



FOLLOW THE RENEWABLE ENERGY FINANCE: BANGLADESH PERSPECTIVE

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**M. Zakir Hossain Khan
Sabrin Sultana
Shadman Khalili**



LIST OF ACRONYMS

ADB	Asian Development Bank
APSCL	Ashuganj Power Station Co. Ltd
ATS	Advance Technology Scenario
BCDP	Climate and Development Partnership
BCRECL	Bangladesh - China Renewable Energy Company (Pvt.) Ltd.
BERC	Bangladesh Energy Regulation Commission
BPDB	Bangladesh Power Development Board
COD	Commercial Operation Date
CPGCBL	Coal Power Generation Co. Bangladesh
CSO	Civil Society Organization
ECF	Extended Credit Facility
EFF	Extended Fund Facility
EGCB	Electricity Generation Co. of Bangladesh Ltd.
EIB	European Investment Bank
FIT	Feed-in Tariff
GCF	Global Climate Fund
GNI	Gross National Income
GNI	Gross National Income
IDCOL	Infrastructure Development Company Limited
IDCOL	Infrastructure Development Company Limited
IEPMP	Integrated Energy and Power Master Plan
IMF	International Monetary Fund
IPP	Independent Power Producers
IPP	Independent Power Producer
JV	Joint Venture
LNG	Liquified Natural Gas
LOI	Letter of Intent
MCPP	Mujib Climate Prosperity Plan
MW	Mega Watts
NGO	Non-Governmental Organization
NWPGCL	North-West Power Generation Co. Ltd
NZS	Net-zero Scenario
PERC	Passivated Emitter Rear Cell
PPA	Power Purchase Agreement

LIST OF ACRONYMS

PV	Photovoltaic
RCOD	Required Commercial Operation Date
RE	Renewable energy
RPCL	Rural Power Company Ltd
RSF	Resilience and Sustainability Facility
SREDA	Sustainable and Renewable Energy Development Authority
TOPCon	Tunnel Oxide Passive Contact
USD	United States Dollar

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Lead Researcher

M Zakir Hossain Khan

Co Researchers

Shadman Sakib Khalili

Sabrin Sultana

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EXECUTIVE SUMMARY

Bangladesh has a target of generating 40% of its electricity from renewable sources by 2041, as per the Mujib Climate Prosperity Plan (MCP). However, as of the publication of the report, Bangladesh ranks 111 out of 190 countries in renewable energy usage; achieved only 4.59% of renewable energy with installed capacity of 461 MW of renewable energy capacity, mainly from solar power, and has planned another 4115 MW of projects in various stages of development. During COP28, country leaders of 123 nations including Bangladesh agreed Global Renewables and Energy Efficiency Pledge (GREEP), committing to a collective goal of tripling global renewable energy targets to double the global average annual rate of energy efficiency improvements from about 2% to over 4% by 2030. They also committed to prioritizing energy efficiency as the "first fuel" in policy, planning, and major investment decisions.

The study conducted revealed the inconsistency in Renewable Energy targets, inequitable approval of Renewable Energy projects in terms of potential of solar radiation and exaggerated tariffs in Renewable Energy projects. The report further analyses the ownership, mode of RE finance, tariff, and implementation of renewable energy projects, highlighting the role of the private sector, potential role of RSF and EIB fundings, the need for transparent and efficient procurement, and the variation in pricing strategies.

According to the report, the private sector plays a significant role in the renewable energy sector, owning 59% of the planned projects and investing 62% of the total funds. Public investment amounts to \$312 million, representing 23% of the total investment while joint venture investment of \$212 million, makes up to 15% of the overall identified investment for renewable energy generation in the country. It was found that 44.34% of total capacity (2020.30 MW) of solar projects are in the Chattogram Hill Tracts Zone, most solar radiated area while solar projects in Rangpur 18% (with combined capacity of 611.3 MW) and Mymensingh 13% (with combined capacity of 551.7 MW).

Another major point to note from the study is that the tariff rates for renewable energy vary across different owners and capacities, with private projects and unsolicited charging much higher rates than public and joint venture projects. In neighbouring countries, regulatory authorities have predetermined tariff rates based on size and publicly disclose comprehensive detailed cost estimates and tariff rates of various projects. The study revealed that average tariff rates for the private sector is almost three times higher than neighbouring and the top industrialist countries as well. This level of transparency in tariff rate determination is lacking in Bangladesh, where Bangladesh Energy Regulatory Commission (BERC) has been crippled to exercise its authority.

One recent policy shift in Bangladesh promotes "Clean Energy" over "Renewable Energy." Nevertheless, renewable energy, including solar, wind, and biomass energy, are a safer and more reliable and cost-effective technology within the current scope of this report. Within the context of Bangladesh, these additional the "Clean Energy" sources remain unproven, unreliable, and expensive supply driven.

EXECUTIVE SUMMARY

The study offers the following key lessons learned and recommendations for enhancing the renewable energy sector in Bangladesh. These include maximizing the potential of renewable energy sources, especially in the regions with high solar radiation and wind speed; as well as ensuring the best utilization of available finance for renewable energy expansion, by prioritizing solicited and competitive projects, reducing the reliance on loans and equity, and increasing the access to grants and concessional funds from national and international sources. Measures to address financing needs should include products designed to specifically address risks and credit.

One crucial focus should be assessing and mapping of renewable energy resources, as well as developing a comprehensive renewable energy finance strategy which should be obligatory to follow. It is also important to improve the tariff determination process for renewable energy projects, by adopting a transparent and consistent methodology, benchmarking with regional and global best practices, and avoiding exaggerated or inflated rates. Bangladesh must also implement a strong monitoring system for renewable energy decisions, emphasizing environmental and social standards and ensure compliance and transparency in all stages of RE projects including solar-based irrigation system with the finance from national and international sources e.g. IMF led RSF and EIB funding. Finally, it is important to focus on strengthening stakeholder collaboration on renewable energy promotion, by involving the civil society, private sector, academia, and media in the policy development, implementation, and oversight of the renewable energy sector.



1. INTRODUCTION

Renewable energy, derived from sources replenished naturally like sunlight, wind, tides, and waves, is increasingly pivotal in Bangladesh. As developing nation, Bangladesh is vulnerable to the ramifications of a potential energy crisis. Leveraging renewable energy is a strategic solution to this challenge. The investment in renewable energy in both public and private sectors in Bangladesh has gained momentum in 2022 transitioning away from non-renewable resources. These efforts align with Bangladesh's goals to curtail carbon emissions and achieve energy security as well as autonomy.

In the realm of renewable energy, solar power stands as the most promising, being the cleanest and the most sustainable option. Solar photovoltaics (PV) have emerged as a dominant solution in the energy sector in last decade, with many countries now harnessing PV systems to generate significant portions of their electricity, addressing electricity deficits like those in Bangladesh.

Additionally, Bangladesh's geographical positioning in a tropical zone enables consistent wind flow, especially in the southern regions where robust trade winds prevail in summer. This positions wind energy as a substantial contributor to the nation's electricity production. Potential sites for wind farms include coastal areas, offshore islands, hilltops, and riverbanks, particularly in Chattogram, Barisal, and Khulna divisions, where wind speeds exceed 6 m/s at 120m altitude¹.

Bangladesh achieved a significant increase in large-scale renewable energy installation, reaching 461 MWP in 2023. This (Figure-1) marked a substantial rise from previous years, with notable upward trend from 2013 to 2022 (SREDA, October 2023).

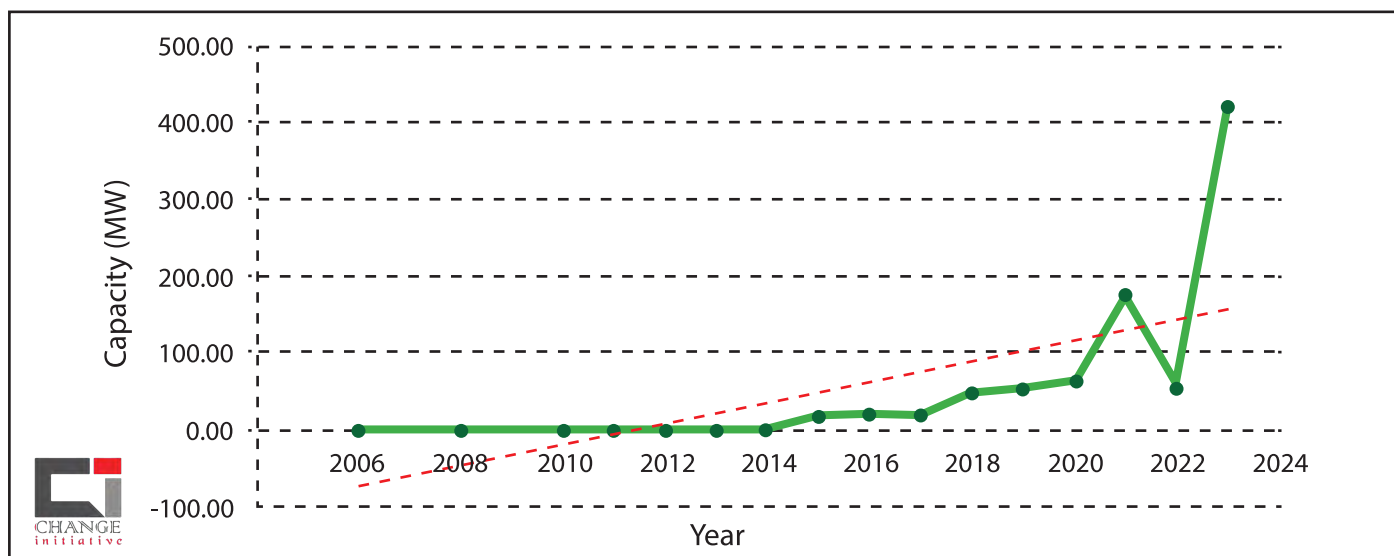


Figure 1: Year wise generation of RE large technologies
Source: SREDA, October 2023

1 <https://www.thedailystar.net/business/wind-power-plant-prospects-bangladesh-coastal-belt-1658767> Accessed on 11 November 2018

However, Bangladesh ranks 111 out of 190 countries in renewable energy usage² and achieved only 4.59% of renewable energy with capacity of 1194.78 MW (On-grid 369.16, Off-grid 825.54) in their electricity generation (SREDA, October 2023).

BPDB estimated a plan of RE generation from 2023-2027, where public sector initiatives for 1576 MW RE generation and private sector initiatives for 1493 MW (Figure-2) RE generation (BPDB, 12 July 2023).

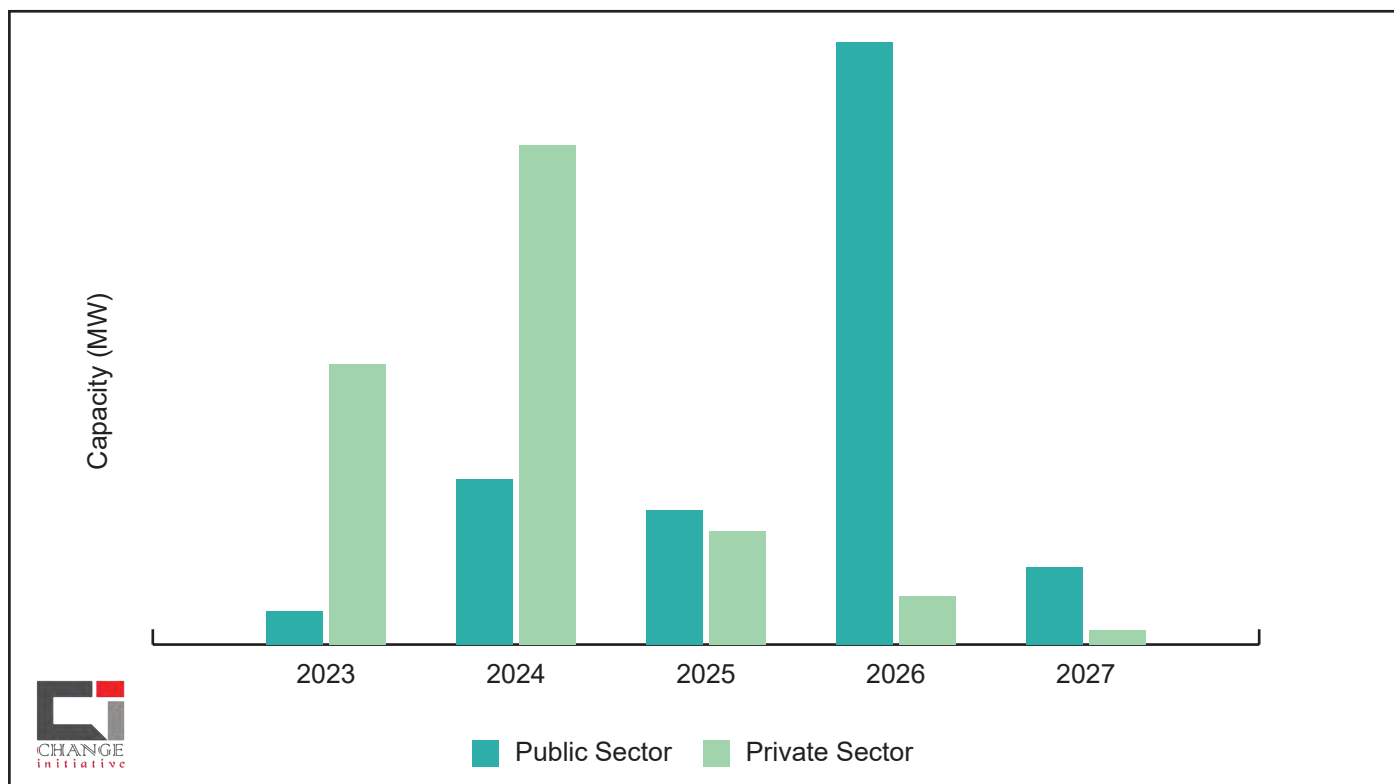


Figure 2: Estimated Renewable Energy generation plan till 2027 | Source: BPDB, 12 July 2023

Bangladesh’s energy transformation is anticipated to between 2025 and 2040, rely on 85% solar and 15% wind energy (Change Initiative, 2023). As of October 2023, Bangladesh has planned 12 wind projects with a total capacity of 359.9 MW, where three firms are in operation with totaling 2.9 MW (SREDA, October 2023).

Globally, solar technology is instilling significant optimism for the widespread adoption of renewable energy. The prices for both PERC and TOPCon Mono M10 solar cells have significantly dropped, indicating a noticeable downward trend in November 2023. As of 28th November 2023, the prices were \$0.0550/W and \$0.0616/W for PERC and TOPCon Mono M10 cells, respectively (Figure-3)³. If the prices of solar cells continue to decrease, the installation costs of solar power plants are likely to decrease as well. Therefore, it is anticipated that tariffs would supposed to decrease in the coming days.

2 <https://www.dhakatribune.com/bangladesh/power-energy/328859/cpd-renewable-energy-sector-in-bangladesh-has> Accessed on 23 October 2023

3 <https://www.pv-magazine.com/2023/12/01/m10-solar-cell-prices-dive-to-new-record-low/> Accessed on 1 December 2023

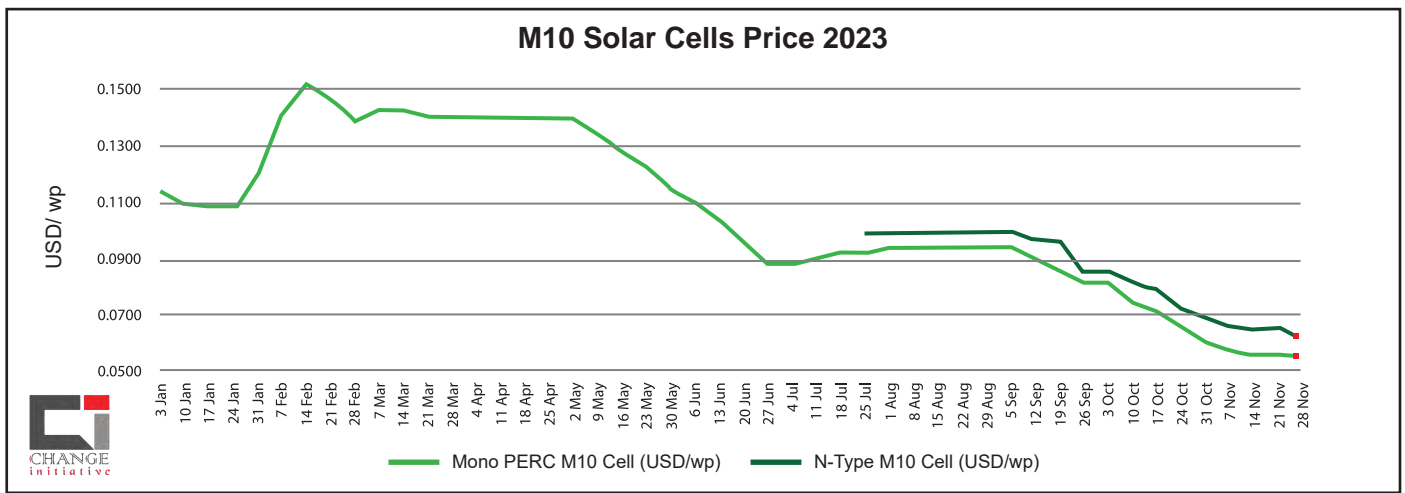


Figure 3: M10 Solar Cell Prices in 2023

The government’s role in promoting renewable energy is complemented by funding from international entities like the Green Climate Fund (GCF) and the Asian Development Bank (ADB). A combination of incentives, tax breaks, and low-interest loans are instrumental in encouraging private sector participation in any renewable energy projects. The Sustainable and Renewable Energy Development Authority (SREDA) is overseeing several megaprojects in renewable energy, with a focus on public-private partnerships to bolster private investment in this sector.

Universally, Renewable Energy primarily encompasses solar, wind, hydro, biogas, and biomass energy sources. In contrast, clean energy is an inclusive term that encompasses Nuclear, Carbon Capture and Storage, Geothermal, Ammonia, and Hydrogen. However, within the context of Bangladesh, the “Clean Energy” sources remain unproven, unreliable and supply driven.

This report on Bangladesh’s renewable energy status will be a crucial for generating empirical evidence and advocating to policymakers about strong emphasis on transparent decision making of RE Finance. By providing detailed analyses of current achievements, challenges, and potential in the renewable energy sector, it aims to offer a data-driven basis for decision-making. Such evidence is vital for convincing policymakers of the need for more robust, cohesive renewable energy finance in Bangladesh. It will also serve as a benchmark for tracking progress, identifying gaps, and guiding future strategies, thereby ensuring that policy development is grounded in realistic assessments and aimed at sustainable energy resources.

2. OBJECTIVES OF THE RENEWABLE ENERGY FINANCE OUTLOOK

- Track the progress, prospect in the RE generation and its finance in Bangladesh.
- Provide the specific way forwards for meeting targets of energy transition in Bangladesh.

3. METHODS AND DATA

The study used a mainly quantitative approach and collected secondary data to analyze the state of renewable energy project Status in Bangladesh. The study also used a review of policies, articles, and reports linked to renewable energy and its finance, as well as key informant interviews with several stakeholders including experts and CSOs. This study identifies the approved renewable energy projects in Bangladesh, its policy, plan, amount of investments and fund sources, mode of finance and critically discussed about the committed funds from the IMF and European Investment Bank (EIB).

A database of renewable energy projects compiled by the Change Initiative and created all the charts and tables on the basis of this database. The study faced constraints in acquiring all relevant secondary data of financing sources, impacting the depth of analysis. These limitations addressed in the second of the Follow the REF (FTREF-2) through rigorous primary data collection efforts, enhancing the report's robustness and accuracy.



4. RENEWABLE ENERGY: PROGRESS, PROSPECT AND PATHWAY

4.1 Global and National Commitment and Renewable Energy in Integrated Energy and Power Sector Master Plan 2023

According to the Eighth Five-Year Plan (8FYP), the Bangladesh government intended to install 10% Renewable Energy by 2025. The Mujib Climate Prosperity Plan (MCCP) aims to achieve 30% power from renewable energy by 2030 and 40% by 2041. In order to fulfill the nation's estimated electricity needs, Bangladesh would require around 18,000 MW of installed capacity from renewable energy sources to meet the country's target to generate. However, only 4.61% was achieved by October 2023 (Change Initiative, 2023). The GoB planned a total of 4095 MW generation of renewable energy by October 2027, primarily showing the upward trend in RE generation. But the concern is that the IEPMP 2023 (Figure 4) has proposed the contribution of renewable energy in the overall primary energy supply would be only 2.8% and 4.4% by 2041 and 2050 respectively. Moreover, the plan has set the overall contribution of renewable energy in power generation mix would be only 11% (solar-5%, wind-6%) on Net-zero Scenario (NZS) and 8% (solar-3%, wind-5%) on Advance Technology Scenario (ATS). This estimate contradicts the target of the Paris Agreement on climate change, Mujib Climate Prosperity Plan, Renewable Energy Policy and most importantly the commitment of the Prime Minister's to supply 40% of electricity from renewable sources by 2041.

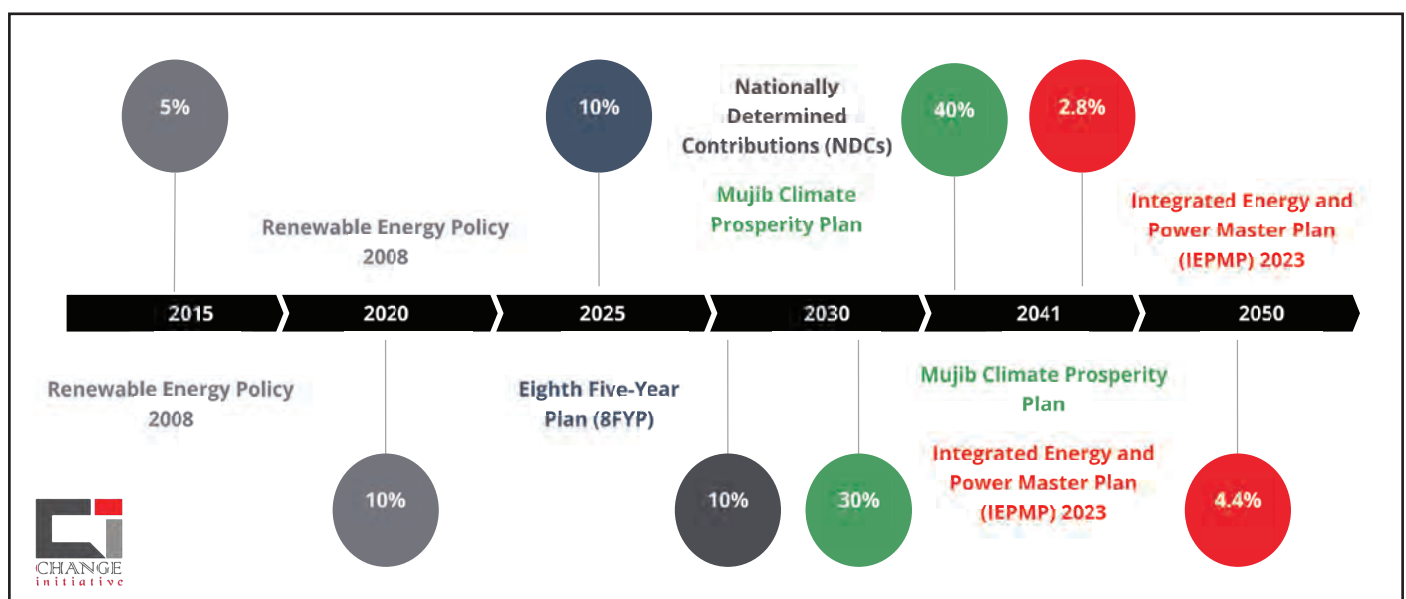


Figure 4: Renewable Energy Mix Target by Various Policies in Bangladesh

This IPEMP 2023 would discourage the national and international flow of investment to renewable energy that got momentum in 2023, global investment in renewable energy reached a record high of USD 3949.84 Million by October 2023 for 48 projects targeted to be completed within 2027. There remains a discrepancy between the various targets established in Bangladesh's climate and renewable energy policies. While the Mujib Climate Prosperity Plan sets excessively ambitious goals, the Integrated Energy and Power Master Plan of 2023 fails to adequately represent the government's commitment to renewable energy.

Bangladesh is among 123 countries, committing to a collective goal of tripling global renewable energy targets.

During COP28, country leaders of 123 nations agreed Global Renewables and Energy Efficiency Pledge to double the global average annual rate of energy efficiency improvements from about 2% to over 4% by 2030. They also committed to prioritizing energy efficiency as the “first fuel” in policy, planning, and major investment decisions. Again the target set in IEPMP 2023 directly contradicts this commitment.

4.2 Overview of Renewable Energy Expansion in Bangladesh

Bangladesh is blessed, as it is a subtropical country and an ideal location for solar radiation utilization where, about 70% of the year-round sunlight is plentiful. Daily solar radiation ranges between 4 and 6.5 kWh/m², with maximum radiation typically occurring in March and April and minimum in December and January. Thus, solar radiation can be a naturally given solution for solving the power crisis of Bangladesh as well reduce the country’s unmanageable fiscal burden. The BPDP has already been indebted to pay dues of \$3.5 billion to IPPs.

Recently, the government has taken several actions to address this issue. Several non-governmental organizations (NGO) and other international organizations are actively trying to offer solar panels, and the cost of these panels is currently reasonable. A significant part of Bangladesh’s renewable energy sector is played by solar parks, large-scale photovoltaic systems developed for the effective generation of solar power. Figure-5 below shows the approximate distribution of Renewable Energy Mega Projects, its capacity and tariff rate (USD/KWh) of Bangladesh as of October 2023.

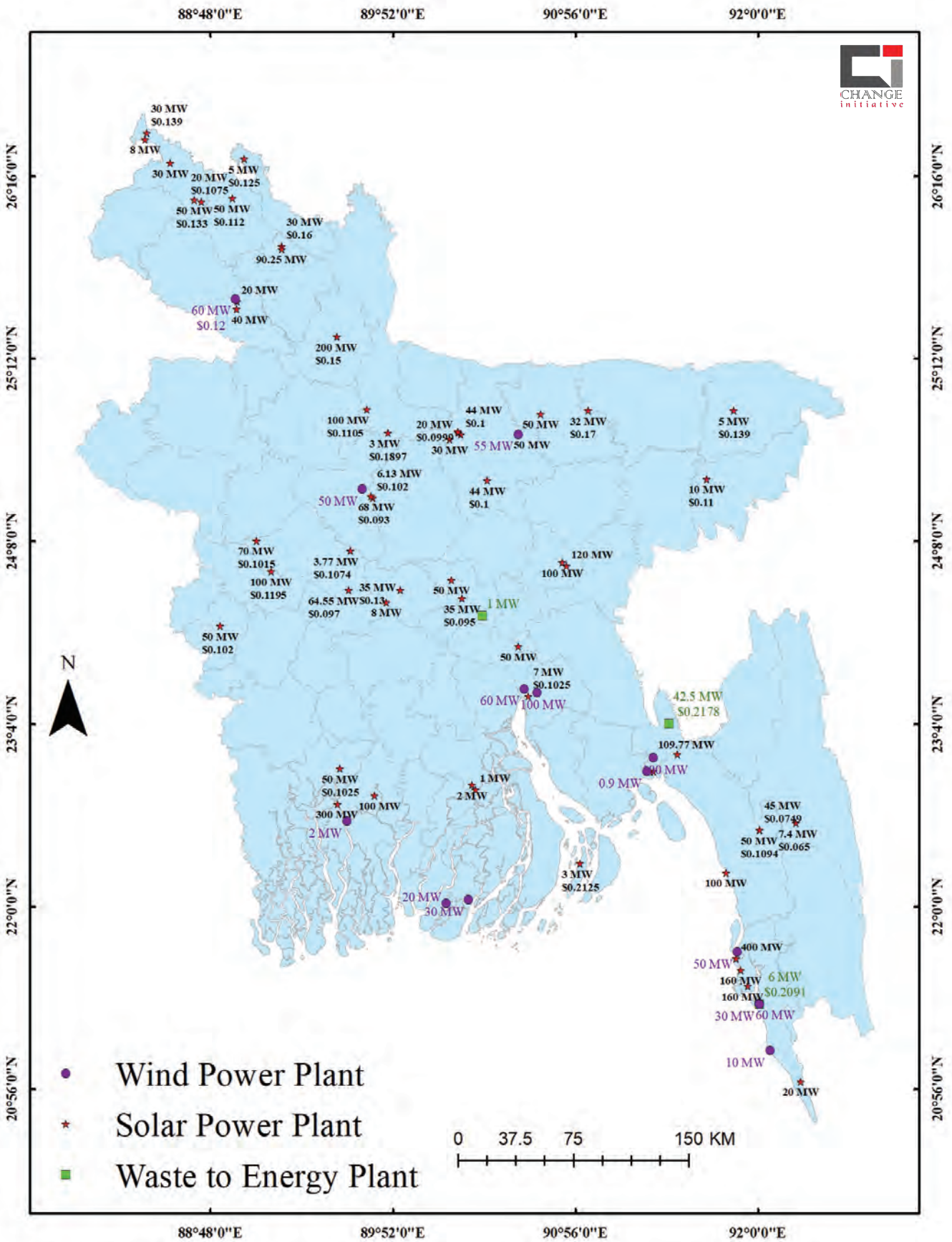


Figure 5: Renewable Energy Mega Projects of Bangladesh

4.3 Solar radiation, wind power and Location of Renewable Energy Power Plants in Bangladesh

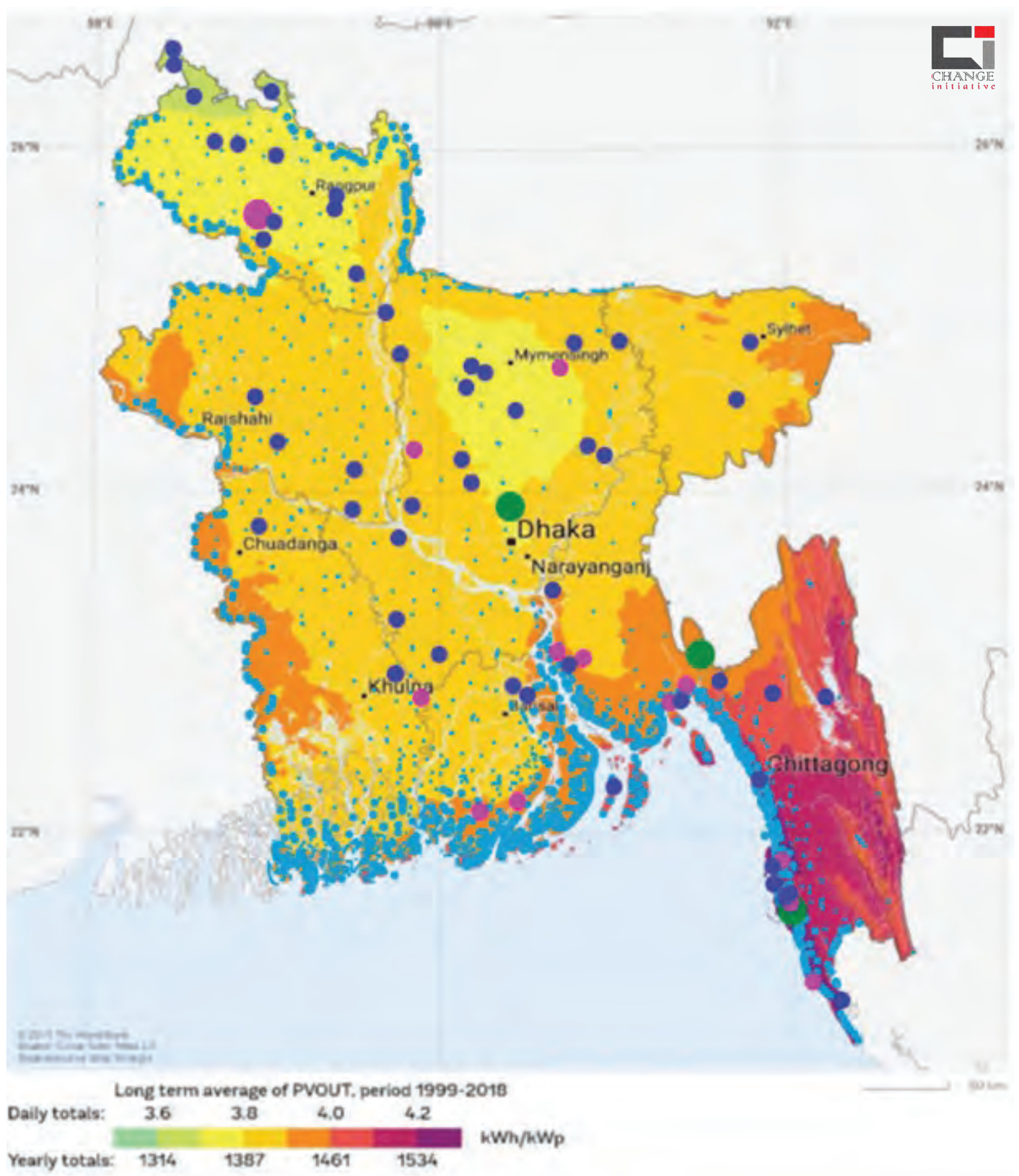


Figure 6: Renewable Energy Plant Distribution

Till to date. There are 78 renewable energy power plants with capacity of 4556.64 MW have been identified so far in Bangladesh. Of these, the majority 25 power plants with the combined capacity of 2020.30 MW or 44.34% of total capacity have been established in Chattogram division (Figure-6). It is noteworthy that the Chattogram division is found to have the most potential for both solar and wind energy according to solar radiation map as well as wind flow respectively, emphasizing its significance in renewable energy projects. In contrast, despite having medium potential the Sylhet division has the lowest number of projects, amounting to 3 power plants (4%) with a combined capacity of 47MW, the least number of projects is found in the Sylhet division, which has a medium potential for solar radiation.

Similarly, it is determined that the potential for wind and solar energy in the divisions of Khulna and Rajshahi is medium. The fact that there are also less projects in these areas, meanwhile, raises the possibility that there is unrealized potential for growing renewable energy initiatives. Investigating and funding these areas has become crucial to maximize their potential contribution to the nation's total capacity for renewable energy.

Surprisingly, despite having little potential for solar radiation and wind movement 31% capacity of overall solar power potential have been established in Rangpur and Mymensingh, more specifically, in Rangpur 18% with combined capacity of 611.3 MW and power plants of 13% with combined capacity of 551.7 MW have been established at Mymensingh.

This difference highlights how infrastructure development for renewable energy disproportionately varies between regions and undermines the science in selecting location. This puts these projects' efficiency in doubt because of the possibility that their location would result in lower or inefficient energy production than in places with more potential for renewable energy.

Since Chattogram Division has great potential for solar as well as the highest amount of non-agricultural khash land are available there the SREDA should prioritize selection of the maximum solar plants there. Moreover, the data shows that coastal zones have the highest potential for wind power too, it should also prioritize the installing wind-power plants in those zones. The draft RE policy 2022 should include the obligation of the priorities in approving solar and wind generation projects in the potential locations e.g. Chattogram division.

4.4 Installed Capacity by Ownership

As of October 2023, the planned renewable energy projects in Bangladesh illustrate a substantial private sector contribution. Among the 49 RE power plants with a total planned capacity of 2288.24 MW, 29 power plants (capacity of 1281.00 MW) are privately owned, 10 power plants (419.32 MW) are operated under the joint venture, and 10 power plants (587.92 MW) are government-owned public projects (Figure-7). This distribution highlights the significant role of the private sector in the renewable energy sector. It is emphasized that adhering to the planned projects will contribute to the overall advancement of renewable energy in the country.

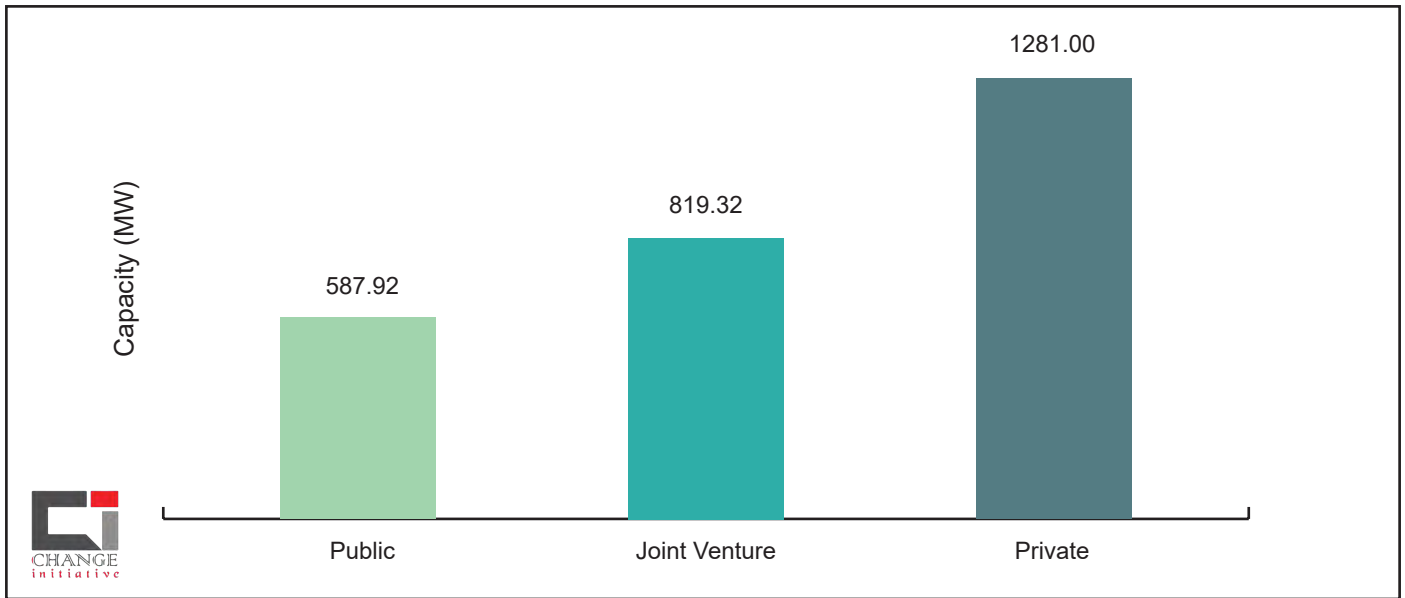


Figure 7: Installed RE Capacity by Ownership

4.5 Present Status of RE Power Plants in Bangladesh

Presently, 461 MW (10 solar power plants) of renewable energy is in operation. Projects for 411.27 MW (14 solar power plants) generation have already been initiated and signed the Power Purchasing Agreement (PPA). Moreover, 2347.02 MW energy from 27 renewable energy projects are under planning stage, likely to undergo environmental assessments, conduct feasibility studies, and following other processes. 150.00 MW from 3 renewable energy projects are waiting for PPA approval. And Letter of Intent (LOI) for 18 projects of 906.25 MW capacity has been issued by October 2023. All the projects that are under planning or PPA signed or LOI issued projects will be operational within 2027.

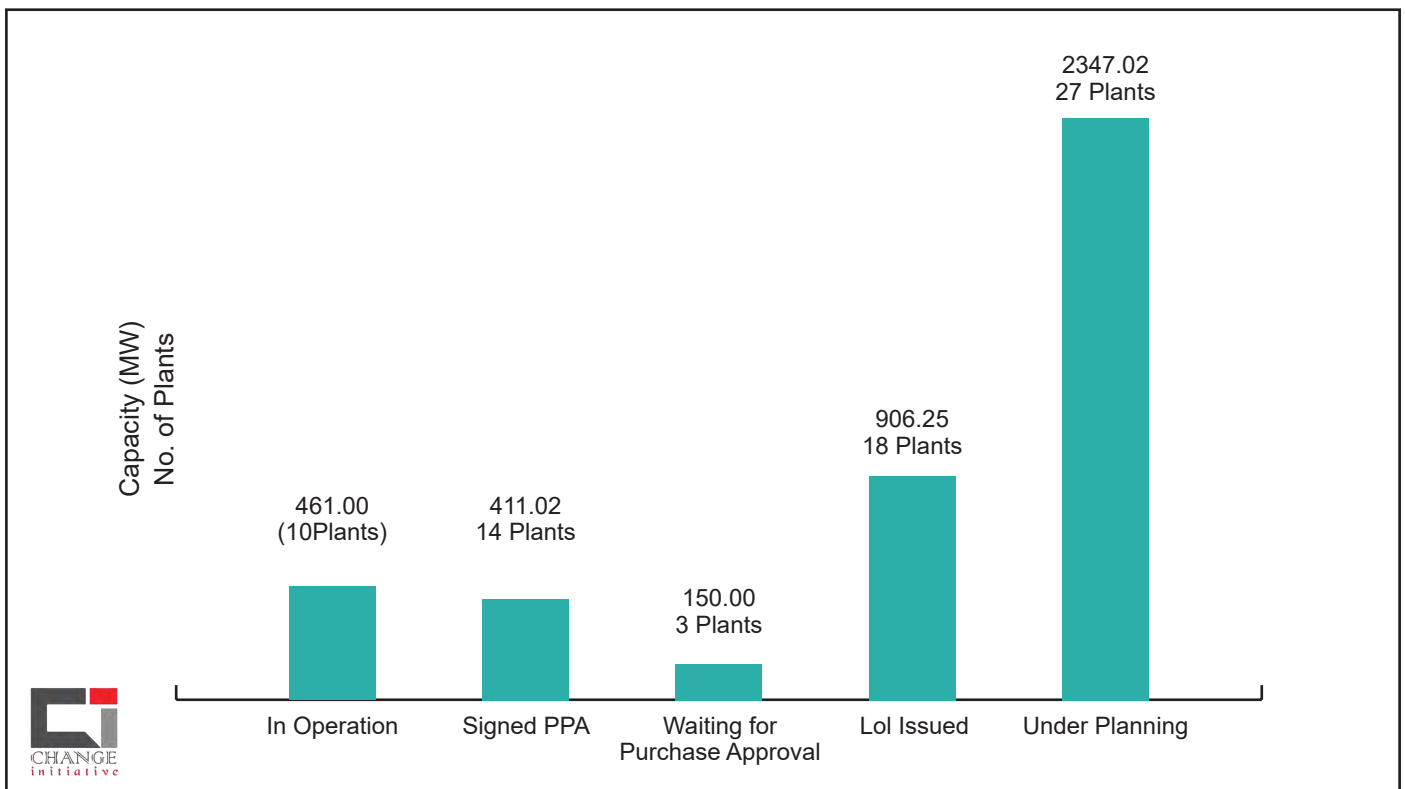


Figure 8: Present Status of RE Power Plants in Bangladesh

Figure-8 illustrates the current scenario, indicating that altogether 27 power plants with a total generation capacity of 1022 MW are However, the uncertainty surrounds 45 projects in the Under Planning and LOI issued stages, totaling 3253.27 MW, as they could potentially face rejection at any time. This dynamic and evolving landscape in the renewable energy sector in Bangladesh reflects ongoing developments and potential challenges as the projects progress through different stages of planning and approval.

4.6 Mode of Approval of the Power Purchase Agreement

In Bangladesh, the large renewable energy projects are characterized by solicited and unsolicited projects. Among the 52 RE projects, only 16.48% with a capacity of 406.25 MW are awarded solicited, while the majority, accounting for 83.17% with a capacity of 2139.29 MW, are unsolicited projects (Figure-9). This distribution highlights and majority of projects are planned without tendering process, away from competitive bidding process. Unsolicited projects are susceptible to corruption and higher tariff rates. To avoid potential losses it is important to give priority to any solicited projects during projects approval to mitigate such risks of resource wastage.

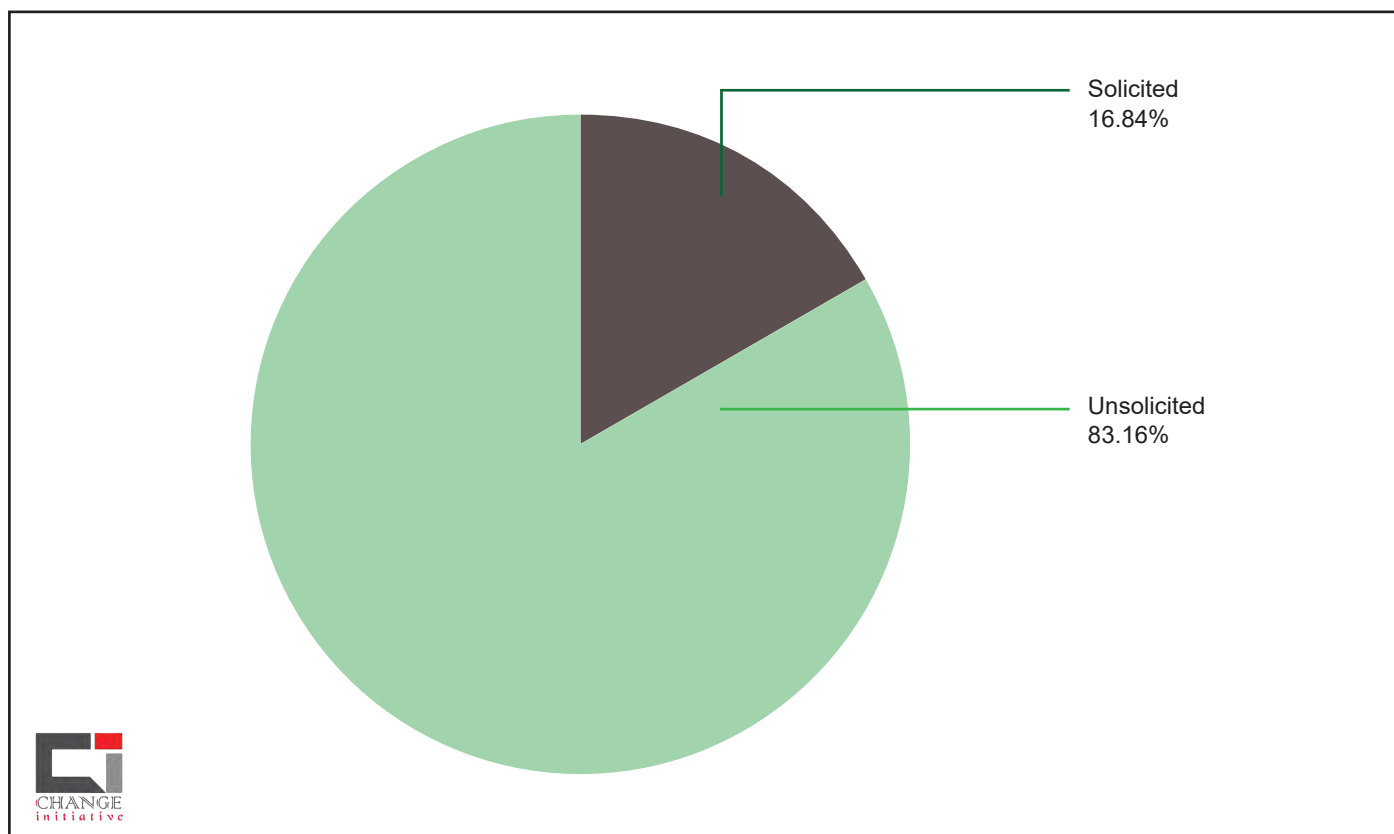


Figure 9: Mode of Power Purchase Agreement Approval

4.7 Mode of PPA Across Ownership

In terms of ownership, a noticeable trend has been observed in different large renewable energy projects in Bangladesh. Out of 52 projects, most of the private-owned projects (22 plants with 1015.00 MW) are signed on the unsolicited process and only 6 projects (266.00 MW) are solicited project. All joint-venture projects are also unsolicited (9 projects with 819.33 MW). Unexpectedly, out of the 8 public projects, 6 (305.00 MW) projects are classified as unsolicited and the remaining

2 projects (140.32 MW) are solicited (Figure-10). The prevalence of unsolicited projects in both private and joint venture projects are contrary to the efficient and transparent procurement process, the global environment, social and governance (ESG) standards too. This raises concerns about potential challenges or issues in the planning and approval processes, highlighting the unexpected predominance of unsolicited process leading towards economic risks.

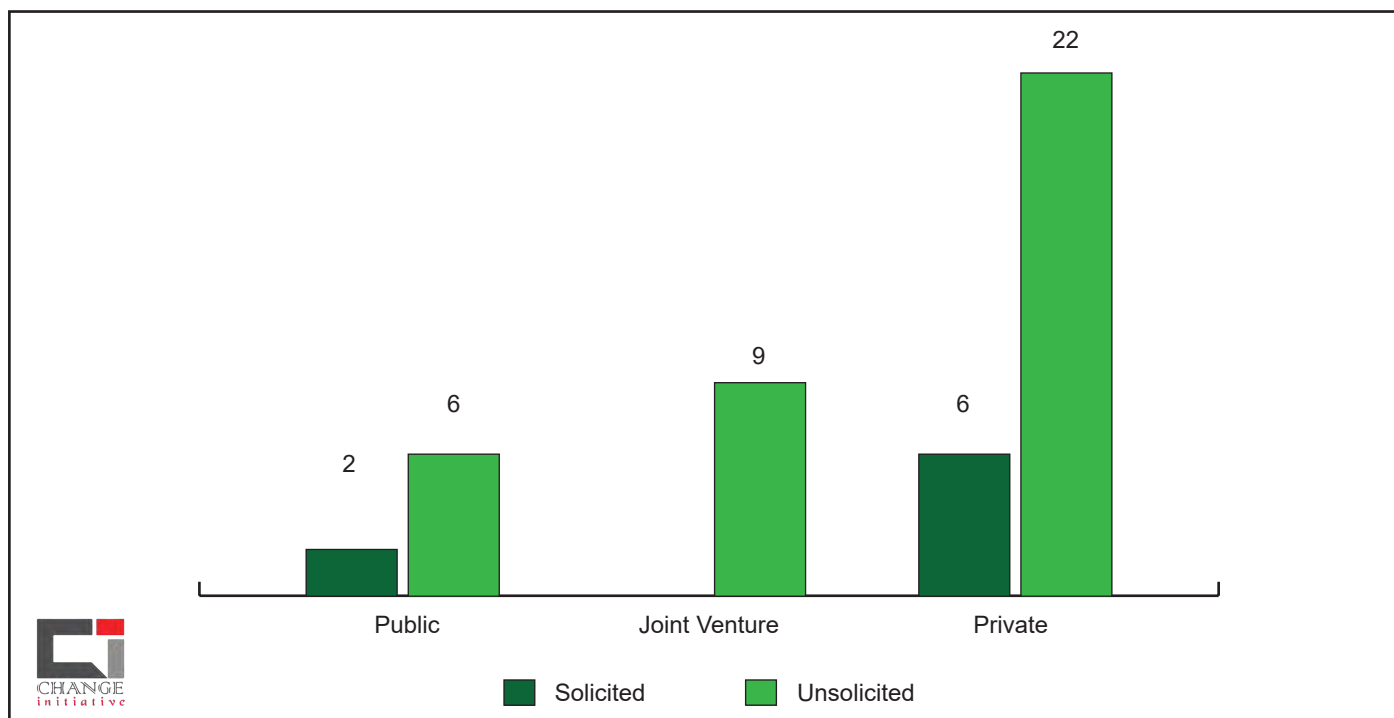


Figure10: Mode of Power Purchase Agreement Approval by Owner

4.8 Diverse Implementing Entities

The Bangladesh Power Development Board (BPDB) plays a crucial role in the execution of renewable energy projects in the country. Out of the total 78 projects, BPDB is responsible for 28 projects, contributing to a total capacity of 1459.52 MW of power supply, 35.9% of the overall renewable energy capacity. Other entities involved in the implementation include RPCL with capacity of 380.70 MW, NWBPCCL with 132.55 MW, CPGCBL with 600.00 MW, EGCB with 350.00 MW, Ashuganj Power Station Company with 220.00 MW, BCRECL with 75.00 MW, and various ‘other’ agencies are contributing 1421.87 MW (Figure-11). The distribution of project implementation showcases the collaborative efforts of different entities in advancing renewable energy initiatives in Bangladesh.

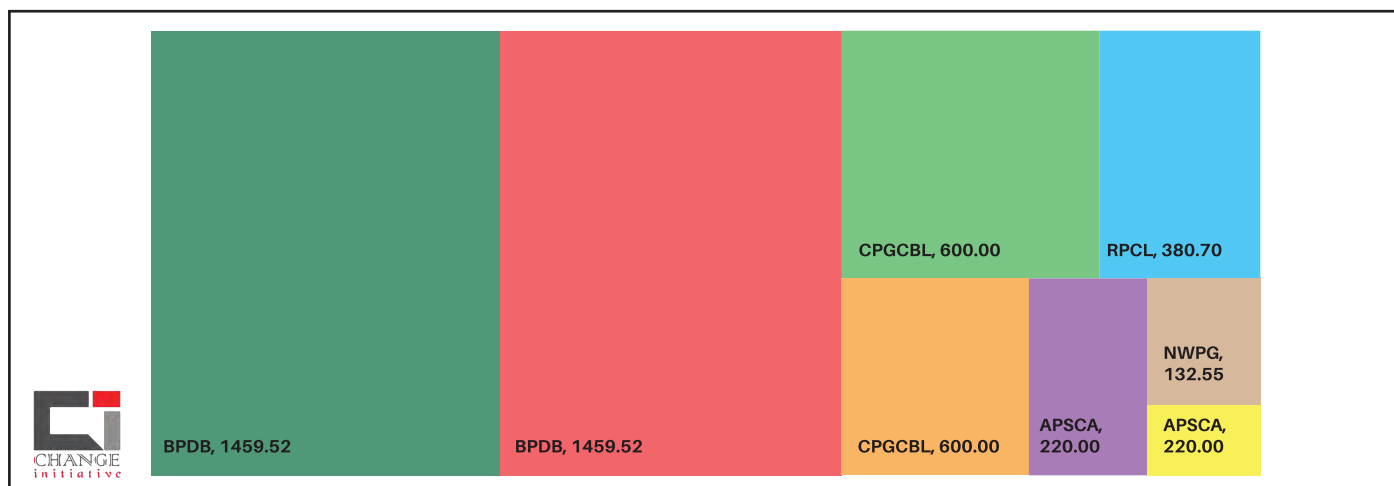


Figure 8: Implementing Entities by combined Capacity (MW) ⁴

BPDB's involvement in renewable projects demonstrates its capability in this sector. In other side of the coin when it comes to fossil fuel-based electricity generation, BPDB is currently encumbered by significant financial challenges. It is now owed approximately \$276⁵, largely due to its dependence on fossil fuel-based power plants. This reliance has led to substantial debts, primarily because of high-capacity charges which is causing banking and economic sector being unstable.

Shifting focus to renewable energy will not only alleviate similar financial strain by eliminating high-capacity charges but also align the BPDB with global trends towards sustainable energy sources. Collaborative efforts with other government entities will be crucial in this transition, ensuring a more financially stable and environmentally responsible energy future for Bangladesh.

4.9 Renewable Energy Finance: Progress and Challenges

Over the past 13 years (2010-2023), foreign investment of approximately US\$30 billion has flowed into Bangladesh energy sector, however the investments have predominantly been in fossil fuels . Approximately US\$26.5 billion would be spent over the course of the next 15 years or by 2040 if the energy mix was composed of 15% from wind, 30% from NMS solar, and 55% from IPP solar(Change Initiative, 2023).

Bangladesh had realized the total US\$ 564m investment in the renewable energy sector from 2016 – 2021 (EY, 2023). Bangladesh secured €400 million recently in funding from the European Investment Bank (EIB) and the European Union (EU) for its renewable energy generation and capacity building H. Funding includes a €350 million EIB loan, a €45 million EU investment, and a €5 million grant to install 750 MW of renewable energy capacity, supporting Bangladesh's green transition and climate mitigation goals .

However, how the fund related discussion would be inclusive and transparent that needs to be examined. Bangladesh also recently reached an agreement with IMF Bangladesh's economic policies with a 42-month arrangement of about US\$ 3.2 with US\$1.3 billion from the Resilience and Sustainability Facility (RSF). Both the funds from the IMF led RSF and EIB in renewable energy should be utilized to leverage the fund to meet the conditional targets for mitigation in the NDC and the risks arising from longer-term structural challenges.

However, these investments still do not cover the target mentioned in previous policies. An estimate by Change Initiative shows that Bangladesh by 2030, roughly USD5.00-USD9.00 billion investments will be needed alone for Bangladesh by 2030 to develop the required installed capacity from renewable energy sources. However, in the approval of both RSF led the Climate and Development Partnership (BCDP) and EIB funding related decisions particularly for the RE projects should be inclusive, transparent, and competitive bidding process with the equal opportunities for all qualified national and international renewable energy generators.

4 About 30 entities implemented 30 projects. This large quantity couldn't fit on the chart. For this reason, it was classified under "others" category.

5 <https://t.ly/NmtE9> Accessed on 11 December 2023

6 <https://www.tbsnews.net/bangladesh/energy/power-sector-fetches-30b-foreign-investment-last-13-yrs-nasrul-649318>

7 <https://www.eib.org/en/press/news/bangladesh-eur-395-million-eib-and-eu-backing-for-renewable-energy-projects>.

4.10 Finance Across Ownership

For around 30 RE projects, the total investment is around \$1374 million. Among these, public investment is US \$312 million, representing 23% of the total investment. The private sector is a significant contributor, investing around \$850 million, which constitutes 62% of the total investment. Additionally, there is a joint venture investment of \$212 million, making up to 15% of the overall identified investment for renewable energy generation in the country (Figure-12).

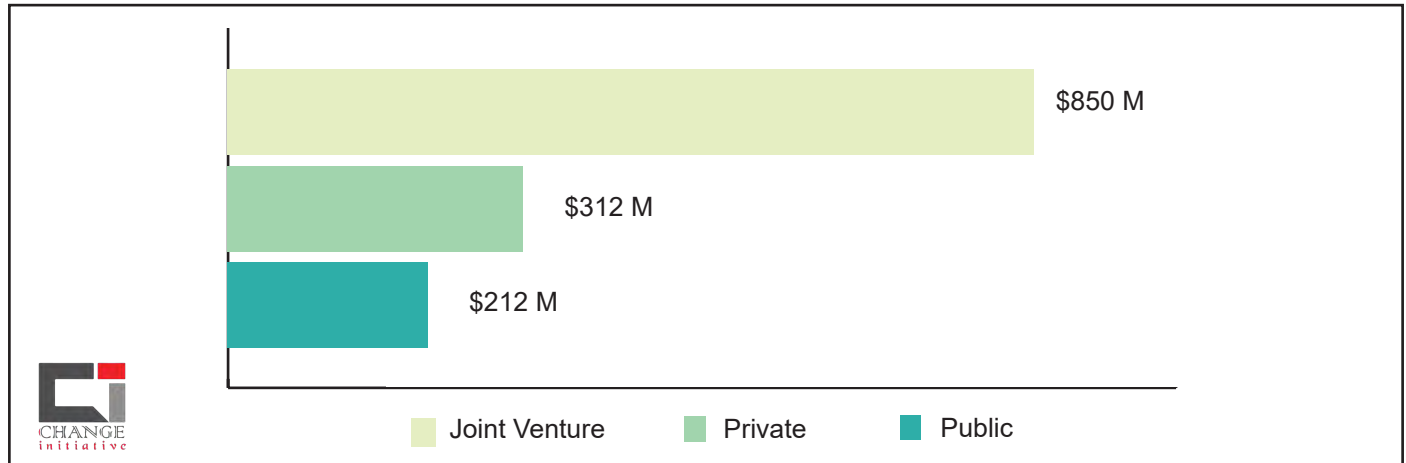


Figure 12: Finance by ownership

4.11 Mode of finance:

For thirty RE projects, 50% of the total investment would be managed as loan. Equity constituted 30%, Green Sukuk Bond accounted for 9% and rest 11% was sourced as grants. Breaking down the 50% loan, 12% are concessional loan, 28% is general loan, 2% is bridge loan, and 8% is syndicated term loan. It's important to note that grants, constituting only 11%, was exclusively allocated for only public RE projects (Figure-13).

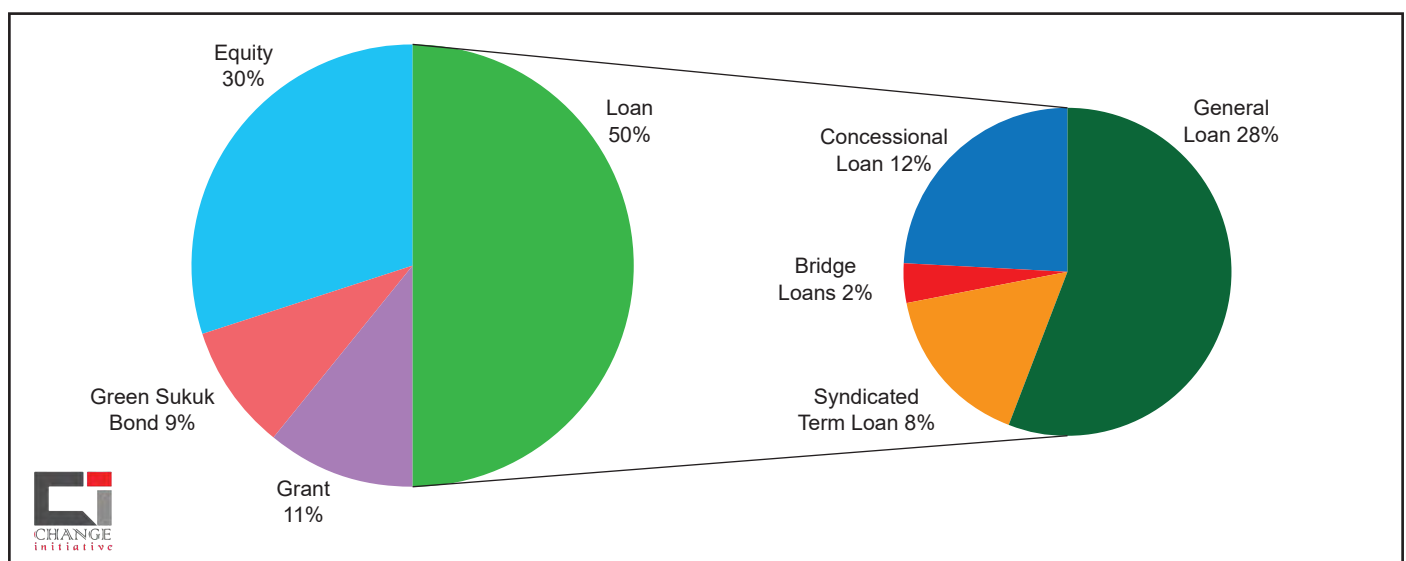


Figure 13: Mode of Finance

To produce 100 MW of electricity, only the private sector accepted the Syndicated Term Loan, which was roughly \$143 million. About \$36 million in bridge loans and \$160 million in green sukuk bonds were obtained by the private sector for 36 MW and 160 MW of energy generation, respectively. Two

hundred and sixteen million dollars was invested to produce 263 MW of power from both the public and private sectors and collected as concession loans. The Joint venture generates 344 MW and 177 MW of RE using equity and loans respectively. The private sector accessed \$412 million ' worth of equity. The public sector borrows about \$16 million in loans. For 58 MW of renewable energy to be produced, only the public sector received grant of about \$ 192 million.

The financing structure for 30 mega projects of renewable energy were diversified. Notably, Bangladesh secured grant for only two projects, one from Asian Development Bank (ADB) and another from World Bank. Around 30% of the project's funding is sourced from equity, an agreement to share power that poses a challenge. As the share of electricity generation from renewable sources increases, it becomes imperative to achieve the goal. Therefore, if the amounts allocated for loans and equity can be reduced, and if national and international private organizations can be persuaded to contribute more towards grants, it will be a significant milestone for Bangladesh's renewable energy sector.

4.12 Tariff Rate of Power Purchase Agreement:

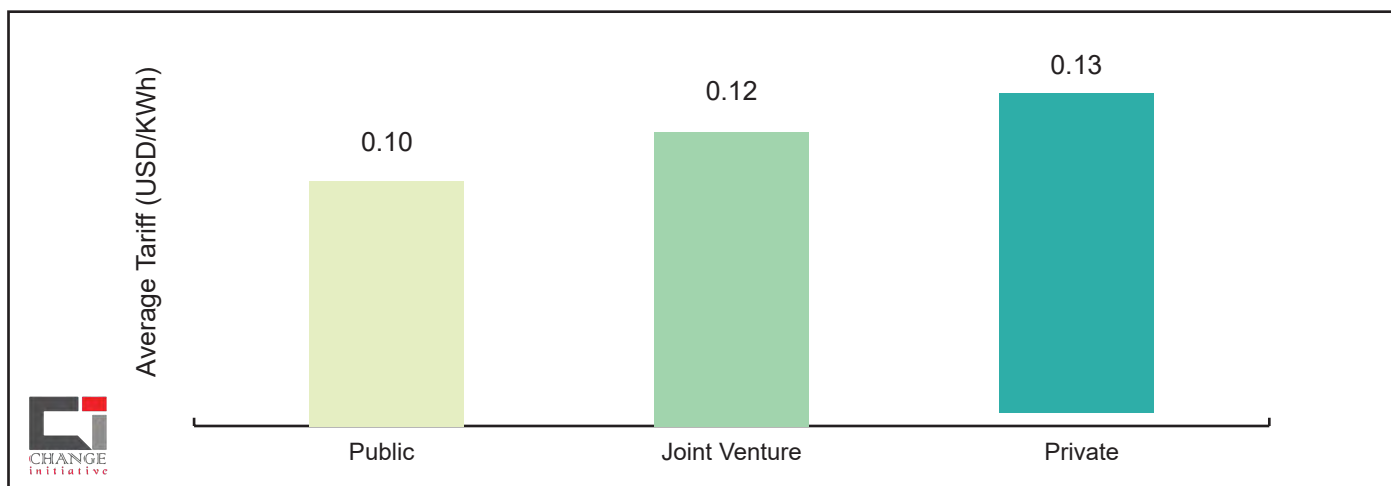


Figure 15: Average Tariff Rate of Power Purchase Agreement by Ownership

Comparatively the private projects of RE are charging a higher tariff for power purchase, specifically at a rate of \$0.13 /KWh. In contrast, public projects are offering the lowest tariff rate (\$0.10/KWh). Additionally, joint venture RE projects is charging tariffs higher than those of public projects, indicating variation in pricing strategies across different owners (Figure-15).

4.13 Average Tariff of Private Power plants by install capacity



Figure 16: Average Tariff for Solicited and Unsolicited large power plants

It seems that for unsolicited as well as largest projects the tariff rates are comparatively higher (Figure-16).

4.14 Average Tariff of Private Power plants by install capacity

Private projects in Bangladesh exhibit varying tariff rates based on their capacity of power generation. For projects with a capacity ranging from 1-50 MW, the average tariff rate is 0.13 USD/KWh. Interestingly, projects with a capacity between 51MW and 100 MW tend to have a lower tariff rate (0.11USD/KWh) than the 1-50 MW range. However, for projects with a capacity of 151-200 MW, the average tariff rate increases to 0.15 USD/KWh (Figure-17).

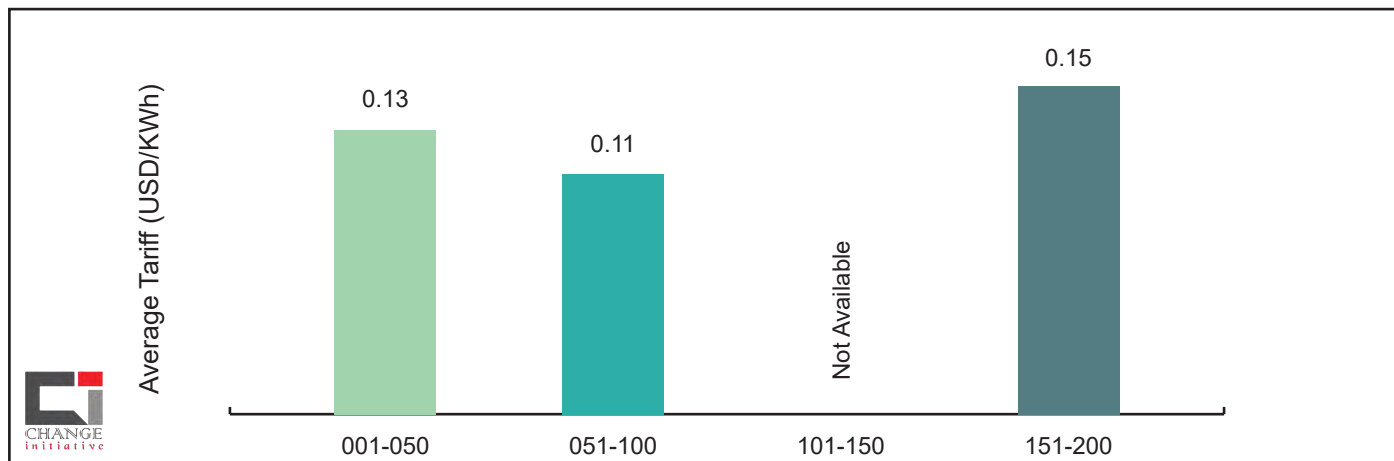


Figure 17: Average tariff of private power plants by install capacity.

4.15 Compare with neighboring countries

Despite being ranked 142nd in per capita Gross National Income (GNI)⁸, Bangladesh has a higher tariff rate for renewable power purchase compared to neighboring and East-Asian countries. Both Thailand⁹ and Vietnam’s per capita gross national income¹⁰ is double than that of Bangladesh, but it has lower tariff than that of Bangladesh. Again, G-7 country Japan ranked 30th largest per capita GNI in the World, has lower average tariff rate than that of Bangladesh. The average tariff of Bangladesh’s RE power purchase within 2022-2023 is 0.155 USD/KWh (Figure-18) is more than double than that of India and Pakistan too (Sadiqa et al., 2021).

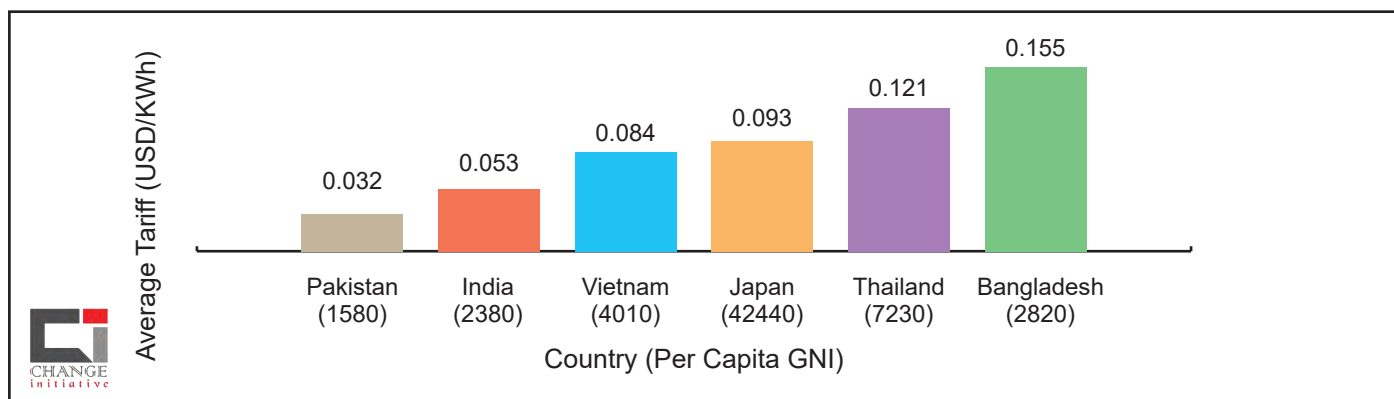


Figure 18: Country wise average tariff within 2022-2023

8 https://databankfiles.worldbank.org/public/ddpext_download/GNIPC.pdf

9 <https://solar.totalenergies.asia/countries/thailand/>

10 <https://apricum-group.com/solar-power-in-asean/>

Thailand is one of the more proactive countries in the Southeast Asia for implementation of a high feed-in tariff (FiT). FiT incentives guarantee a fixed payment rate for electricity generated from renewable sources, boosting financial appeal for the investors that are involved in these projects. Recently, Vietnam has implemented FiT programs to provide a guaranteed payment for RE electricity generation. On the other hand, Bangladesh has the highest tariff rate for RE generation compare with other neighboring countries. Till now, Bangladesh has no incentives to get FiT method to fix the tariff rate.

4.16 Exaggerated Tariff Determination

Usually, the business models that are globally followed for solar energy and other renewable energy models include both Capital expenditure (Capex) and Open expenditure (Opex). In Bangladesh, Opex model is the most widely used which allows to buy electricity from the authorizing company at a fixed rate known as tariff rate. However, in our country, the major problem persists in terms of fixation of tariff rates and alignment with any well accountable policy. Infrastructure Development Company Limited (IDCOL) is mostly responsible for setting tariff rates but they do not publicize or follow any known policy. It opens the scope of confusion and debate and comparison of tariff rates among Independent Power Producers (IPPs) of similar characteristics show differentiated tariff rates in the country. Considering land prices, the tariff rates for solar parks or IPPs can be higher than small-scale solar projects. However, the tariff rates for some rooftop solar are seen to be significantly higher than what should be. This situation poses serious questions. As per High Court order, Bangladesh Energy Regulation Commission (BERC) is the organization for settling all the disputes between two parties – license holders and consumers. Therefore, as the organization responsible for tariff rate determination IDCOL should follow government mandates on tariff set-up by BERC¹⁴. Among the documents submitted, the company must also submit the credibility of tariff determination and as well as and the process that was followed for tariff fixation.

¹⁴ The Bangladesh Energy Regulatory Commission (BERC) Act 2003 - Climate Change Laws of the World (climate-laws.org)

5 LESSONS LEARNED AND WAY FORWARD

5.1 Planning to Maximize the Potential in RE

- a. **Consistent Renewable Energy Targets:** Bangladesh's renewable energy objectives vary significantly, with the Mujib Climate Prosperity Plan setting ambitious goals, while the Integrated Energy and Power Master Plan 2023 falls short of the optimal targets. To address this, a unified vision and roadmap for renewable energy expansion needs to be adopted and followed by all relevant government entities.
- b. **Solar Power Potential:** Bangladesh possesses substantial solar power potential, with solar parks and affordable panels driving the renewable energy sector. To capitalize on this, to promote the optimal adoption of solar panels and expand the solar park projects accordingly. Also, to evaluate the efficiency of current approved LOI of the projects and consider reallocating resources to regions with greater renewable energy potential.
- c. **Regional Project Disparities:** Regional variations exist in renewable energy projects, with Chattogram division exhibiting the highest potential. To optimize energy distribution, allocate resources and investments to regions with untapped potential, like Khulna and Rajshahi.
- d. **Competitive Private for RE Sector Expansion:** Privately-owned power plants play a significant role in the renewable energy sector. Encourage and support to private sector with regards to incentive participation with while ensuring alignment with national renewable energy goals and regulations while maintaining transparency.

5.2 Ensure Best Utilization of Accessible Finance in RE

- a. Establish a dedicated Renewable Energy Finance Taskforce responsible for transparently managing RSF, EIB, and similar national/international mitigation funds while coordinating with key stakeholders, including the Ministry of Power, Energy and Mineral Resources, the Bangladesh Power Development Board, the Sustainable and Renewable Energy Development Authority, and the private sector. This taskforce will also oversee the progress and impact of both RSF and EIB funded renewable energy projects through engaging experts, CSOs and communities who have no clash-of-interest.
- b. Implement a competitive and transparent procurement process for each RE project including RSF and EIB fund allocation, ensuring equitable and efficient selection of renewable energy projects. Adhere to global standards, encompassing environmental and social safeguards, gender responsiveness, and stakeholder engagement.
- c. Create attractive incentives for the financial sector and create an enabling environment for renewable energy development alongside the international fund. Measures should encompass phasing out fossil-fuel subsidies through promoting carbon tax, innovation and transparency in green finance, repealing the Speedy Supply of Power and Energy (Special Provision) (Amendment) Act 2010, and prioritizing renewable energy over coal and LNG as over-emphasized in the draft Integrated Power and Energy Master Plan (IPEMP) 2023.

5.3 Opportunities for Enhancement in Tariff Determination Process

- a. The absence of a clearly defined and widely recognized mechanism for tariff determination is a notable issue in the energy sector including renewable energy. In neighboring countries, regulatory authorities have predetermined tariff rates based on size and publicly disclose comprehensive detailed cost estimates as well as tariff rates of various projects. This level of transparency is lacking in Bangladesh, BERC should be empowered.
- b. BERC proposes the 'Electricity transmission tariff regulations 2016' for the determination and change of tariff; it is required to apply its mandate. The higher tariff rates with varying land prices and greater distances from transmission lines is a common observation. However, case studies have shown that the differences in land prices do not always correspond proportionally to disproportionate tariff rates. To enhance transparency and accountability, relevant authorities should introduce additional measures that include specific project details, such as tariff rates and other associated costs, thus providing greater clarity for the public.

5.4 Scope of Stakeholders collaboration on Renewable Energy Promotion

- a. Implement a robust monitoring system for renewable energy decisions, emphasizing environmental and social standards like solar panel recycling. Ensure compliance and transparency in all stages of RE projects including solar-based irrigation system.
- b. Foster knowledge generation in renewable energy, addressing issues such as rural energy access, subsidy impacts, and equitable energy distribution. Promote research and information dissemination.
- c. Advocate, transparency, integrity, and competitiveness in renewable energy projects should be enabled for strengthened governance and oversight mechanisms to uphold ethical practices.
- d. Build the private sector's capacity in compliance and international finance access for renewable projects. Provide training for developing bankable projects and support for navigating regulations and securing funding.

5.5 Improving flow of finance to align with requirements of MCCP and NDC

- a. Allocate funds strategically to capitalize on the US\$10 billion investment opportunity in renewable energy generation over the next decade. Streamline subsidies to match the estimated US\$2 billion required to achieve the 40% renewable energy target, reducing the current subsidy burden of US\$2.82 billion
- b. Seek additional credit lines from international lenders to support IDCOL and BIFFL in offering longer tenors or a more competitive cost of funds to renewable energy projects.
- c. Use guarantee products through existing DFIs/MDBs to cover BPDB's weak credit profile and crowd in international commercial banks funding.
- d. Develop specific insurance products and address the current risk of currency convertibility and political instability that may deter foreign investors.

- e. Provide technical assistance in respect of auction support, land identification, and digitalization of land records to facilitate the development of renewable energy projects.

Implement a carbon tax and develop financial products that specifically target risks and credit associated with renewable energy projects. Strengthen stakeholder collaboration in promoting renewable energy by involving civil society, private sector, academia, and media in policy development, implementation, and oversight.

Instead of shifting focus towards these unproven sources, prioritizing clean energy over proven renewable energy could create unprecedented burden Bangladesh in terms of safety, security, affordability, access to resources, and energy scarcity.

One recent policy shift in Bangladesh promotes “Clean Energy” over “Renewable Energy.” Nevertheless, this study for renewable energy, including solar, wind, and biomass energy, as a safer and more reliable technology within the current scope of this report.

6. CONCLUSION

The status of renewable energy finance in Bangladesh, as elucidated in this report, presents a landscape of significant strides, challenges, and a pathway for future advancement. Bangladesh has made significant progress in the adoption of renewable energy, particularly in solar and wind energy sectors, reflecting a growing commitment towards sustainable and environmentally friendly energy sources. This transition is crucial for Bangladesh, considering its vulnerability to energy crises and climate change.

Key findings from the report indicate a robust increase in large-scale renewable energy installations, primarily solar photovoltaics, driven by both public and private sector investments. Despite these advancements, Bangladesh still faces considerable challenges, including policy inconsistencies, financing limitations, and infrastructural constraints. Notably, the disparity between the ambitious targets set by the Mujib Climate Prosperity Plan and the more conservative projections of the Integrated Energy and Power Master Plan of 2023 highlights a need for more cohesive and realistic policy frameworks. Financially, the renewable energy sector has witnessed significant investments, predominantly in the private sector, augmented by international funding and government incentives. However, the disproportionate focus on fossil fuels in foreign investments underscores the need for a more balanced and strategic allocation of resources towards RE

The report’s comparative analysis with neighboring countries reveals that Bangladesh’s renewable energy tariffs and investments, while substantial, require strategic adjustments to enhance competitiveness and attract more investment.

Looking ahead, the future prospects of renewable energy in Bangladesh are promising, given the government's commitments to sustainable energy and international climate agreements. However, achieving these goals will necessitate a more integrated approach, combining effective policymaking, robust financing mechanisms, and infrastructural development. Recommendations include aligning policy objectives with implementation strategies, fostering a conducive environment for private investment, and addressing the infrastructural needs of the renewable energy sector.

In summary, while Bangladesh has made considerable progress in renewable energy adoption, significant efforts are still required to harmonize policies, optimize financing, and overcome infrastructural challenges. Achieving a sustainable energy future for Bangladesh will hinge on a

concerted effort from all stakeholders, underpinned by realistic, cohesive, and strategic planning. The potential for renewable energy in Bangladesh is immense, and with the right policies and investments, the country can effectively transition to a sustainable and energy-secure future.

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