Passport-size photos of shareholders and directors
12. Bank Encashment Certificate with respect to each foreign shareholder
13. Receipt of payment of the government fees.



### 7.1.1.2 ADDITIONAL LICENCES

After setting up the company, some additional licences or permissions may be required, depending on the expansion/scope of the business. The additional licences required for establishing an energy business are mentioned below:

1. **Trade Licence.** In order to obtain the Trade Licence, an application accompanied by the necessary documents needs to be submitted to the relevant local governmental authority (i.e. City Corporation/Municipal Council/Union Parishad).
2. **TIN Certificate.** In order to obtain the TIN Certificate, an online application needs to be submitted to the National Board of Revenue (NBR).
3. **VAT Certificate.** In order to obtain the Value Added Tax (VAT) Certificate or Business Identification Number (BIN), an online application along with the necessary documents needs to be submitted to the NBR.
4. **Import Registration Certificate and Export Registration Certificate.** In order to obtain the Import Registration Certificate (IRC) or Export Registration Certificate (ERC), an online application along with the necessary documents needs to be submitted to the Chief Controller of Imports and Exports (CCI&E).

5. **Environmental Clearance Certificate.** In order to obtain an Environmental Clearance Certificate (ECC), an application must be submitted to the Department of Environment along with the necessary documents.

6. **Fire Licence.** In order to obtain a Fire Licence, an application must be submitted to the Department of Fire Service and Civil Defence (FSCD) along with the necessary documents.

### 7.1.1.3 CAPTIVE POWER PLANT (CPP) LICENCE

An application must be submitted to the Secretary of the Bangladesh Energy Regulatory Commission (BERC) to obtain the licence for a Captive Power Plant with a capacity of 1 MW or above under Section 28 of the BERC Act 2003. If the capacity is less than 1 MW, an application for a Waiver Certificate under Section 29 of the Act will have to be submitted. However, a renewable energy project is not required to obtain a power generation licence from the BERC if the project capacity is 5 MW or less. It may be noted that a rooftop solar power project is considered a Captive Power Plant.

## 7.2 Market entry strategies

Expanding business operations into Bangladesh presents significant opportunities for German companies in the renewable energy sector. This document outlines various market-entry strategies and associated risks, with a focus on the legal forms available for establishing a local entity in Bangladesh. Understanding these options is essential to informed decision-making.

### 7.2.1 Legal forms for establishing a local entity

#### 1. Branch office

- A branch office acts as a country office of a foreign entity and can engage in commercial activities with prior approval from BIDA.
- Approval from BIDA is necessary, and can determine the terms and conditions of activities.
- Remitting profits from Bangladesh may take approximately one year from registration.
- Suitable for EPC contractors but impractical for third-party ownership models due to strict foreign exchange controls.

#### 2. Liaison office

- EPC contractors can set up a liaison office in Bangladesh for liaison, marketing and promotional activities. However, it cannot engage in income-generating business activities.
- Not suitable for RE service providers.

### 3. Local company

- Setting up a local company allows for business activities and isolates project risks.
- 100% foreign investment is allowed in most sectors, including energy, without prior approval.
- The Bangladesh Companies Act requires private limited companies to have at least two shareholders, allowing the German investor to hold 99% of shares.
- Joint ventures with local companies are also an option.
- Repatriation of dividends does not require prior approval from Bangladesh Bank.

## 7.2.2 Market entry recommendations

### 1. EPC contractors

- EPC contractors operating on a project basis and not intending to generate revenue locally can undertake projects without establishing a legal entity in Bangladesh.
- Ensure compliance with licensing and certification requirements for RE equipment.

### 2. RE service providers

- For third-party ownership models:
  - Establish a subsidiary in Bangladesh to offer tailor-made solutions to C&I consumers.
  - Obtain general business licences.
  - Comply with the 1:20 expatriate-to-local employee ratio.
- Consider the private Power Purchase Agreement (PPA) model, which is generally accepted by C&I consumers.
- Leasing models may not be necessary given the acceptance of private PPAs.

## 7.3 Market entry risks

1. **Regulatory approval.** Ensure timely approval from BIDA for branch offices and follow regulatory requirements for local companies.
2. **Foreign exchange controls.** Be aware of strict foreign exchange controls when remitting profits or dividends from Bangladesh.
3. **Licensing and certification.** Comply with licensing and certification requirements for renewable energy equipment and projects.
4. **Market acceptance.** Understand the market's preference for ownership (CapEx model) or third-party ownership (OpEx model) and tailor your approach accordingly.



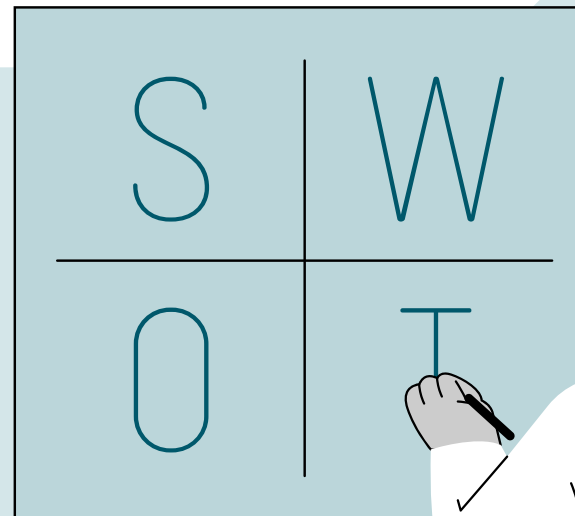
German companies entering the renewable energy market in Bangladesh have **promising opportunities** but must **carefully evaluate** their legal entity options, considering the nature of their business and market conditions.

Establishing a local subsidiary, complying with regulatory requirements and understanding market preferences are key steps towards success in this emerging sector.



# 8

Strategic considerations  
and concluding remarks



## 8.1 Opportunities for solar PV investment

Investing in solar PV in Bangladesh offers several compelling opportunities. The low cost of solar technology, coupled with the need to reduce import dependence in the country's power sector, makes it economically viable. Solar PV can be deployed rapidly in the C&I sector and with minimal maintenance requirements, making it a viable investment. Key factors supporting solar PV investment in Bangladesh include declining costs, economies of scale, a favourable policy framework and transparency in the bidding process.

## 8.2 Key challenges for solar PV investment

However, there are challenges that impede the growth of solar PV investment in Bangladesh. Accessing finance at reasonable rates and the perception of high borrowing costs discourage stakeholders. Inadequate implementation guidelines for renewable energy, increased import duties on inverters, technical capacity constraints and concerns regarding the quality of renewable energy technologies pose challenges. The absence of a feed-in-tariff, overcapacity in the power sector and perceived investment risks due to the country's credit rating further complicate the landscape.

## 8.3 SWOT analysis

### STRENGTHS

- Energy insecurity and unstable raw material supply to power plants create demand for alternative energy sources.
- High fuel prices and ongoing energy price hikes make solar energy an attractive option.
- Bangladesh's geographical location provides ample sunlight for solar power generation.
- Export-oriented manufacturing industries are motivated to meet climate goals set by international buyers.

### OPPORTUNITIES

- Government initiatives and policies promote renewable energy adoption.
- Rising demand for clean energy solutions.
- Collaboration with local partners can help navigate regulatory complexities.

### WEAKNESSES

- Absence of a smart grid hinders efficient energy distribution.
- Misconceptions among industry players about the effectiveness of solar technology.
- Tax policies may affect the implementation of renewable energy projects.
- The energy sector is heavily influenced by fossil fuel-based companies.

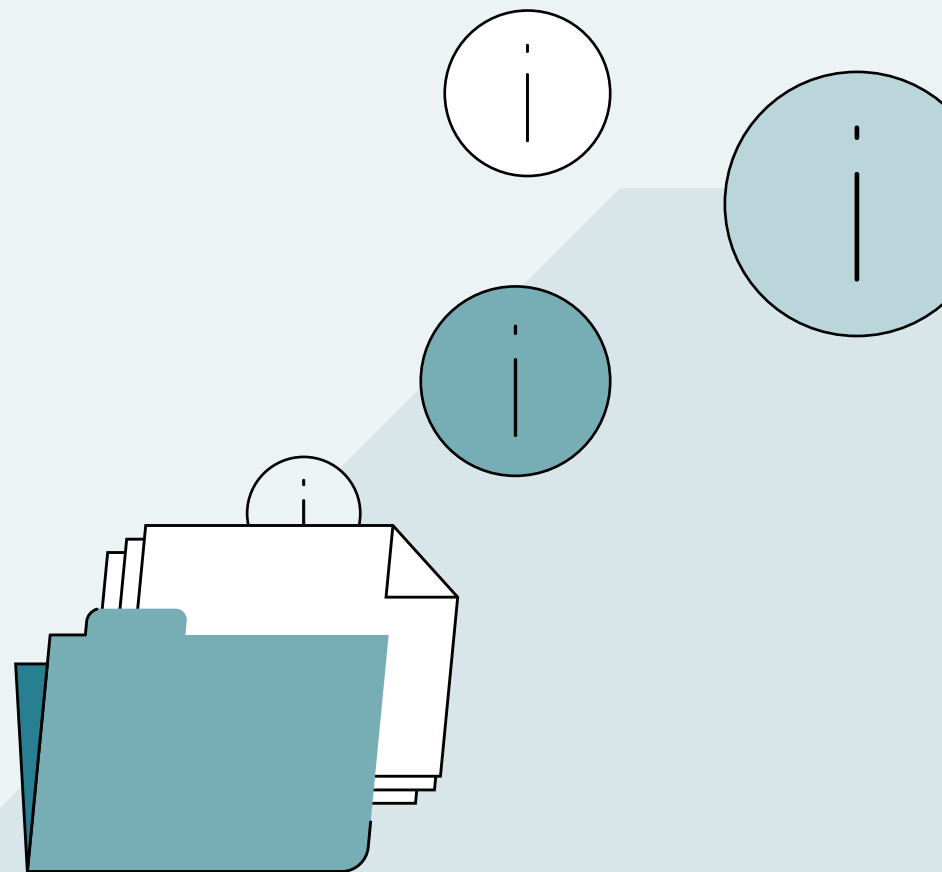
### THREATS

- Competition from fossil fuel-based energy generation companies.
- Uncertainty regarding policy stability.
- Technical and quality challenges in the renewable energy sector.
- The perception of investment risks due to the country's credit rating.

Entering the solar market in Bangladesh presents significant opportunities for German SMEs, driven by the country's energy needs, favourable policies and a growing digital economy. However, challenges such as financing, regulatory complexities and quality concerns must be addressed.

A comprehensive understanding of the local market dynamics, coupled with strategic partnerships, will be essential to succeed in Bangladesh's solar PV sector.

## Annexes



## Annex 1

### Profiles of the market players

Relevant stakeholders in the Bangladesh electricity market along with a brief description of their activities:

NAME	HEADQUARTERS	KEY BUSINESS / FUNCTION
<b>a. Public and governmental institutions</b>		
Power Division, Ministry of Power, Energy and Mineral Resources	Dhaka, Bangladesh	Power Division is the supreme policy-making institution of the government in charge of all activities relating to power system development, operation and maintenance.
Power Cell	Dhaka, Bangladesh	Power Cell is the think-tank of the power sector. It also oversees power sector reform.
Sustainable and Renewable Energy Development Agency (SREDA)	Dhaka, Bangladesh	SREDA acts as a focal point for the development and promotion of sustainable energy, comprising renewable energy and energy efficiency.
Energy and Power Research Council (EPRC)	Dhaka, Bangladesh	The EPRC develops an international online clearing house to highlight research needs in the country's energy and power sector and attracts innovative solutions to meet such needs.
Electrical Advisor and Chief Electrical Inspector (EA&CEI)	Dhaka, Bangladesh	The EA&CEI conducts electricity consumption audits, tests and provides licences/permits to electricians and technicians.
Bangladesh Power Development Board (BPDB)	Dhaka, Bangladesh	The BPDB operates most publicly owned generators and some urban distributors. It acts as a single buyer, purchasing power from public and private generators and selling to distributors.
Ashuganj Power Station Company Limited (AP-SCL)	Brahmanbaria, Bangladesh	AP-SCL is a government-owned public limited company and the largest power hub in Bangladesh.
Electricity Generation Company of Bangladesh Limited (EGCB)	Dhaka, Bangladesh	EGCB is the oldest company fully owned by the government primarily operating near Dhaka in Siddhirganj, Haripur and other power stations.

NAME	HEADQUARTERS	KEY BUSINESS / FUNCTION
North West Power Generation Company Limited (NWP-GCL)	Dhaka, Bangladesh	NWP-GCL is a state-owned power generation company operating in the West and South-West Zone of Bangladesh.
Rural Power Company Limited (RPCL)	Dhaka, Bangladesh	RPCL was the first Independent Power Producer (IPP) of Bangladesh owned by 5 (five) rural electric cooperatives (PBSs), and is registered as a public limited company incorporated in 1994.
Power Grid Company of Bangladesh (PGCB)	Dhaka, Bangladesh	PGCB is the sole operator of the national transmission grid. It schedules grid operations, wheeling energy to distributors. System operation is performed by the National Load Dispatch Centre under it.
Bangladesh Rural Electrification Board (BREB)	Dhaka, Bangladesh	BREB oversees operations of rural electric cooperatives (PBSs). It performs supervisory, regulatory and monitoring duties to ensure the technical standards and performance of the PBSs.
Dhaka Power Distribution Company Ltd. (DPDC)	Dhaka, Bangladesh	DPDC distributes energy and conducts commercial operations in the southern part of Dhaka city and adjoining areas.
Dhaka Electricity Supply Company Ltd. (DESCO)	Dhaka, Bangladesh	DESCO conducts commercial operations in the northern part of the Dhaka metropolitan area including the Mirpur, Uttara and Gulshan jurisdictions.
West Zone Power Distribution Company (WZPDC)	Khulna, Bangladesh	The WZPDC is responsible for regional distribution in the urban areas of Khulna and the Barisal Division in South-West Bangladesh.
Northern Electricity Supply Company Ltd. (NESCO)	Rajshahi, Bangladesh	NESCO is responsible for regional distribution in the urban areas of Rajshahi and Rangpur Division in North-West Bangladesh.

NAME	HEADQUARTERS	KEY BUSINESS / FUNCTION
<b>b. Partners and competitors*</b>		
Solar Construction & Engineering Ltd.	Dhaka, Bangladesh	EPC of on-grid and off-grid solar projects, industrial on-grid rooftop solar projects, on-grid rooftop solar projects for residential buildings, all kinds of solar panels and inverter importer and supplier.
XOLAREN Bangladesh Limited	Dhaka, Bangladesh	XOLAREN provides services in all renewable sectors in Bangladesh to ensure a lower carbon footprint, and to meet that purpose it is involved in rooftop solar, energy efficiency, energy assessment, engineering solutions and so on.
Nano Power Bangladesh	Chattogram, Bangladesh	Since 2001, Nano Power has been working as a manufacturer, importer and service provider for the world-class maintenance of electronics & power electrical goods, particularly RE appliances.
GRACE Technology Bangladesh	Dhaka, Bangladesh	It started its journey in 2016 and provides competitive services to the nation for RE products and appliances.
Solar World Limited	Rangpur, Bangladesh	The company initially implemented solar home system projects in Gaibandha, Bogra, Rangpur, Kurigram, Lalmonirhat, Nilphamari, Panchagarh, Thakurgaon and Dinajpur districts, and is currently diversifying its portfolio to include all kinds of services for RE.
Solar Electro Bangladesh Limited (SEBL)	Dhaka, Bangladesh	SEBL is one of the leading importers of solar panels, consumer electronics, solar charge controllers, batteries, on-grid & off-grid inverters, solar street lights & solar-related products, LED bulbs & tubes, energy-saving fans, prepaid meters, etc., and is working to promote renewable and alternative energy in Bangladesh by providing ultimate solutions to the current power crisis with solar systems, for the domestic and commercial sectors in particular, with the latest tools and techniques.

NAME	HEADQUARTERS	KEY BUSINESS / FUNCTION
Rahimafrooz Renewable Energy Ltd (RREL)	Dhaka, Bangladesh	RREL with the "Rahimafrooz Solar" brand is a leading SHS integrator and installer with over 600,000 customers based in Bangladesh since 1989. It also manufactures solar PV modules and has unique storage technology for SHS. RREL has also executed over 35 MWp of off-grid and on-grid solar projects in drinking water, irrigation, telecom BTS, street lighting, rooftops, mini-grids, with 25+ years of experience.
Energypac Electronics Ltd.	Dhaka, Bangladesh	EPC provider, supplier and installer of solar solutions, and manufacturer of LED lights.
Bengal Solar - Bengal Renewable Energy Ltd.	Dhaka, Bangladesh	Bengal Solar is one of the leading system integrators in the renewable energy arena in Bangladesh. Keeping our planet's future in mind, it is working to offer users a clean and green energy solution.
Solar EPC Development Ltd.	Dhaka, Bangladesh	Solar EPC Development Ltd. is a leading solar IPP project developer, turnkey EPC contractor, EPC management and solar project consulting company in Bangladesh's renewable energy field. It provides techno-economic feasibility, design, EPC, commissioning for utility-scale projects, commercial rooftop solar and solar irrigation.

NAME	HEADQUARTERS	KEY BUSINESS / FUNCTION
<b>c. Influencers</b> <b>e.g. economy associations and associations in the energy market</b>		
Solar Construction & Engineering Ltd.	Dhaka, Bangladesh	EPC of on-grid and off-grid solar projects, industrial on-grid rooftop solar projects, on-grid rooftop solar projects for residential buildings, all kinds of solar panels and inverter importer and supplier.
XOLAREN Bangladesh Limited	Dhaka, Bangladesh	XOLAREN provides services in all renewable sectors in Bangladesh to ensure a lower carbon footprint, and to meet that purpose it is involved in rooftop solar, energy efficiency, energy assessment, engineering solutions and so on.
Nano Power Bangladesh	Chattogram, Bangladesh	Since 2001, Nano Power has been working as a manufacturer, importer and service provider for the world-class maintenance of electronics & power electrical goods, particularly RE appliances.
GRACE Technology Bangladesh	Dhaka, Bangladesh	It started its journey in 2016 and provides competitive services to the nation for RE products and appliances.
<b>d. Foreign branches of German companies</b>		
Siemens Bangladesh Limited (SBL)	Dhaka, Bangladesh	SBL represents the entire energy business of Siemens Energy AG. At Siemens Energy, the priority is to empower customers to meet the growing global demand for energy while transitioning to a more sustainable world. It plans to accomplish this through innovative technologies, extensive energy experience and an ambitious strategy to drive the decarbonisation of global energy systems.
German Business Council (GBC)	Dhaka, Bangladesh	The GBC was formally registered as a trust on 24 December 2019. It is a platform for German businesses in Bangladesh.





## **Annex 2** **Net Metering Guidelines 2018 – application procedure**

Refer to the SREDA website for details.

→ Bengali Version

→ English Version

## **Annex 3** **Electricity Grid Code 2019 – application procedure**

Procedure for applications for connection to and use of the transmission system can be accessed via this link (Clause 5.7, page 25):

→ Electricity Grid Code 2019

## **Annex 4** **SREDA technical standards for solar appliances**

SREDA technical standards can be found here via this link:

→ SREDA technical standards

## **Annex 5** **Net Metering Guidelines 2018 – interconnection requirements**

Interconnection requirement guidelines can be accessed here:

→ Net Metering Guidelines 2018

## **Annex 6** **Electricity Grid Code 2019 – requirements for VRE generators**

Requirements for VRE generators can be accessed here (Clause 5.9, page 28):

→ Electricity Grid Code 2019

## **Annex 7** **Data on solar PV resources in Bangladesh**

→ Utility-scale grid-connected solar power plants

→ Utility-scale solar PV projects now under construction in Bangladesh

→ Planned utility-scale solar PV projects in Bangladesh

→ Net metering rooftop solar PV systems in Bangladesh

→ Rooftop solar PV projects except NEM in Bangladesh

## **Annex 8** **RE EPC companies in Bangladesh**

RE EPC companies listed on the SREDA website can be found via this link:

→ Database of Renewable Energy Stakeholders

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As a federally owned enterprise, GIZ supports the German Government in achieving its objectives in the field of international cooperation for sustainable development.

**Published by**

Deutsche Gesellschaft für  
Internationale Zusammenarbeit (GIZ) GmbH

**Registered offices**

Bonn and Eschborn, Germany

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**Programme/project description**

Project Development Programme (PDP)

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**Design/Layout**


DITHO Design GmbH, Cologne

**Maps**

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On behalf of  
German Energy Solutions Initiative of the  
German Federal Ministry for Economic Affairs and Climate Action  
(BMWK)  
Berlin  
Martina Habibes  
Berlin

Berlin, 2023



Deutsche Gesellschaft für  
Internationale Zusammenarbeit (GIZ) GmbH

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