Reimagining Clean Energy Financing
Clean energy financing

The promotion of green growth, to minimise the negative environmental impacts of economic operations, requires substantial financial commitment. Clean energy finance involves providing or enabling finance through grant, debt and equity mechanisms. The ability of energy projects to generate positive financial returns, along with environmental ones, is a pre-requisite of diverting debt and equity financing to green growth in capitalist market systems. One of the biggest challenges to clean energy is to beat conventional sources on price while increasingly matching their performance. Traditional approaches to making financial decisions are proving themselves to be insufficient as climate change presents us with environmental risks not experienced by previous generations. It is therefore of critical importance that policy makers and financial institutions respond effectively to the challenges clean energy projects face today with appropriate support and incentives for clean energy finance especially in developing countries.

Bangladesh currently stands at the crossroads of accelerated economic growth and green transformation. Over the past decade, Bangladesh’s economy has grown at an annual rate of around 6%, which is better than the growth rate of many other Asian economies. The Government of Bangladesh now aims to achieve the status of a ‘middle-income country’ by 2021 and that of a ‘high-income country’ by 2041. It is well known that electricity plays a vital role in poverty eradication, sustained economic growth, infrastructure development and security of any country. Thus, Bangladesh will need to address the barriers to higher growth posed by low access to reliable and affordable power, limited availability of serviced land, rapid urbanisation, vulnerability to climate change and natural disasters to achieve its socioeconomic growth targets.

The performance of Bangladesh’s power sector in the last five years has been impressive due to the progressive efforts of policymakers, support from developing partners in public financing mechanisms, and effective project implementation by public and private developers.

The growth in terms of capacity addition in the last 10 years has been remarkable, from around 5 GW in 2008-09 to about 14 GW in 2017-18. The total power generation capacity is close to 20,000 MW installed capacity (including captive power & renewable energy). Renewable Energy contributes approximately 3% of the total installed capacity. The country has a target of generating 24,000MW of electricity by 2021 and 60,000MW by 2041. Massive capacity enhancement and expansion projects are being undertaken in the power sector.

Further, actions proposed to match the demand-supply gap of electricity incorporates green and sustainable energy generation while responding to the pace of the economic growth of the country. Government of Bangladesh is committed to stable and sustainable power supply that will increase electricity access, enhance energy security, reduce poverty and mitigate climate change. As per the Power System Master Plan, Bangladesh aims to add 2 GW renewable energy (RE) generation to achieve installed capacity of 2,470 MW by 2021 and 3,864 MW by 2041. The Sustainable & Renewable Energy Development Authority (SREDA) of Bangladesh has set a target to achieve about 2,337 MW of RE installation by 2020, which will ensure that the share of RE installation, in the entire generation mix, reaches 10%.

Solar and wind will be the key focus areas for future capacity addition, which shall account for about 50% and 40% of the 2,896 MW of RE-based installed capacity by 2021, respectively. Given the shift in generation mix and advancement in technological interventions that the Bangladesh power sector is witnessing, significant skill upgrade and capacity building of the workforce are required to enable successful transformation. The policy, legal & regulatory and financial interventions need to be planned, designed and implemented by factoring in consumer requirements, process, technology, information requirements, organisational set-up, utility level business models, project financing mechanisms, affordability/viability improvement etc. If implemented properly, long term benefits of going green will provide opportunity for increased employment; increased energy security and industrial efficiency; and a reduction in the vulnerability to the adverse effects of climate change. A powerful combination of enabling policies, regulatory, legal and PPP frameworks, to enable market demand, are evident in multiple developed and developing nations globally to help solar and wind compete at par with conventional sources and win.
Key factors that will help fast track the growth of solar and wind market in Bangladesh are identified as follows:

1. Solar and wind have to beat conventional sources on price while increasingly matching their performance. In most of the countries, the unsubsidized levelized cost of energy (LCOE) for utility-scale onshore wind and solar PV generation has dropped even with or below most other generation technologies.

2. Solar and wind energy must help cost effectively to balance the grid. Reliable grid integration is the most important factor on technology front. While resources such as combined-cycle gas turbines (CCGT) has more flexibility to follow the load curve, increasingly affordable battery storage and other innovations are helping smoothen the effects of wind and solar intermittency, giving them more of the reliability required to compete with conventional sources. Australia and Europe have more residential and commercial rooftop solar than utility-scale solar capacity. It is raising the prospect of distributed versus utility-scale solar-plus-storage and becoming the defining competition of energy resource when grid and socket parity are reached.

3. Adopting new technologies involving automation, artificial intelligence (AI), and blockchain, as well as advanced materials and manufacturing processes, can accelerate the deployment of renewables. The technologies range from those streamlining the production and operation of renewables (automation and advanced manufacturing) to those optimizing their use (AI in weather forecasting), improving the market for renewables (blockchain), and transforming the materials of solar panels and wind turbines (advanced materials).

4. In Denmark, which has the world’s highest share of intermittent renewables (53 percent), electricity prices, exclusive of taxes and levies, are among the lowest in Europe. Consumers are key to create demand for the most reliable, affordable, and environmentally responsible energy sources. Cities will play a key role in creating demand. City administrators, city planners, developers, builders and consumers living in cities must integrate renewables into their smart city plans, community energy projects democratizing the access to the benefits of renewables on and off the grid, emerging markets leading the deployment of renewables on their path to development, and corporations expanding the scope of their solar and wind procurement. The demand aggregation will result in the downfall of technology prices.
Present Renewable Energy Financing Scenario of Bangladesh

In Bangladesh, IDCOL (Infrastructure Development Company Ltd.), a government-owned non-bank financial institution, has been promoting renewable energy technologies and pioneering financing in the sector. Most of the renewable energy activities of IDCOL are designed to ensure energy access for the rural population that are residing in the remote rural areas far away from existing grid line and sometimes are, isolated from the main land.

IDCOL’s solar home system program is the largest off-grid renewable energy program in the world which has provided electricity access to more than 45 million families. IDCOL is financing solar mini-grid to provide uninterrupted grid quality electricity to the rural communities, mainly in Char areas, where extension of grid electricity is challenging and expensive. As of now, IDCOL has approved 26 such projects of which 23 projects are operational and this intervention has brought in newer economic activities in these “Char” areas, improving their livelihood. These solar mini-grid projects ensure usage of energy efficient equipment and appliances, such as, LED lamps, LED TV, DC fans and refrigerators, etc. Use of energy efficient appliances in mini-grids also help to reduce monthly bills for the customers. IDCOL has set a target to finance 50 solar mini-grid projects by 2025.

With a view to replacing diesel pumps with solar energy based irrigation pumps, IDCOL aims to install 50,000 solar irrigation pumps and ensure clean energy access for the agricultural sector of the country. Under the program, 1,186 pumps have been successfully implemented so far. The program has enabled farmers to produce 3 crops per year due to its economic affordability and reduce carbon emissions as diesel use is reduced.

Given the land constraints for harnessing solar energy, IDCOL has started financing industrial roof-top solar projects where solar PV system will be installed on unused roofs of industrial and commercial entities. IDCOL has already approved 8 solar rooftop projects of which 3 projects (approx. 2 MWp) are operational. IDCOL has a plan to finance at least 300 MWp equivalent projects by 2022.

In addition, IDCOL has recently financed 8 MW solar grid tied project at Majhipara, Tetulia.

Under its household energy programs, IDCOL has successfully implemented Domestic Biogas & Bio-fertilizer Program and Improved Cook Stove (ICS) Program. Till date IDCOL has installed about 49,000 biogas plants through subsidy and concessional credit facility financing to its Partner Organizations. IDCOL targets to install 60,000 biogas plants by 2021. Under its ICS program, IDCOL has financed installations of 1.65 million systems and target to finance 5 million ICSs by 2021. In order to ensure sustainability of the interventions, IDCOL provides grants to the POs for market development and capacity building purposes at local level.

Till date IDCOL has invested more than USD 700 million as grant and concessionary loan for implementing various RE initiatives.

IDCOL’s total Investments in different segment of renewable energy is summarized below:

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Grant disbursed</th>
<th>Loan Disbursed</th>
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<tr>
<td>SHS</td>
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<td>368</td>
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<td>647</td>
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<td>ICS</td>
<td>664</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
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<td>47,825</td>
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</table>

(Amount in BDT million)
Terms and Conditions for

Financial Packages provided by IDCOL for Renewable Projects is given below:

**Solar Mini-grid & Solar Irrigation**

- **Facility**: Term Loan
- **Tenure**: 10 years
- **Loan Amount**: 80% of the Project Cost
- **Grace Period**: 2 year (principal only)
- **Repayment**: Quarterly
- **Interest Rate**: 6% p.a. (fixed)

**Solar Roof-top**

- **Facility**: Term Loan
- **Tenure**: 10 years
- **Loan Amount**: 80% of the Project Cost
- **Grace Period**: 1 year (principal only)
- **Repayment**: Quarterly
- **Interest Rate**: 6% p.a. (fixed)

The basic structure of some of the program

The following figures shows the basic structure of some of the program. IDCOL has developed a unique model for dissemination of RE in Bangladesh. The model has been proved effective and accepted by the beneficiaries under different programs.

**Figure 1**: ‘Fee for Service’ structure under IDCOL solar irrigation projects

**Figure 2**: Program structure under IDCOL Solar mini-grid projects

**Figure 3**: Solar Home System (SHS) Program Structure
Other Green Financing Scheme

Bangladesh Bank Re-financing Scheme

Bangladesh Bank (BB), the central bank, has launched BDT 2 billion green banking refinance scheme in 2009 that provides loans for renewable energy and energy efficiency projects such as solar, bio-gas plants, industrial ETP (effluent treatment plant), Pet bottle recycling plants, vermicomposting, hydro power, Solar Battery recycling plants, LED bulb manufacturing plants, setting up of hybrid Hoffman kiln in brick manufacturing units under the scheme - to help reduce industrial pollution and increase power supply. The fund has been named the “solar energy, biogas and effluent treatment plant sector refinance scheme”. Few more sectors have been brought under the green banking refinance scheme to build environment-friendly economy. Under the scheme, the central bank provides funds to financial institutions at 5% interest, which then provide loans to project sponsors for renewable schemes at 8 - 9 % interest. The cumulative amount refinanced under the scheme up to June, 2018, stood at BDT 3,797.25 million. In FY18, total disbursement under the BB's refinance increased by 91 percent to BDT 665.47 million which was BDT 348.80 million in FY17.

Green Transformation Fund (GTF)

In February 2016, BB has announced its intention to create a new longer term refinancing window named Green Transformation Fund (GTF) of USD 200 million (BDT16.7 billion). With a view to fostering sustainable finance, the fund will be used to ensure sustainable growth in export oriented textile leather and jute sectors conducive to transformation of green economy in the country. It is intended to facilitate access to financing, in foreign exchange, to all manufacturer-exporters in export oriented textiles & textile products and leather manufacturing sectors to import capital machinery and accessories for implementing environment-friendly initiatives. The initiatives include water use efficiency in wet processing, water conservation and management, waste management, resource efficiency and recycling, renewable energy and energy efficiency, heat and temperature management, air ventilation and circulation efficiency and work environment improvement initiatives. The disbursement, from GTF, up to FY2018 is USD 130,477 (BDT 10.9 million) in two projects.

For the future of power sector in Bangladesh

By 2041, it is envisaged that Bangladesh will require investment of about 35 billion USD (BDT 2930 billion) in the power sector. Government financing initiatives are already playing a vital role in attracting private sector investments in the renewable energy sector. Given the scale of funding requirement over the coming years, Bangladesh may need to explore other sources of financing beyond the existing ones. The current global financial market provides an opportunity to consider many options for financing which can be explored in the context of Bangladesh.

Incentives

In order to promote development of renewable energy sources in Bangladesh, various fiscal incentives can be provided to renewable energy developers. While many of these incentives supporting renewable energy does not directly lower cost of finance; but has impact on risk assessment and profitability; risk assessment indirectly lowering return expectations and therefore, cost of capital. The incentives include: Renewable purchase obligation (RPO); Renewable energy certificates (REC); Income tax holiday - 80IA benefits; Accelerated depreciation (AD); Generation based incentive (GBI); Preferential / feed-in tariffs (FIT); net metering; Duty & tax exemption / concessional duty for imports; etc.
Local currency denominated bonds in overseas market

Issue of such bonds in overseas bond markets to tap offshore capital markets can be a debt financing option. In this case, unlike external commercial borrowings (ECBs), where the issuer bears the risk of exchange rate fluctuations, the bond is issued in local currency in an attempt to shield issuers from currency risk and instead transfer the risk to investors buying these bonds. The coupon rate depends upon factors such as the issuing entity’s country rating and currency stability.

Overseas listing

Listing of Bangladesh’s profitable public power utilities in overseas markets can be explored as an equity financing option to unlock value. As it is difficult to raise equity through listing for new generation projects (because of the multiple risks involved), utilities with proven track records of stable cash flows and profitability can be listed to raise funding for the new projects. This will, however, require adherence to international accounting and governance standards. In addition to enlarging and diversifying the equity base of the companies, listing would also lead to good corporate governance practices and transparency because of the various disclosure requirements.

Strategic disinvestment

Strategic disinvestment of GoB’s stake in the public power utilities can also be explored as an option to raise equity. However, the aspects of control and the overall benefit to the people of Bangladesh, among others, will need to be considered while exploring this option.

Export credit agencies

Export credit agencies (ECAs) are government-sponsored institutions established to support the export of capital goods and services from the country. The first ECA, financing in the power sector of Bangladesh, was in 2012 for Ashuganj Power Station Company Ltd., arranged by HSBC. Generally, the credit facility tenure is of 12-13 years, including a grace period of 2-3 years. The promotion of renewable energy technologies (RET) through ECAs’ is one of the possible avenue that Bangladesh can explore.

Public Private Partnership (PPP) models

Utility Scale Renewable Energy Market Development through PPP Model for investment in renewable energy project implementation has established the bankability of renewable energy projects within the emerging regulatory framework and contributed to lowering the cost of electricity generation. Demonstration of such projects has help to mitigate the perceived risks and increase investor confidence and thus increase the availability of financing for private sector to implement such projects.

Bangladesh can also explore various PPP models. Given the investment requirement, the role of private participation will be important in Bangladesh's power sector. This requires a clear framework and greater clarity for private investors. PPPs are widely used to finance and operate infrastructure in many countries (refer to case study 2 on next page), particularly in developing regions. Risk sharing, or risk transfer, to the private sector is the key differentiator for PPPs compared with traditional public procurement, where governments carry the bulk of the risks. The advantage of PPPs is that governments and private investors share investment and delivery risks by allocating them to the parties best able to manage them, with the concepts of resiliency and sustainability increasingly tied.
Case studies

Case study 1: 12,000 MW grid-connected Solar Photovoltaic (PV) Power Projects (India)

In India, the Cabinet Committee on Economic Affairs (CCEA) have recently approved the Ministry of New & Renewable Energy's proposal for implementation of the Central Public Sector Undertaking (CPSU) Scheme Phase-II for setting up 12,000 MW grid-connected Solar Photovoltaic (PV) Power Projects by the Government Producers with Viability Gap Funding (VGF) support of INR 8,580 crore for self-use or use by Government entities, both Central and State Governments. The 12,000 MW or more capacity of grid connected solar power projects will be set up by the Government Producers in 4 years period, i.e. 2019-20 to 2022-23, thereby creating investment of about INR 48,000 crores. The Scheme will mandate use of both solar photovoltaic (SPV) cells and modules manufactured domestically as per specifications and testing requirements fixed by MNRE. The Scheme will also help in giving a push to 'Make-in-India' by encouraging Government Producers to procure solar cells and modules from domestic manufacturers. The Scheme will create sufficient demand for domestically produced solar PV cells and modules for next 3 to 4 years.

The proposal for setting up 12,000 MW Solar Power Projects will provide direct employment to around 60,000 persons for about one year in pre-commissioning activities/construction phase and around 18,000 persons for about 25 years in the operation and maintenance period. In addition, more than 1,20,000 additional employment opportunities will be created for the local population by way of involvement in setting up of Solar Power Projects and also in manufacturing of domestically produced cells and modules.

Case study 2: Gujarat Rooftop Solar Program

In 2010, the Government of Gujarat launched its pilot solar rooftop program in the city of Gandhinagar, the state’s capital. The IFC, serving as transaction advisor, helped Gujarat innovate a 5 MW solar rooftop public-private partnership (PPP) project to add power generating capacity, develop contractual models for further solar projects, and demonstrate the technical and economic feasibility of rooftop-based solar power. Under the PPP model used to finance Gujarat’s solar rooftop program, two private firms, Azure Power and SunEdison, each won 25-year concessions for 2.5 MW solar rooftop projects. The two developers will install solar photovoltaic panels on the rooftops of public buildings and private residences and connect them to the grid in Gandhinagar. The 5 MW of power is saving over 7 million metric tons of greenhouse gas emissions annually.

Azure Power and SunEdison will lease rooftop space from government and residential buildings. The building owners will receive INR) 3 (or US$0.05) for every unit of power generated. The private operators are responsible for installing the panels and connecting them to the grid, for which they will receive a feed-in-tariff of INR 11.21 ($0.18) per unit. One of the greatest successes of the pilot program has been its replicability for other cities in the state of Gujarat. The solar rooftop concept is being replicated in five other cities in Gujarat - Bhavnagar, Mehsana, Rajkot, and Surat.

Case study 3: The Maldives Rooftop Solar Program

The Government of the Republic of Maldives’ (GoM) Accelerating Sustainable Private Investment in Renewable Energy (ASPIRE) is an SREP and World Bank funded initiative to support 20 MW of private sector investment in solar PV. The first sub-project under ASPIRE, launched in April, 2015, is seeking investors for 4 MW of rooftop solar PV systems on identified public buildings in the Male and Hulhumale islands.

The installation of the rooftop solar PV systems will be based on a Design, Build, Finance, Own, Operate, Transfer (DBFOOT) model for 20 years of ownership by the selected bidder. Investors will be selected and awarded according to the lowest bid tariff. Once the bid is awarded, the investor will sign a PPA with State Electric Company Limited (STELCO) to sell electricity produced by the PV systems to STELCO at the specified rate offered by the winning bidder. The roof spaces will be leased through separate agreements between the public entities that own the identified buildings and the selected bidder.