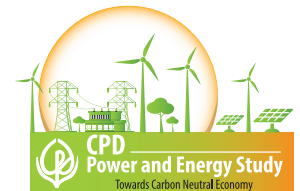


# Currents of Change

## Quarterly Brief of the Power & Energy Sector of Bangladesh

Volume 1, Brief No. 1  
July-September 2023



## Key Highlights

- The CPD Power and Energy Study has published the first quarterly brief for the first quarter of FY2024 (July-September 2023), and it will be published on a regular quarterly basis.
- The quarterly will highlight issues related to the overall sectoral performance from the lens of energy transition in Bangladesh.
- During the Q1 of FY2024, more fossil fuel-based generation capacity has been added to the grid despite the power sector being overburdened with an over-generation capacity of as high as 52 per cent (as of 30 September 2023).
- Transmission and distribution failure was also a contributing factor to power outages during July-September of FY2024 along with energy shortage.
- During the period, Petrobangla and the BPC continued to struggle to settle the import payments of fossil fuels (petroleum oil, LNG).
- Although the government has been working on expanding renewable energy generation, the progress on the completion of power plants scheduled to operate commercially in 2023 is not promising.
- By September 2023, at least 260 MW would have been added to the national grid if the renewable power plants had started timely operations.

### Centre for Policy Dialogue (CPD)

House 40/C, Road No 11 (new), Dhanmondi,  
Dhaka – 1209, Bangladesh  
Telephone: (+88 02) 55001185, 48118090  
E-mail: info@cpd.org.bd

Khondaker Golam Moazzem, Helen Mashiyat Preety, Jebunnesa and Faisal Quaiyyum

## 1. BACKGROUND

Bangladesh's power and energy sector is dynamic, and the landscape keeps changing constantly. The government and public authorities related to the power and energy sector take initiatives, policy measures, and operational decisions regularly. So, it is crucial to keep track of the government's decisions, measures and initiatives and monitor the implementation and progress of the measures. The recipients of government decisions and measures, particularly investors, operators, service providers and users of energy and power and community should also be informed about those actions of the government and public regulatory authorities.

This quarterly will regularly monitor the sectoral performance from the energy transition perspective. This will be carried out based on the government policy decisions and actions, current sectoral health, contemporary challenges and their short to long-term consequences in both the power and energy sector, and progress in renewable energy deployment and development. The first quarterly targets to review the sectoral performance of the power and energy sector from the lens of energy transition in Bangladesh during July-September of FY2024 (Q1, FY2024).

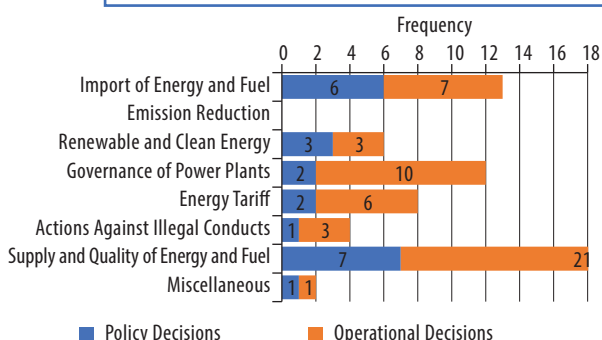
The quarterly is segregated into six broad sections. Following this brief background as the first section, the second and third sections provide a brief snapshot of the major policy and operational decisions taken from July-September 2023, and the power sector performance (progress in generation, transmission and distribution, cause, and duration of load shedding, tracking the phase-out of rental and quick rental power plants) during Q1, FY2024. The fourth section lays out the energy demand, supply, generation and import, exploration status of the domestic gas, and import of LNG in the same quarter. The section five deals with the status of renewable energy of the last quarter and the progress of the renewable energy-based power plants that are in the pipeline. And finally, the quarterly summarises the historical trend of some of the key indicators of the power and energy sector until September 2023 in the last section.

## 2. MAJOR DECISIONS TAKEN DURING JULY–SEPTEMBER 2023

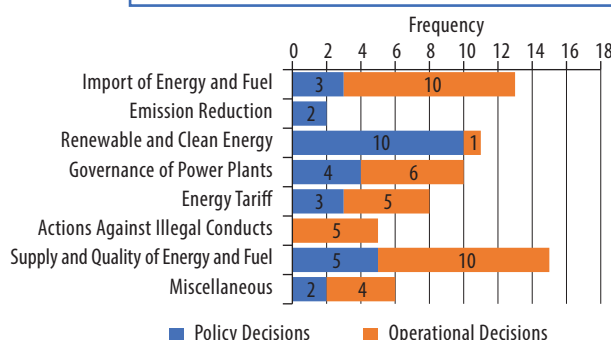
**Policy Decisions:** During April-September 2023, the government and relevant public authorities have taken several policy measures. These initiatives focus primarily on fuel and energy supply and quality, followed by energy import. A comparison has been made between the last quarter of FY2023 and the first quarter of FY2024. During April-June 2023, major policy decisions include finalising a long-term LNG supply agreement with QatarEnergy by Petrobangla, approval of LNG import from the spot market, providing tax exemption to the private power plants commencing operations before June 2024 on their income until June 30, 2036, and conducting a successful experimental extraction of gas from the new well-called Ilisha-1 in Bhola, increasing the total number of active wells in the district to nine.

On the other part, in the following quarter, July-September 2023, the government’s policy decisions were mainly on renewable and clean energy-related issues. Unlike the previous quarter, import, supply and quality of fuel and energy were not the center of the decisions. The major policy decisions during July-September 2023 include initiative to support renewable energy objectives and commitments to carbon reduction such as starting the process to lease approximately 63 lakh square feet of rooftop space on factory and warehouse buildings across 13 state-owned jute mills to international tender, actively promoting rooftop solar projects within the industrial and commercial sectors to address land limitations that have hindered the expansion of renewable energy, to accelerate the adoption of renewable energy and optimise open spaces on industrial and commercial buildings, IDCOL is offering a term loan covering 80 per cent of the costs for rooftop solar projects.

**Figure 1** Government and Government Relevant Authorities’ Action Focus Point During April and June, 2023



**Figure 2** Government and Government Relevant Authorities’ Action Focus Point During July and September, 2023



**Source:** Authors’ compilation from newspapers and related government website.

**Operational Decisions:** The major operational decisions include the increase of fuel, especially LNG, Heavy Fuel Oil (HFO) and High Speed Diesel (HSD) to ensure the uninterrupted supply of energy and fuel, decisions to settle the payment of power plant and other state-owned companies, measures to off the capacity payments of the independent power plants, adjustment of energy prices. During the period of April-June 2023, the highest number of operational decisions were taken to ensure the supply and quality of energy, similar to the policy measures. These decisions include the establishment of control rooms for six distribution and one transmission entities to ensure uninterrupted electricity supply, pushing the Adani’s Godda power plant to commence power generation from its second unit, rationing of gas supply due to the supply shortage, separate gas supply deals with different power plants and measures to protect the two floating LNG terminals in Moheshkhali in anticipation of the cyclone Mocha.

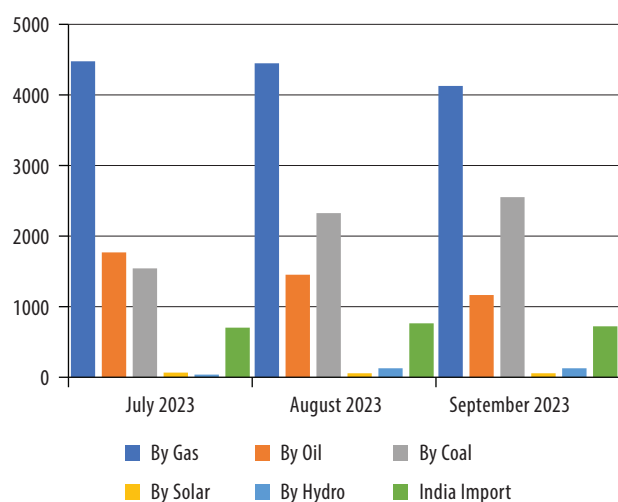
In July-September 2023, the government’s operational decisions also revolved around maintaining the supply and quality of energy and fuel and import of energy and fuel. However, the number of actions taken in this quarter has decreased by half. Some of the key decisions include the government’s choice of opting the payment-time exchange rate of the US dollar for settling the import cost of furnace oil based IPPs, import of two LNG cargoes from the international spot market at a total cost of Tk 1,243 crore, reduction of the High Sulfur Fuel Oil (HSFO) import volume for September 2023 and receiving second shipment of fuel from India through the cross-border Indo-Bangla Friendship Pipeline. Unfortunately, the government’s initiatives are found to be the least in case of reduction emissions in the Q1 of FY2024.

**Update on IMF Conditionality:** The power and energy sector is one of the major areas of policy interventions under the International Monetary Fund's (IMF) credit support in 2023. Under the IMF conditionality, Bangladesh is supposed to phase out the subsidy on the power sector by adopting a market-based pricing mechanism. To reduce fiscal pressure, power tariffs have been increased three times by 5 per cent each time this year, following the approval of the IMF loan. According to the Energy and Mineral Resources Division, the energy prices will be revised by adopting the market-based pricing mechanism for fuel oils. However, the adjustment has been postponed due to the upcoming national election. The delegates from IMF, in their recent visit to Dhaka, have opined the market-based pricing mechanism should be adopted at this moment to lessen the subsidy burden of the power and energy sector.

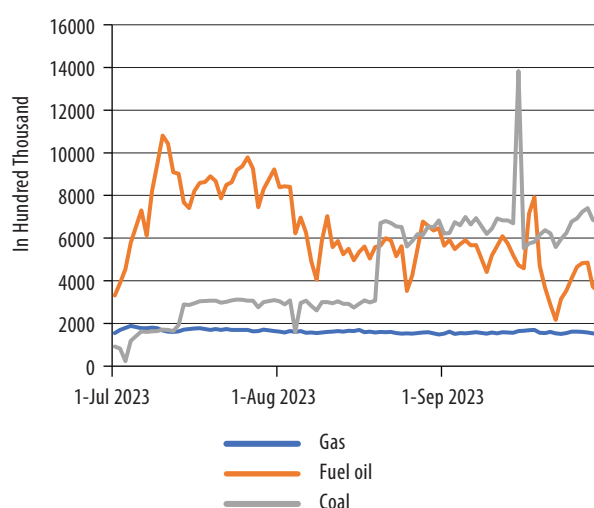
### 3. POWER SECTOR DURING JULY–SEPTEMBER 2023

**Generation:** During this quarter, a subtle change in the fuel mix is observed in generating electricity. Although gas is the main source of energy in power generation, coal is increasingly becoming an essential source in power generation during July–September 2023. Diesel and furnace oil are the other two important sources of energy for electricity generation. As reflected in Figure 3, at the end of August 2023, coal is being used more. The choice of fuel partly depends on import price of fuels including coal, LNG, diesel, and furnace oil. Because of the lower import price of coal, use of coal has increased over time, which is reflected in Figure 4. Even the cost of coal has passed the cost of gas. There is little use of renewable energy in power sector except in September 2023.

**Figure 3 Electricity Generation by Different Fuel (MKWH)**



**Figure 4 Per-day Fuel Cost of Powerplants (Taka)**



Source: BPDB Daily Generation Report.

**Transmission and Distribution:** As of 12 July 2023, the transmission lines stood at 14,717 circuit km, and distribution lines are at 629,000 km while having a grid sub-station capacity of 61,525 Mega Volt Amp (Table 1). Although there is progress in transmission lines and the capacity of grid sub-stations compared to the beginning of the previous quarter, the progress of distribution lines is stagnant.

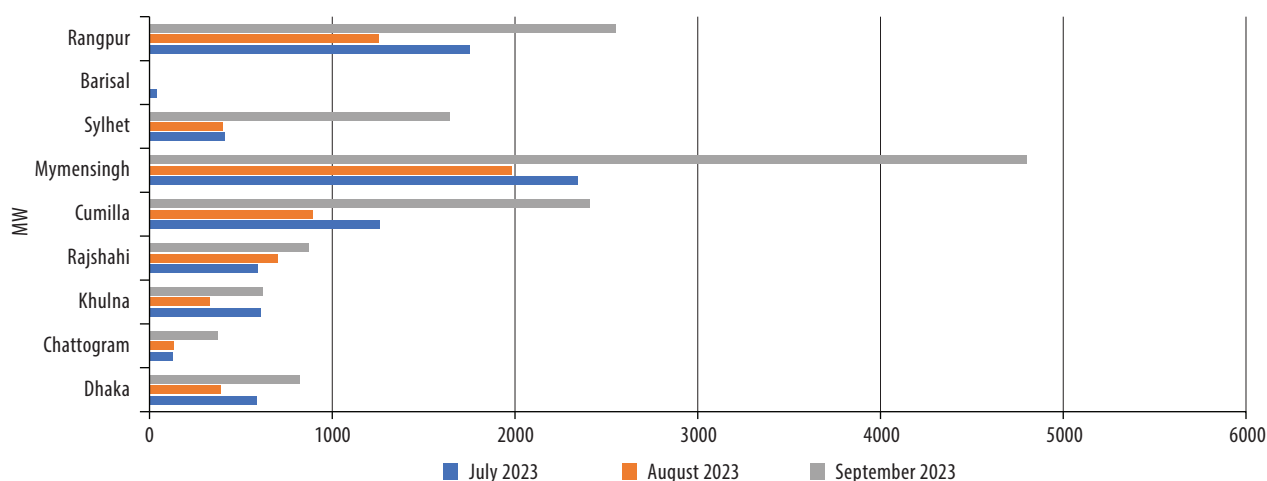
**Table 1 Progress in Transmission-Distribution System of Electricity**

Indicators	April-2023	July-2023
Transmission Line (Circuit Km)	14,672	14,717
Distribution Line (Km)	629,000	629,000
Grid Sub-station Capacity (MVA)	61,412	61,525

Source: BPDB Daily Generation Report.

**Load Shedding:** During the Q1 of 2024, the demand and supply gap of power generation decreased from 7,739 MW in July 2023 to 6,100 MW in August 2023. But the gap again widened to 14,102 MW in September 2023, resulting in an increased load shedding in different parts of the country. Figure 5 reflects the load shedding scenarios in different regions of Bangladesh during July, August, and September 2023. The graph shows Rangpur, Sylhet, Mymensingh, and Cumilla have higher load shedding relative to their low demand. However, the reason for the supply shortage is not clear for Sylhet, Mymensingh and Cumilla, despite being located in the part where the ratio of power plants is higher. Figure 6 portrays further insights into the load shedding pattern in the regions. It shows from June 2023, even though the amount of load shedding and the number of load shedding at day peak is declining, the evening peak load shedding is increasing. Additionally, in July 2023, the PGCB also reported a partial grid failure in the Sylhet zone, causing a load shed of 630MW.

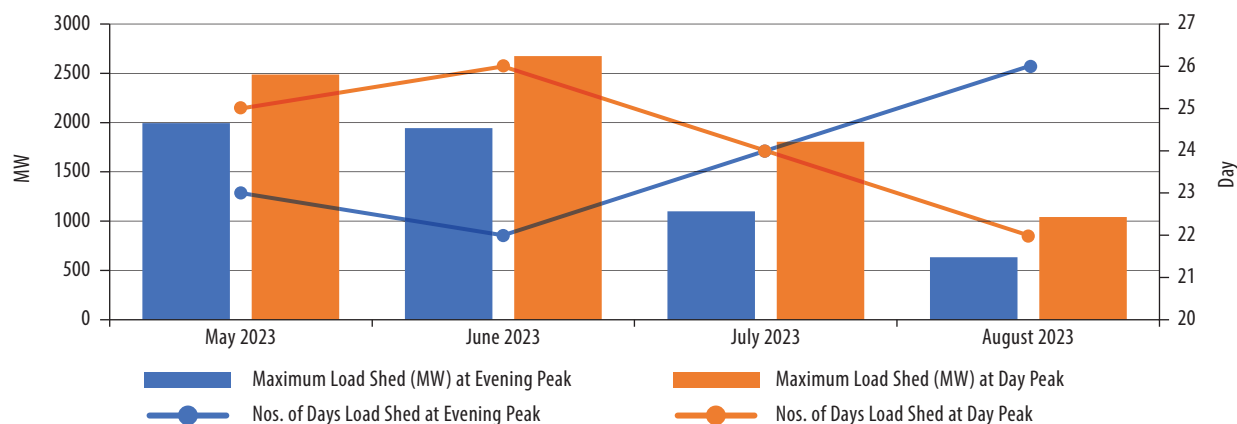
**Figure 5 Zone-wise Load-shed at Evening Peak (Generation end) in MW**



Source: BPDB Daily Generation Report

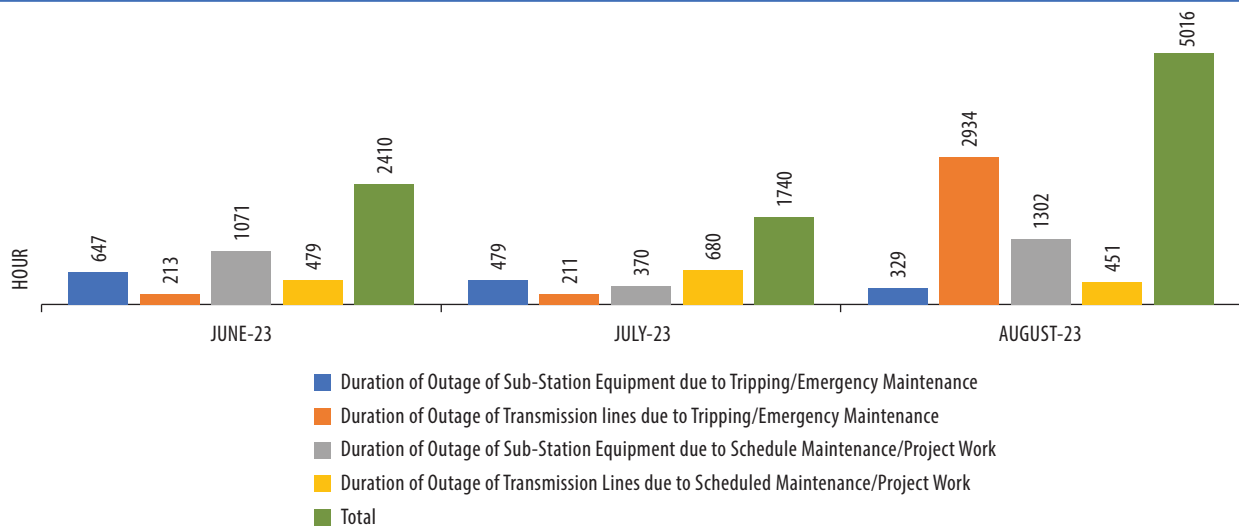
Despite the progress of transmission lines and grid substations over the period, there was an increase in the number of interruptions in the transmission grid station network due to system issues, rising from approximately 2,410 interruptions in June 2023 to 5,016 interruptions in August 2023 (Figure 7). This portrays the long power outage duration which is not only the result of fuel shortage but also the outcome of Bangladesh's inefficient transmission and distribution system. Looking only at the generation shortage cannot explain the amount of load shedding taking place in Bangladesh.

**Figure 6 Monthly Load Shedding pattern (Sub-station end)**



Source: PGCB Monthly Report.

**Figure 7 Summary of Monthly Tripping and Outage from Sub-station End (Emergency & Scheduled)**



Source: PGCB Monthly Report.

**Capacity Payment Burden:** According to the Power Division and BPDB, total owed amount to the Independent Power Producers (IPPs) is currently USD 3.5 billion (equivalent to over Tk 35,000 crore) as capacity payment as of September 2023. In addition to the fact that even if the capacity payment needs to be paid in domestic currency, it has to be paid according to the dollar transaction rate. The government has opted to use the payment-time exchange rate of the dollar for settling the cost of furnace oil imported by the IPPs, rather than the purchase-time rate. This payment system aims to reconcile any disparities between purchase and payment time prices.

**Fossil Fuel Phaseout and New IPPs:** During this quarter, a new coal-based power plant called 'Chattogram 2x612 MW Coal-based Power Plant (2nd Unit)' has started operating with a capacity of 612MW. This plant was expected to be commissioned in December 2022. On the other side, an oil-based plant called 'Keraniganj 300 MW PP (APR)' with a capacity of 300MW was phased out in August 2023, when its contract expired in April 2023 (Table 2).

According to the BPDB's latest progress report, several IPP contracts have been extended to add more gas and HFO-based power plants, totaling 983 MW in the Q1 of FY2023. Additional fossil fuel-based plants are planned, which will add 8,082 MW of installed capacity by 2030. There is some hope for progress as some renewable energy-based plants are also in the pipeline, adding a total of 2,193 MW of installed capacity by 2030 in addition to the existing 749 MW.

Nevertheless, this progress falls short of meeting the commitments of the Mujib Climate Perspective Plan 2021 (30 per cent renewable electricity generation by 2030) and the draft Integrated Energy and Power Master Plan (40 per cent from clean energy by 2041).

## 4. ENERGY SECTOR DURING JULY–SEPTEMBER 2023

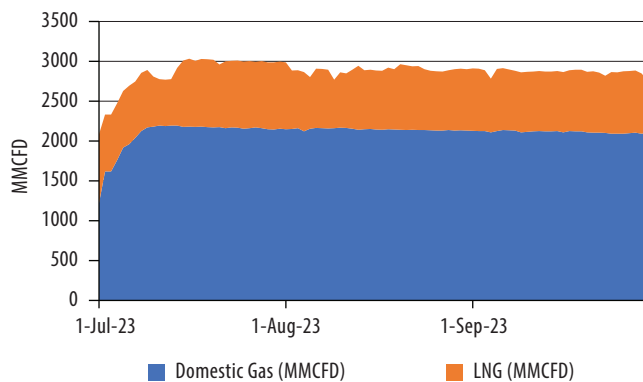
**Gas Demand and Supply:** During the Q1 of FY2024, the gas supply, including LNG, was stable. A gas shortage at the beginning of July 2023 was mainly driven by gas unavailability in the domestic gas fields (Figure 8).

**Table 2 Status of Fossil Fuel Phase-out**

Fuel		Contract Expired IPP			New IPP		
		July	August	September	July	August	September
Gas	Number	–	–	–	–	–	–
	Capacity	–	–	–	–	–	–
Coal	Number	–	–	–	–	–	1
	Capacity	–	–	–	–	–	612
Oil	Number	–	1	–	–	–	–
	Capacity	–	300	–	–	–	–

Source: BPDB.

**Figure 8 Gas Supply (July-September 2023)**



Source: Authors' illustration from BAPEX data.

planned to import two LNG cargoes from the international spot market at a total cost of Tk 1,243 crore. Later, Petrobangla decided to import one cargo from the spot market in September 2023, down from the two.

**LNG Infrastructure in Bangladesh:** The government agreed to start fresh agreements with Summit Group and Excelebrate Energy to secure a long-term supply of LNG beyond their current contracts as LNG terminal service providers. According to a proposal, Excelebrate Energy Bangladesh Ltd, operating a floating terminal and re-gasification unit (FSRU) in Moheshkhali, Cox's Bazar, plans to provide 1 to 1.5 million tonnes per annum (MTPA) of LNG starting in 2026 for 15 years through a long-term contract. Similarly, Summit Oil & Shipping Co Ltd, which also has an FSRU in Moheshkhali, Cox's Bazar, is set to deliver 1.5 MTPA of LNG beginning in 2026, with a contract period of 15 years.

**Import of Fuels:** The Bangladesh Petroleum Corporation (BPC) decided to import 15.85 lakh MTs of fuel oil from Unipek Singapore Pte Ltd. and Vitol Asia Pte Ltd. (Singapore) from July-December 2023. During July-August of FY2024, the import payment against the crude petroleum import was USD 93.5 million which was 14.9 per cent higher than that of the same period in FY2023.

Both Petrobangla and BPC are struggling to pay the fuel import bill during the last quarter. The Energy Division has urgently reached out to the Bangladesh Bank, seeking assistance for the state-owned BPC to secure the necessary amount of dollars to settle overdue import bills that have accumulated over several months. The BPC's overdue payment to international suppliers was USD 50 million as of 15 August 2023 that increased to USD 670 million as of 30 September 2023 out of these USD 260 million to the International Islamic Trade Finance Corporation (ITFC), and USD 410 million to other suppliers.

During this period, Bangladesh Bank is contributing USD 100 million as part of a USD 500 million syndicated fund spearheaded by the ITFC to provide loans to the Bangladesh Oil, Gas and Mineral Resources Corporation (Petrobangla) to import liquefied natural gas (LNG). Petrobangla is taking a USD 500 million loan from the ITFC-led syndicated fund for six months. Previously, in June 2023, Petrobangla sought a loan of Tk 7,181 crore from the Finance Ministry to meet the cost of liquefied natural gas (LNG) import until September 2023.

## 5. RENEWABLE ENERGY DURING JULY-SEPTEMBER 2023

**Renewable Energy Progress (Up to July 2023):** The progress in the renewable energy sector during the last quarter and the preceding quarters of 2023 has fallen short of the anticipated or expected levels (Table 3). According to the BPDB report of January 2023, July 2023 and SREDA, if the power plants had not been delayed in starting commercial production, Bangladesh would have had an additional 267 MW of electricity by September 2023 from renewable sources, which would have been more environment and cost friendly.

**Renewable Energy Financing (Up to July 2023):** A total of 13 renewable energy power plants were scheduled to commercially start operation up to July 2023, of which the combined total cost of 10 out of 13 power plants can be found, and it's important to note that

**Table 3** Progress Status of Renewable Based Power Plants Scheduled to Operate Commercially in 2023 (Up to July 2023)

Progress Status	Number of Power Plants
Fully operational and on time	0
Fully operational but delayed	3
Partially operational but on time	1
Partially operational but delayed	0
Delayed	9

Source: BPDB Monthly Reports 2023 and SREDA.

**Table 4** Financing Options for Renewable Power Plants Set to Operate in 2023 (Up to July)

Type of Financing	Number of Power Plants
Type of Financing	Number of Power Plants
Government Funded	3
Domestic Private Investment	4
Foreign Investment, Grant or Loans	3 (2 Foreign Investment & 1 Foreign Assistance + Loan)
Joint Ventures	3

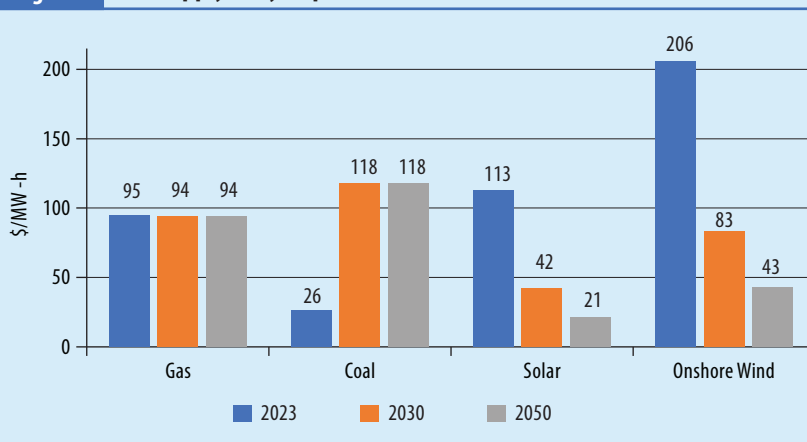
Source: BPDB Monthly Reports 2023 and SREDA.

### Energy Generation Cost from Various Sources: Bloomberg (2023)

has conducted an analysis of levelised cost of electricity generation (US\$/MWh) of different energy mix in the context of Bangladesh (Figure 9).

According to a report by Bloomberg, building more thermal power plants in Bangladesh and incorporating co-firing ammonia or blending hydrogen by 2030 is unlikely to be cost-effective for emission reduction compared to alternative renewable energy solutions like solar or wind. By 2025 and 2030, the levelised cost of electricity from renewable sources will fall drastically if Bangladesh continues to progress at the current pace.

**Figure 9** Gas Supply (July-September 2023)



Source: Bloomberg NEF Report, Bangladesh Power Sector at the Crossroads, 2023.

approximately 46 per cent of this total cost is funded by foreign assistance, grants, or loans (Table 4). Among these foreign supports, 34.5 per cent is contributed through foreign investments.

## 6. REMARKS AND COMMENTS

During the first quarter of FY2024, the sector continues to echo the same pattern that has not worked well towards energy transition. Despite the excess unutilised power generation capacity, the BPDB continues to extend the installed power generation capacity even further. In addition to that, these new power plants are mostly coal, gas, or oil-fired. Even during the last quarter, the power generated from imported oil was being replaced by coal-based power generation due to the high import cost of fuel and the unavailability of gas, including LNG. Such adjustment is difficult to accept as the government has committed to limiting coal usage. Rather it is expected the government will take immediate action to deploy renewable energy to balance the shortage.

Despite the progress of transmission lines and grid substations exceeding over the period, the frequency and duration of power interruption and power outage has increased in the Q1 of FY2024. The unexpected outcome points to the importance and urgency of Bangladesh's smart grid and modernised transmission and distribution system.

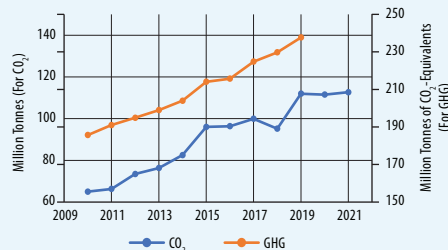
The government should allocate more resources to expedite the drilling of 46 gas wells as committed. The import cost of petroleum oil and LNG has been skyrocketing, and Petrobangla has been failing to settle the payments. It is high time that the government should

## ANNEX: POWER AND ENERGY SECTOR IN A NUTSHELL UNTIL SEPTEMBER 2023

develop a short to medium-term plan to reduce import dependency, especially LNG. Adequate allocation from the upcoming Annual Development Programme (ADP) and the national budget should be provided for exploring old and new gas fields and wells.

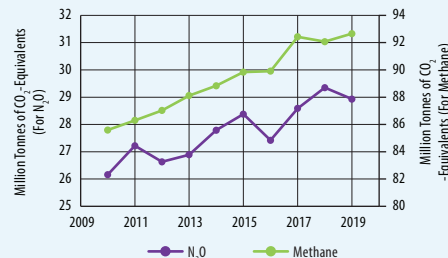
During this period, the Ministry of Power, Energy and Mineral Resources (MoPEMR) has shown optimistic performance in attracting foreign investment, grants, and loans for renewable energy deployment. Nevertheless, until Q1 of FY2024, progress in terms of the completion and commercial operation of the renewable energy-based power plants is not up to the mark as the power plants scheduled to operate commercially in 2023 are mostly running late. Hence, the renewable energy-based power plants that are under construction or in the pipeline should be completed and added to the grid on a priority basis within the expected timeline. Bangladesh can redirect the capacity payment of the zero-production plant to innovation policies of renewable energy. This can be done in the form of tax-adjusted energy prices, renewable R&D subsidies, etc. These policies can facilitate the development of local, cheapest technology and pave the way for the future of renewable energy in Bangladesh.

### Total Emission of CO<sub>2</sub> and GHG in Bangladesh



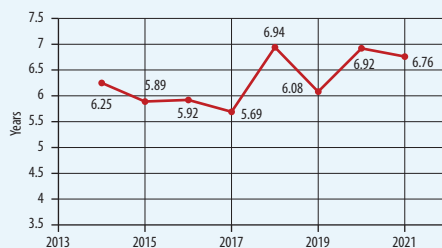
The total emission of CO<sub>2</sub> has increased by 42.3 per cent from 2009 to 2021 (see the axis labeled as Million Tonnes unit). Similarly, Greenhouse Gas has increased by 21.87 per cent from 2009 to 2019 (see the axis labeled as Million Tonnes of CO<sub>2</sub>-Equivalent units). **Source:** Global Carbon Budget 2022 and Our World in Data based on Climate Analysis Indicators Tool.

### Total Emission of N<sub>2</sub>O and Methane in Bangladesh



From 2010 to 2019, the total emission of N<sub>2</sub>O has risen by 9.57 per cent (see the vertical axis on the left-side). Likewise, the total volume of Methane emission has also grown by 7.6 per cent during the same time frame (see the vertical axis on the right side). **Source:** Our World in Data based on Climate Analysis Indicators Tool.

### Net Life Expectancy Lost in Bangladesh Due to Poor Air Quality



Being in the top position for consecutive years, in 2021, the average person in Bangladesh could have gained 6.76 years (or, 6 years 9 months) of life expectancy if the air quality were to meet WHO guideline. **Source:** University of Chicago

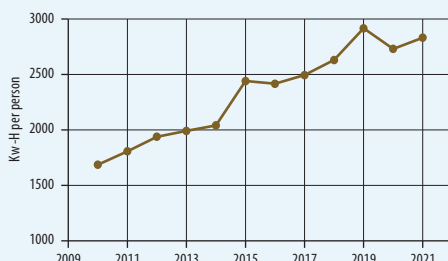
### Country-wise AQI Ranking from 2018-2022 (Average)

South Asian Ranking	World Ranking	Name of the Country
1	3	Pakistan
2	5	Bangladesh
3	8	India
4	16	Nepal
5	46	Sri Lanka
6	90	Maldives

Data for Bhutan and Afghanistan cannot be found.

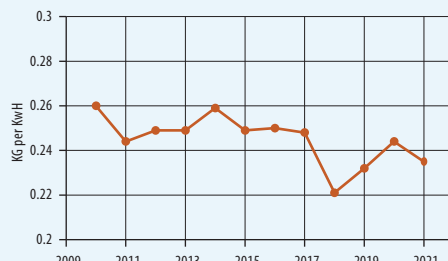
On an average scale spanning from 2018 to 2022, Bangladesh is in the 5th position globally in terms of worst air quality. On a similar setting, in South Asia, Bangladesh ranks second in terms of poor air quality. **Source:** <https://www.iqair.com/bangladesh>, US Embassy of State

### Per Capita Energy Consumption in Bangladesh



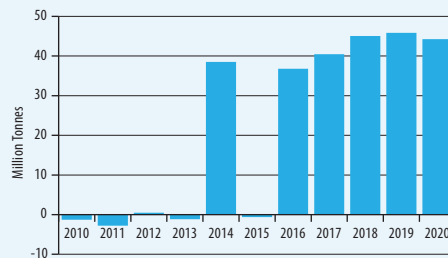
Although the population of Bangladesh grew by 14.15 per cent during 2010 and 2021 (Source: The World Bank), the annual energy consumption or energy usage of an individual grew by an average of 67.92 per cent during these 11 years. **Source:** US Energy Information Administration (EIA)

### CO<sub>2</sub> Emissions Per Unit of Energy Consumption in Bangladesh



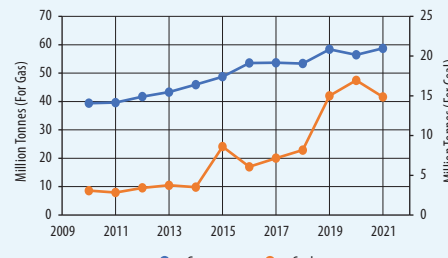
Even though per capita energy consumption increased along with the increase in population during 2010 and 2021, the CO<sub>2</sub> emissions per unit of energy consumption has decreased by 9.6% during this period. However, the rate of decrease is not up to the mark. **Source:** Global Carbon Budget 2022

### Annual Net CO<sub>2</sub> Emission Embedded in Trade in Bangladesh



By the transition of annual net CO<sub>2</sub> emission embedded in trade from negative to positive over time, it can be said that Bangladesh went from being a net exporter to a net importer of CO<sub>2</sub> emissions as the goods Bangladesh has imported produced more CO<sub>2</sub> than that of the exported goods. **Source:** Global Carbon Budget 2022.

### Total CO<sub>2</sub> Emissions from Coal and Gas in Bangladesh



During the 2010 and 2021, total CO<sub>2</sub> emission from Gas production has increased by 49.1 per cent. Additionally, total CO<sub>2</sub> emission from coal production sky-rocketed by 383.18 per cent during this time frame. **Source:** Global Carbon Budget 2022.