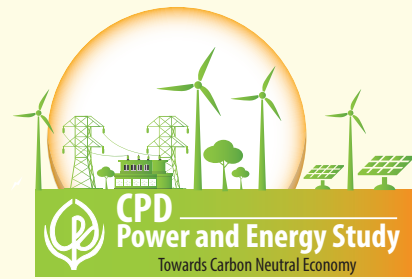


Policy Brief

Issue: 1
March 2024



Highlights

- Bangladesh and China present stark contrasts in renewable energy utilization, with Bangladesh ranking low and China leading globally. Bangladesh can learn from China's rapid advancement in renewable energy.
- Bangladesh aims for a 40% renewable energy share by 2041, with plans for solar, wind, hydro, and bioenergy expansion, drawing lessons from China's success and investment strategies in renewable energy.
- Despite significant Chinese investment in global renewable energy, Bangladesh remains a minor recipient. Increased Chinese investment could significantly aid Bangladesh's renewable energy sector.
- Chinese investors face various challenges in Bangladesh's renewable energy sector, including infrastructure deficits, financing and administrative difficulties, and technological gaps, necessitating policy, administrative, and legal improvements.

How Bangladesh's Renewable Energy Sector Can Attract Chinese Overseas Investment Addressing the Challenges

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1. Introduction

In the field of renewable energy development, there is a large gap between Bangladesh and China. In 2022, China was far ahead in renewable energy utilisation, while Bangladesh was ranked 187th out of 196 countries. For developing countries such as Bangladesh, China's experience in renewable energy is a lesson to be learned. In the past 40 years, China has made an amazing comeback from being a laggard in renewable energy to becoming a global champion. As of June 2023, China's installed non-fossil energy generation capacity reached 51.5 per cent of its total installed capacity. It constituted 1.39 billion kilowatts and represents an 18.6 per cent increase from the previous year. Breaking down the non-fossil energy capacity, it was observed that hydropower was 420 million kilowatts, wind power was 390 million kilowatts and solar power was 470 million kilowatts (China Electricity Council, 2023). China has been able to successfully embrace renewable energy thanks to a well-developed legal system, the building of institutional capacity, and the utilisation of advanced technologies. Overall, China's success in developing renewable energy is worthwhile for Bangladesh to learn from, and most importantly Bangladesh needs to attract Chinese investment in renewable energy sector.

2. Bangladesh's Current Energy Mix and Energy Transition Programme: Learning from China's Experience

As of 2023, Bangladesh's renewable energy sources accounted for only a fraction of 2.66 per cent of the total generation capacity. The total generation capacity of renewable energy is 689 MW.

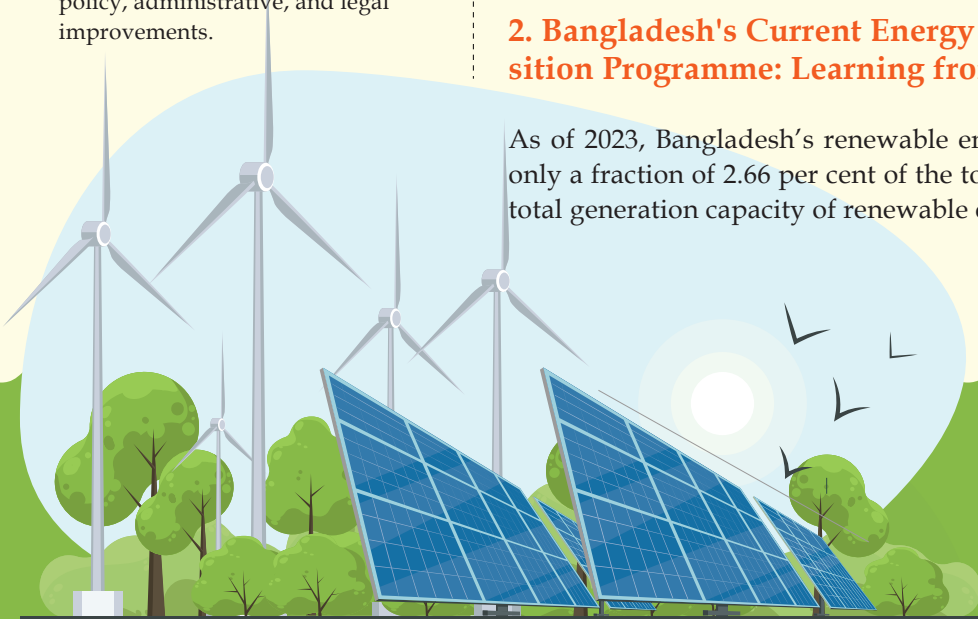
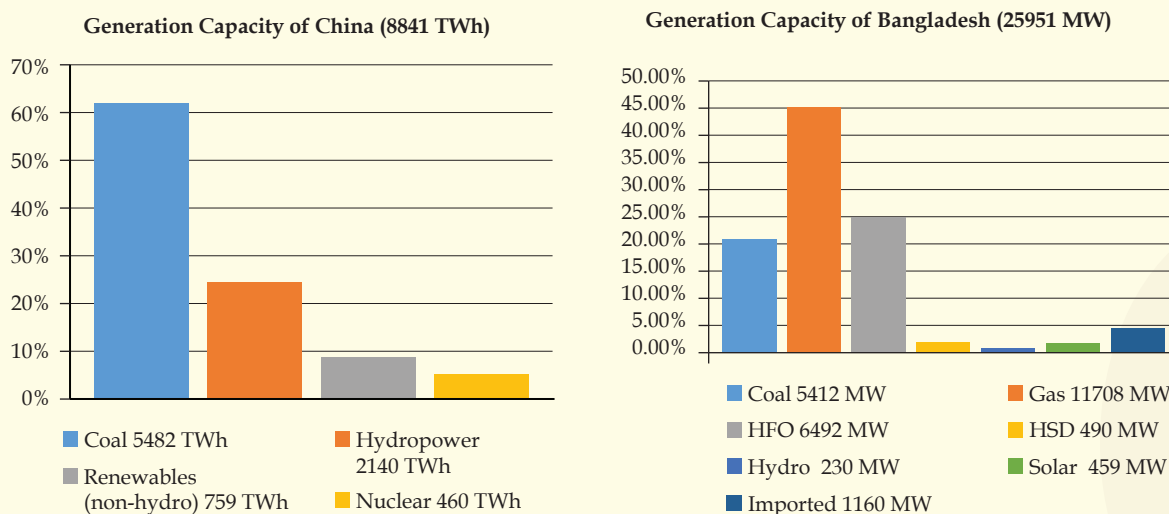


Figure 1 Generation Capacity of Bangladesh and China



Source: Bangladesh Power Development Board and BP Statistical Yearbook of World Energy 2022.

Bangladesh is formulating an ambitious renewable energy development roadmap for a successful transition from fossil fuels to renewable energy. This vision contains substantial goals, especially for Bangladesh proposes a 40 per cent share of renewable energy by 2041, underscoring the country’s strong commitment to implementing a clean energy programme. The roadmap outlines strategic mandates for each renewable energy sector. Among them, solar energy is a top priority, calling for the expansion of rooftop and ground-mounted photovoltaic installations. Promoting the widespread adoption of solar energy in homes and businesses. Solar microgrids are to be installed in rural areas to ensure access to off-grid energy. Bangladesh suggests to fully utilise coastal and offshore wind power, with plans to develop wind farms and innovative offshore wind turbine technology to break land constraints. Another strategic task is to optimise hydropower for efficiency and sustainability, with continued exploration of small hydropower plants in rural communities. The vision also addresses bioenergy and biomass, proposing to convert agricultural wastes into sustainable biogas generation and biomass power resources, while promoting the use of efficient biomass stoves to reduce firewood consumption.

On the other part, China has made significant progress in its transition to renewable energy, thanks to its well-established legal system, institutional capacity building, and utilisation of advanced technologies. In 2021 China’s renewable energy generation was account for 29.4 per cent of the country’s total power generation, a huge leap from 7 per cent a decade ago. As of June 2023, data from the Global Energy Monitor shows China has invested in 23 projects in Bangladesh’s energy sector with a size of nearly USD 7 billion, covering both fossil fuels and renewable energy.

China's strong development of renewable energy is accompanied by aggressive future planning to solidify its global leadership role in the clean energy transition. With ambitious targets including 1,200 gigawatts (GW) of installed wind and solar capacity by 2030, China's dominance in renewable energy is expected to grow as efforts continue. In addition to optimising the energy mix, efforts will be needed in the transportation, heating and industrial sectors. China continues

to promoting technological advances, investing heavily in development of emerging renewable energy technologies, such as offshore wind power, advanced solar technology and hydrogen fuel cells, while actively developing emerging renewable energy technologies, while actively developing energy storage solutions such as pumped storage and batteries to realise a variety of renewable energy sources and energy storage solutions such as pumped hydro storage and batteries, so as to realise the seamless integration of multiple renewable energy sources. China is also using artificial intelligence and digital technology to modernise its smart grid and enhance its adaptability to a diverse energy mix. On the policy front, the launch of initiatives such as the national carbon emissions trading market, green power certificates for renewable energy, and the development of global co-operation are a combination of China's efforts to promote sustainable energy development globally.

3. Bangladesh's Renewable Energy Sector Attracts Overseas Investment: The Case of Chinese Overseas Investment

Bangladesh's power and energy sector has attracted significant overseas investment over the last few decades. According to the International Energy Agency (IEA), the cumulative investment in Bangladesh's energy sector from 2010 to 2022 totaled about USD 39 billion, of which about USD 1 billion was invested in renewable energy projects between 2016 and 2021 i.e. investment in the renewable energy sector is gaining attraction since last few years (National Database on Renewable Energy, NDRE). For Bangladesh's power and energy sector, 2022 Foreign Direct Investment (FDI) in the top five countries and regions are in order are - UK, UAE, the Netherlands, the United States and China (Table 1). The US ranked the top five countries in terms of investment with USD 2.9 billion, mainly in the natural gas and oil sub-sectors. However, their investment in the power sector is quite low compared to the other countries on the list. China follows with investments totaling USD 667 million, mainly in the power sector which is highest in the power sector. The UAE is also in the Bangladesh's power sector, where the UAE also invested USD 233 million (which is the 2nd highest in the power sector), further contributing to the sector's growth and development.

As per the recently mandated Integrated Energy and Power Master Plan, Bangladesh has set a target of achieving 40 per cent of the total generation from clean energy by 2041. China's expertise and financing capacity can help to achieve the goal. China's investment in renewable energy

Table 1 FDI Stock in Power and Energy in Bangladesh (2022)

Country (region)	Natural gas and oil	electrical power	(grand) total
United States of America	2910.50	166.50	3076.90
Sino	0.00	666.90	666.90
the Netherlands	43.10	200.30	243.40
UAE	5.90	232.70	238.70
United Kingdom of Great Britain and Northern Ireland	36.70	184.30	220.90
Malaysia	0.01	168.40	168.40
India	0.20	117.70	117.90

Source: FDI and external debt (January-June 2023), Bangladesh Bank.



projects in other countries has been increasing in recent years (especially in Southeast Asia and Africa), and these overseas investments can provide Bangladesh with valuable experience. As of 2023, China's engagement in renewable energy overseas, particularly through its Belt and Road Initiative (BRI), reflects a strategic pivot towards green energy investments. The overall energy-related engagement of China in BRI countries was the greenest on record, with green energy (solar, wind) investments reaching about USD 7.9 billion, approximately 28 per cent of its energy engagement, in addition to USD 1.6 billion invested in hydropower (Wang, 2024). While Africa, Southeast Asia, and Latin America, with their abundant resources and emphasis on renewable energy, have been the main inflow countries for these investments. Bangladesh has received less Chinese overseas renewable energy investment due to multifaceted challenges in the renewable energy sector of Bangladesh like weak infrastructure, legal and financial issues, etc. The challenges have been discussed in the following section.

Between 2000 and 2022, Chinese companies invested in the construction of more than 1,400 generating units overseas, of which 31 per cent was located in Southeast Asia (Joe, 2023). China's investments in overseas power generation projects include greenfield investments and mergers and acquisitions. China has invested USD 7.07 billion in Bangladesh under the Belt and Road framework, which, although not all of the funds have been utilised for renewable energy, illustrates the depth of China's involvement in Bangladesh's infrastructure development.

4. Chinese Investors in the Renewable Energy Sector in Bangladesh: Challenges

China has encountered multiple challenges in investing in infrastructure projects in Bangladesh, and the challenges of investing in the renewable energy sector are even more complex. According to the experiences of the resource persons, experts and entrepreneurs present in the kick-off forum titled 'Opportunities and Challenges for Overseas Investment in the Renewable Energy Sector of Bangladesh: The Case of China' organised by the Centre for Policy Dialogue and the Sunrise Project on October 2023, Chinese investors are facing six broad categories of challenges in the renewable energy sector in Bangladesh, which are: (1) weak infrastructure, (2) financing challenges, (3) inadequate administration, (4) complex laws and regulations, (5) inadequate human resources, and (6) lack of technology and quality assurance issues.

4.1 The Weak Infrastructure

Under the broad category of weak infrastructural challenges, land is the most significant factor which includes issues such as land acquisition, land quality, and upstream flooding. Lack of suitable low-cost land often leads to a significant increase in project costs or even abort the project. Abundance of silt in the land of Bangladesh often causes soil erosion. Multiple solar plants of the country are adjacent to riverine areas due to the relatively cheaper price of the land which makes them susceptible to soil erosion.

4.2 Financing challenges

Reduced foreign exchange reserves coupled with currency depreciation also poses challenges. Bank guarantee structures following the signing of letters of intent have become complex, diluting



the incentives for international banks to invest. In addition, lack of flexibility in key terms of power purchase agreements (PPAs) and implementation agreements (IAs) blocked project financing and created obstacles to attracting investment on a sustained basis during project implementation in the renewable energy landscape. There are also concerns about irregularities in investment behaviour, particularly in the later stages of the project. In addition, frequent delays in payment of bills by the Bangladesh Power Development Board (BPDB) exacerbated these issues, complicating the investment environment. International banks are often unable to properly contact the local banks concerning the letter of intent. There is no flexibility in negotiating certain power purchase and implementation agreement terms.

4.3 Management challenges

Long development cycles are rooted in inefficient governmental approvals, which seriously impede project progress. This situation is further exacerbated by the lack of clear regulatory policies for the renewable energy market, which hinders market development and is detrimental to the implementation of sustainable energy solutions. The Renewable Energy Policy, which should have been the managerial guideline for the renewable energy market of the country, is backdated.

4.4 Legal challenges

Addressing the challenges posed by weak legal systems requires a strategic approach. Currently, there is no targeted implementation of laws and regulations on power generation, transmission and distribution, and finance to strengthen the legal foundation of the energy sector. Meanwhile, in response to the lack of short and medium-term strategies, the Government of Bangladesh has no comprehensive development roadmap to achieve the set goals on time by setting clear and achievable milestones that contribute to the overall long-term goals.

4.5 Human resources challenges

There is a significant gap in the required skills and expertise within the local workforce, which is essential for the energy sector. This lack hinders the development and efficient operation of energy projects. There is a lack of collaboration in creating educational programmes that are aligned with the actual needs of the industry. The absence of targeted training programmes (e.g. maintenance) contributes to the gap between the current skill level of the workforce and the industry's needs.

4.6 The technical challenge

The technological challenges relate to several key areas. First, electricity storage (especially lithium batteries) is yet to be addressed through technology imports and transfers, which could significantly increase the level of energy storage. Secondly, the lack of small and medium-sized grids is disrupting the diversification of energy distribution and meet local demand more efficiently. Grid stability is yet to be achieved in the power sector. Finally, the absence of local grid is halting the local energy accessibility. For the energy sector, each of these challenges provides an opportunity for strategic development and progress.



5. Summary and recommendations

Co-operation with China in the area of renewable energy could be of great benefit, but customised initiatives will be the key. Bangladesh must actively absorb China's experience in renewable energy development within its own socio-economic and environmental context. Differences in economic structures, forms of governance and environmental conditions between China and Bangladesh call for tailored initiatives in Bangladesh's renewable energy sector. While there is potential, there are challenges, and the Chinese experience can contribute to the development of the sector.

The policy recommendations based on the challenges faced by Chinese investors in the renewable energy sector in Bangladesh are as follows:

1. Land-related Challenges

- The Bangladesh Ministry of Land should improve policies to reduce the cost of land for renewable energy projects and develop incentives.
- Implement soil conservation measures such as riparian buffer strips, conservation tillage, and cover crops to improve soil quality and prevent erosion.
- Use strategic vegetation and rock beds for riparian protection and emphasise the efficient use of dry lands in the south-east for sustainable land management.

2. Financing Challenges

- Optimise bank guarantee frameworks following the Letter of Intent to address international banks' concerns and boost investment.
- Introduce flexibility in negotiating Power Purchase Agreements (PPAs) and Implementation Agreements (IAs) terms while maintaining basic terms to facilitate project financing.
- Ensure timely payment of bills by the BPDB to boost investor confidence and ensure smooth project operation.
- Enhance co-operation among stakeholders, improve regulation, and manage finances better to mitigate investment challenges.

3. Management Challenges

- Streamline governmental approval processes to make them more efficient and timelier.
- Implement comprehensive policies to stimulate and support the renewable energy market's development, facilitating market building and encouraging investment.

4. Legal Challenges

- Strengthen the legal foundation of the energy sector through targeted implementation of laws and regulations on power generation, transmission, distribution, and finance.
- Formulate a comprehensive development roadmap with clear and achievable milestones to achieve long-term goals.



5. Human Resources Challenges

- Increase collaboration between academia and industry to bridge expertise gaps and align academic programmes with industry needs.
- Offer targeted training covering manufacturing technologies, engineering, and project operations to enhance local employment opportunities and industry employability.

6. Technical Challenges

- Address electricity storage issues through technology imports and transfers, particularly for lithium batteries, to increase energy storage levels.
- Focus on establishing more mini grids to promote diversification of energy distribution and meet local demand efficiently.
- Invest in upgrading infrastructure and technology to ensure grid stability.
- Create local grid markets to revitalise the energy sector, promote economic growth, and increase local energy accessibility.

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