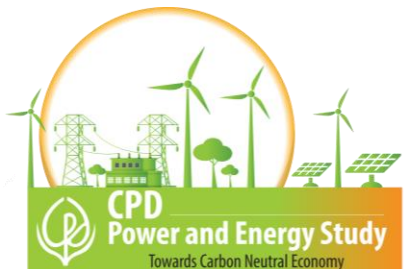




Launching of

Currents of Change:
Quarterly Brief of the Power & Energy Sector of Bangladesh

16 November 2023



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1. Introduction

1.1 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 regularly take initiatives, policy measures, and operational decisions
- At the very same time, Bangladesh has also started its journey towards the energy transition from fossil fuel to renewable energy
- So, it is crucial to keep track of and follow up the government's decisions, measures and initiatives and monitor the implementation and progress of the measures and policies
- Against this background, the Centre for Policy Dialogue (CPD) has launched an initiative to monitor and track sectoral performance from the standpoint of energy transition
- A quarterly brief titled '*Currents of Change: Quarterly Brief of the Power & Energy Sector of Bangladesh*' will be published on energy transition on a regular basis

1.2 Objective

- The first quarterly brief targets to review the sectoral performance of the power and energy sector from the lens of energy transition in Bangladesh during the period July- September of FY2024 (Q1, FY2024) with the following three objectives

1. Ensuring Vigilant Tracking

- The brief aims to maintain a systematic tracking system for **government decisions, measures, and initiatives** within the power and energy sector, ensuring comprehensive oversight and timely awareness.

2. Informing the Stakeholder

- As recipients of government decisions include investors, operators, service providers, and users of energy and power, the brief aims to **help the stakeholders to be informed and involved** with the government in a more effective manner

3. Implementation Review and Monitoring

- The quarterly brief will **monitor and review the government policy decisions and actions, sectoral health, current issues, and their short- to long-term effects** on the energy and power sectors, as well as advancements in the deployment and development of renewable energy sources

2. Major Decisions Taken by Government and Relevant Authorities During April and September 2023

2. Major Decisions Taken by Government and Relevant Authorities During April and September 2023

- A positive **shift in policy focus** from fuel and energy supply to renewable and clean energy has been observed (figure 1 & 2)
- **Less** number of **operational decisions** were undertaken in the latter quarter than the previous one
- Where as more focus has been provided to import of energy and fuel in the later quarter (figure 1 & 2)

Fig 1: Government and Government Relevant Authorities' Action Focus Point During April and June, 2023

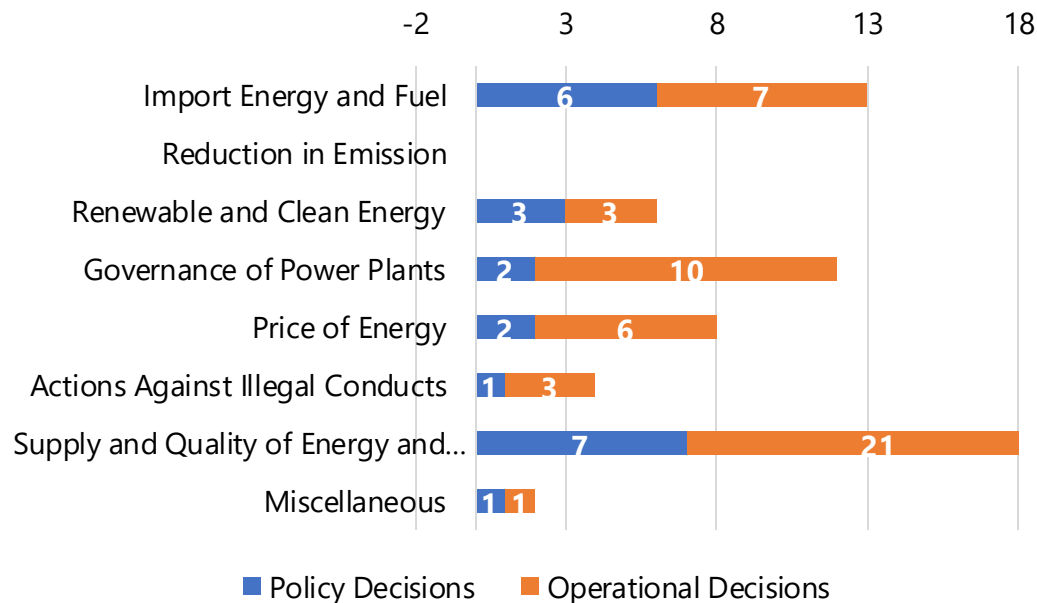
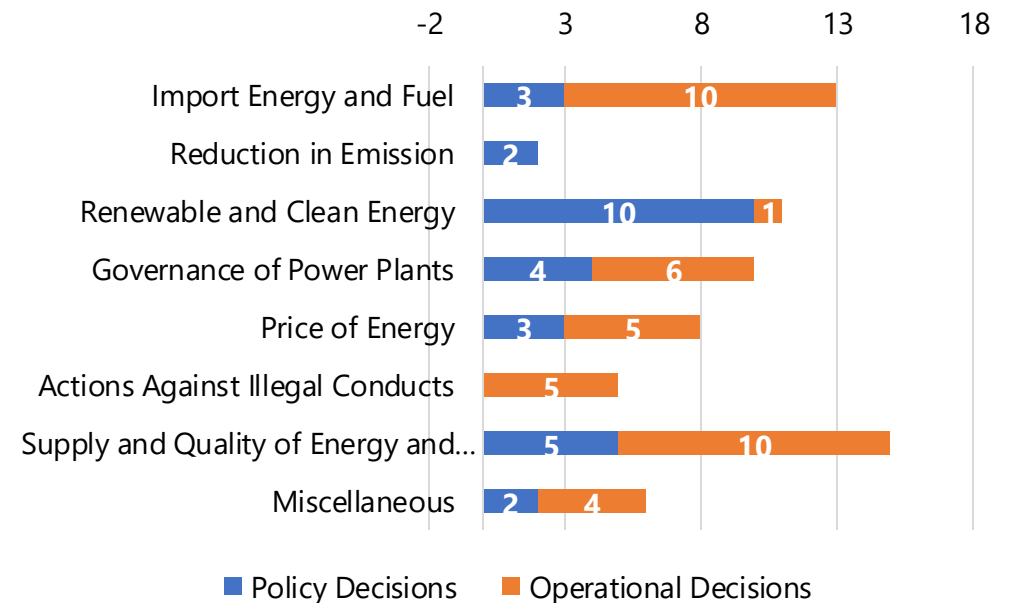


Fig 2: Government and Government Relevant Authorities' Action Focus Point During July and September, 2023



Source: Authors' compilation of newspaper articles, and documents from official websites.

2.1 Major Policy Decisions During April and September 2023

April-June 2023 Highlights

- Finalised a long-term **LNG supply agreement with QatarEnergy** by Petrobangla
- Approved **LNG import** from the spot market
- Provided **tax exemption** to private power plants operating before June 2024 until June 30, 2036
- Successfully conducted **experimental gas extraction from the new well, Ilisha-1**, in Bhola, increasing active wells to nine in the district

July-September 2023 Highlights

- Shifted **focus to renewable and clean energy**
- Initiated leasing approximately **63 lakh square feet** of rooftop space on **state-owned jute mills** to international tender for installing **solar panels**
- Actively **promoted rooftop solar projects** in industrial and commercial sectors to address land limitations
- Committed to accelerating the adoption of renewable energy and **optimising open spaces** on buildings
- IDCOL offering **a term loan covering 80% of the costs for rooftop** solar projects

2.2 Major Operational Decisions During April and September 2023

April-June 2023 Highlights

- Establishment of **control rooms for six distribution and one transmission entity** for uninterrupted electricity supply
- Pushing **Adani's Godda power plant** to commence power generation from its second unit
- Shortage of gas supply led the government to **rationing distribution**
- **Separate gas supply deals** with different power plants
- Measures to **protect two floating LNG terminals** in Moheshkhali in anticipation of **Cyclone Mocha**

July-September 2023 Highlights

- Government's choice of opting the **payment-time exchange rate of the 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 Tk1,243 crore
- **Reduction of High Sulfur Fuel Oil (HSFO) import** volume for September 2023

2.3 Update on IMF Conditionality

- 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
- The Energy and Mineral Recourse division **has already constructed a model** that will be implemented to adopt market based pricing mechanism
- 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 to September 2023

3.1 Current Scenario

- From 2009 to September 2023, Bangladesh’s power generation capacity rose rapidly from **5,493 MW** to **27,834 MW** to meet the increasing demand for electricity

- Figure 3 shows that the gap between installed capacity and actual generation is widening over the period which has led to an overcapacity problem

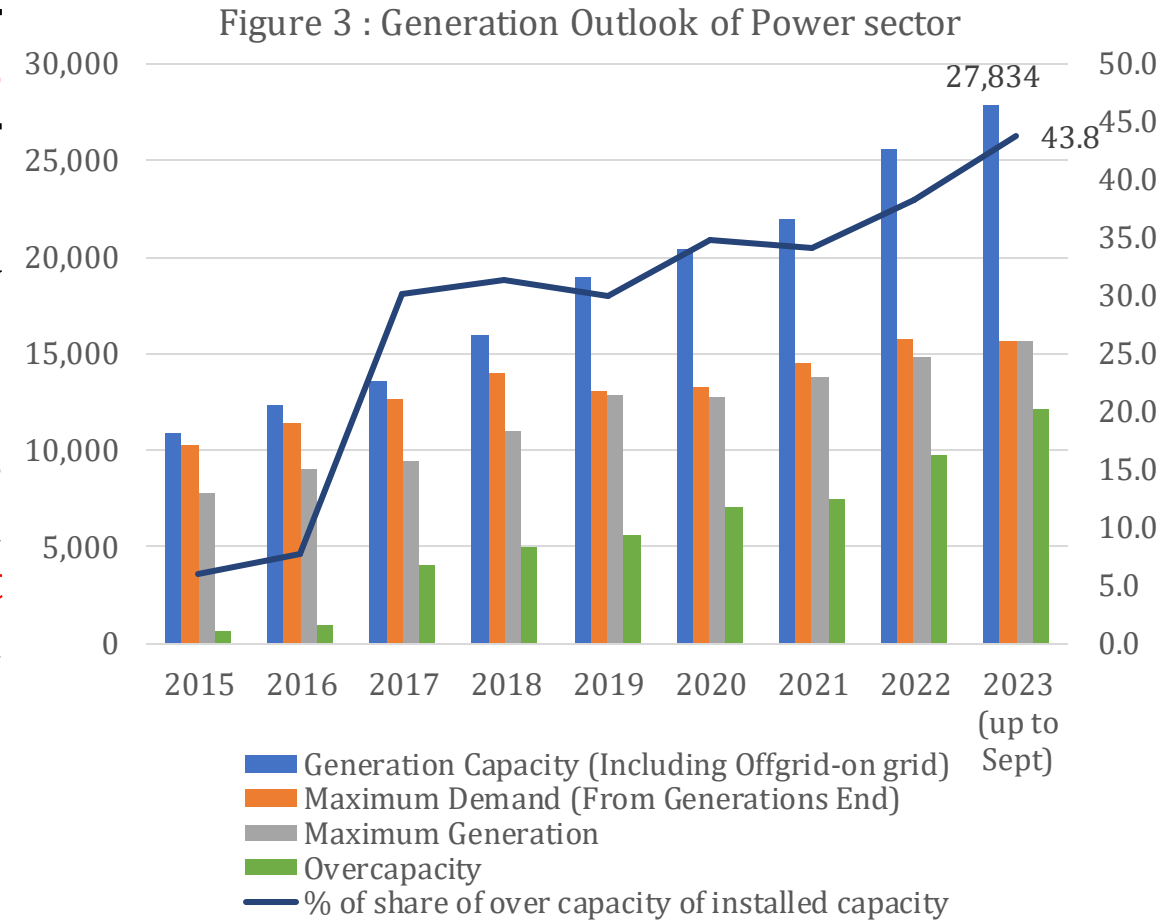
- In 2023 (up to August), there is a substantial increase in generation capacity and maximum demand compared to the previous year, **leading to a significant overcapacity of 12,186 MW, 52% of the installed capacity**

- However, this increased generation capacity wasn’t met with adequate fuel reserve

- This resulted in the second downside of dealing with the wrong fuel mix

- Most of the new power installations in Bangladesh are coal, gas, or oil-fired.

- Given the lower rate of new gas field exploration, the reserve has been declining over the years, and Bangladesh has to choose between imported oil or coal for power generation



Source: Authors' illustration from BPDB Data

3.2 Electricity Generation During July- September 2023

- During this quarter, **a subtle change in the fuel mix is observed** in generating electricity
- Given the lower rate of new gas field exploration, the reserve has been declining over the years, and **Bangladesh has to choose between imported oil or coal for power generation**
- So, the choice of fuel partly depends on the import price of these fuels, including coal, LNG, diesel, and furnace oil.
 - Renewable energy contributes only a small fraction to electricity generation per quarter when compared to alternative sources
- Although Gas continues to maintain its dominant position as the primary energy source for power generation, **a substitution pattern is observed between oil and coal during this quarter** (Figure 4)
- Figure 5 portrays this scenario where –
- At the beginning of the quarter oil (HFO/HSD) were the second sources of power generation beside gas
- And at the end of August 2023, coal is being used more in the to reduce the usage and fuel cost of oil

Fig 4: Electricity Generation by Different Fuel

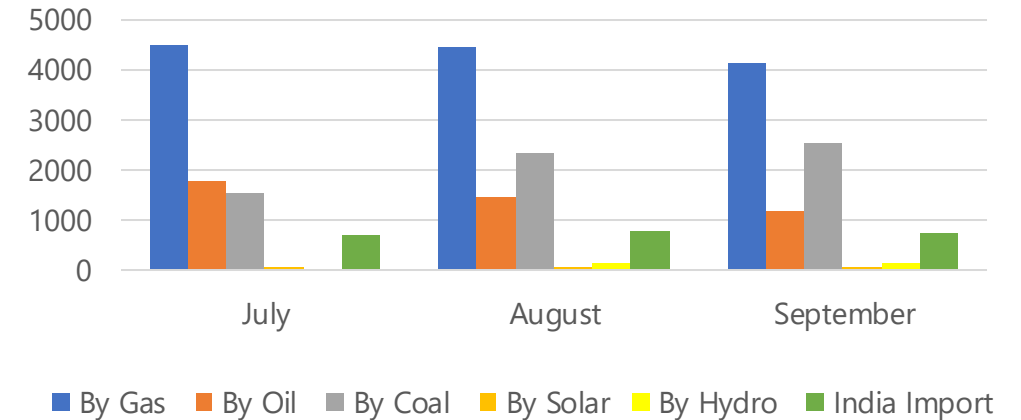
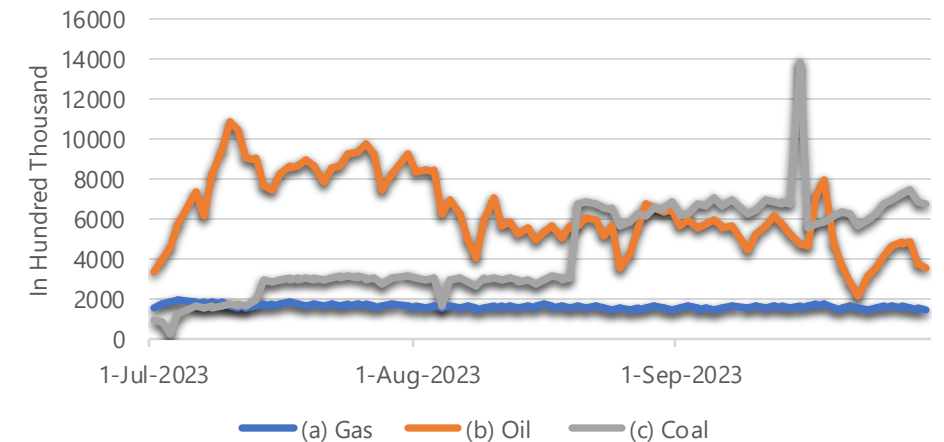


Fig 5: Daily Fuel Costs of Powerplants



Source: Authors' illustration from BPDB Data

3.3 Transmission and Distribution During July- September 2023

- A **progress in transmission lines and grid sub-station capacity** compared to the previous quarter was observed
- As of 12 July 2023, at the beginning of this quarter, the transmission lines stood at 14717 circuit km, and distribution lines are at 629000 km while having a grid sub-station capacity of 61525 Mega Volt Amp (table 1)

Indicators	April 2023	July 2023
Transmission Line (Circuit Km)	14672	14717
Distribution Line (Km)	629000	629000
Grid Sub-station Capacity (MVA)	61412	61525

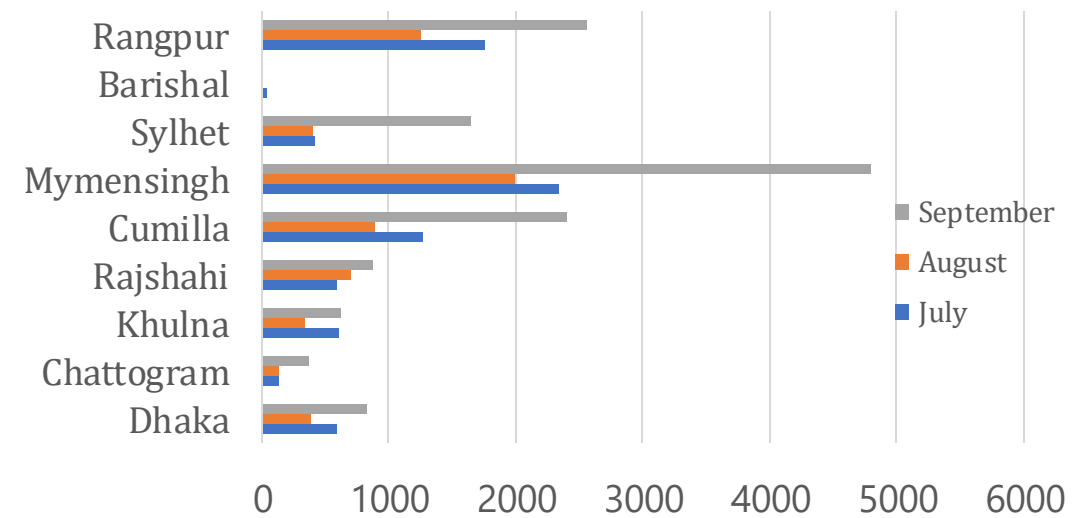
Source: BPDB Monthly Reports

- Despite advancements in other areas, progress in **distribution lines remains stagnant** as of the specified date
- In other words, although there are improvements in transmission line and grid sub-station capacity, the progress of **micro-level electricity distribution from substations** is not improving at the same pace

3.4 Load Shedding

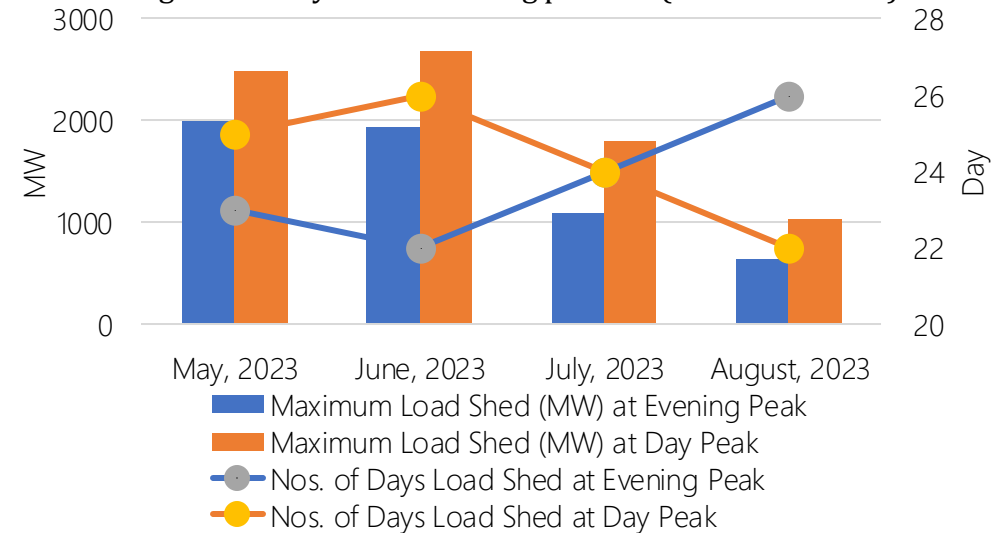
- During this quarter, the **disparity between power generation demand and supply** diminished from July to August but expanded once more in September
- The demand and supply gap of power generation decreased **from 7739 MW in July to 6100 MW in August**
- But the gap again widened to 14102 MW in September, resulting in increased load shedding in different parts of the country (fig 6)
- Despite having **lower energy demand** than the capital, regions such as **Mymensingh, Sylhet, Cumilla, and Rangpur** experience more frequent load shedding
- This suggests a **city-centric distribution** of power supply
- Looking at the pattern of these load shedding, a decline in the overall amount and number of load shedding during day peaks is observed
- However, **a contrasting trend is observed in the number of load shedding taking place during evening peaks** (fig 7)

Fig 6: Zone wise Load-shedding at Evening Peak (Generation end) in MW



Source: BPDB Daily Generation Report

Fig 7: Monthly Load Shedding pattern (Sub-station end)

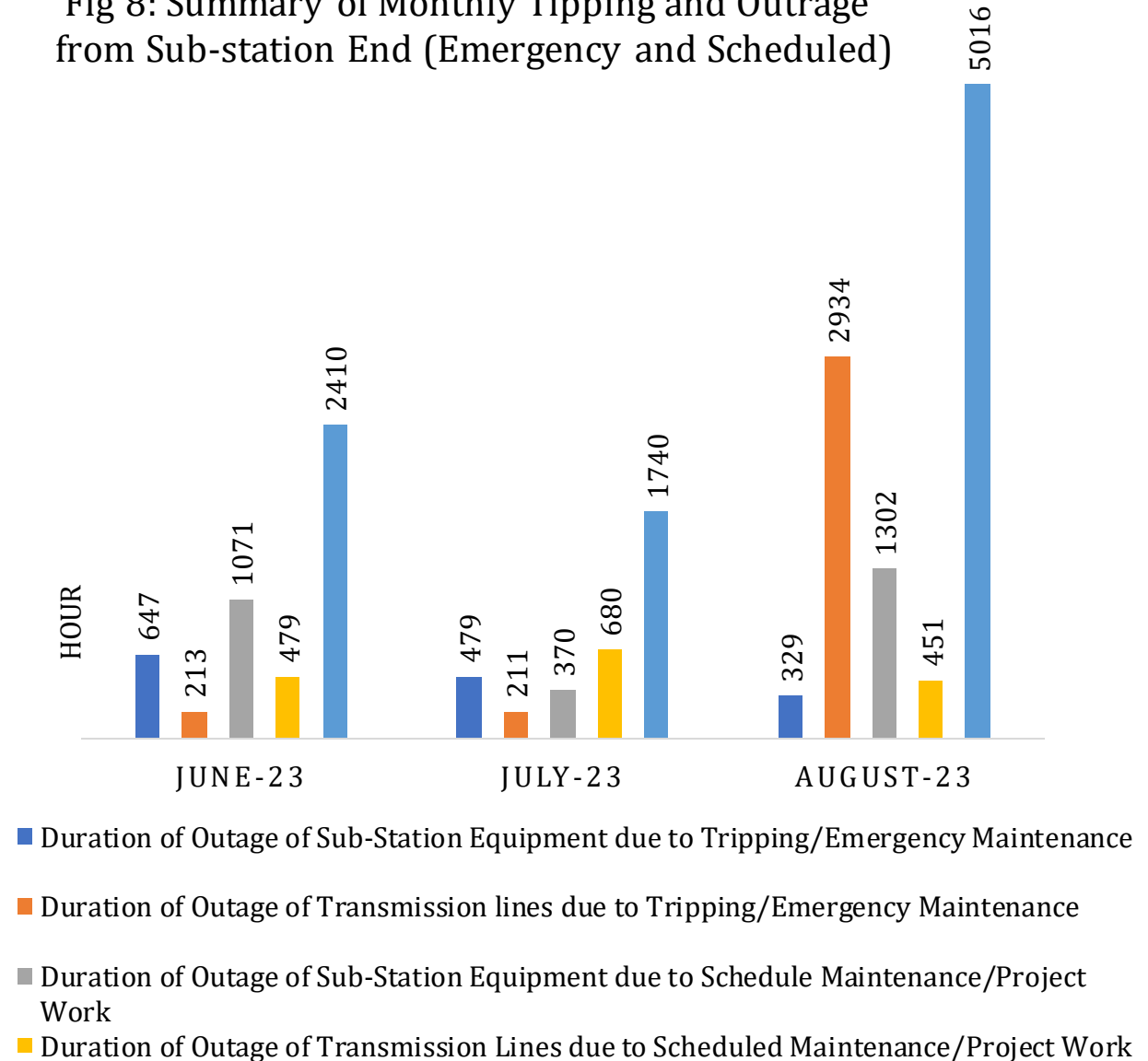


Source: PGCB Monthly Report

3.4 Load Shedding (Continued)

- Notably, power outages due to interruptions in the transmission grid station network **increased** from approximately **2,410 hours in June 2023 to 5,016 hours in August 2023** (fig 8)
- Additionally, in July, PGCB also reported an instance where a partial grid failure took place in the Sylhet zone, causing a load shed of 630MW
- Through the surge in interruptions and power outages despite the increase in **transmission lines and grid sub-station capacity**, the **inefficiency of Bangladesh's transmission and distribution system** is highlighted as a significant factor
- Emphasises that focusing **solely on generation shortage may not fully explain** the extent of load shedding in Bangladesh. A holistic approach considering system efficiency is essential.

Fig 8: Summary of Monthly Tripping and Outrage from Sub-station End (Emergency and Scheduled)





3.4 Capacity Payment Burden

- In the last 12 years the government has paid the **82 IPPs, 32 rental power plants a sum of Tk.104,000 crore** as capacity payment
- Total Owed to IPPs: According to Power Division and BPDB, the **total amount owed to Independent Power Producers (IPPs)** stands at **USD 3.5 billion (over Tk 35,000 crore)** as capacity payment as of September 2023
- Currency and Exchange Rate Challenges: Noteworthy is the challenge that even if **capacity payment** is in **domestic currency**, it must **align** with the **dollar rate**
- Payment-Time Exchange Rate Approach: The government opts for using the **payment-time exchange rate of the dollar** for settling the **cost of furnace oil** imported by **IPPs**, instead of the **purchase-time rate**
- Objective of Payment System: The payment system aims to reconcile any disparities between purchase and payment time prices, providing stability and fairness in transactions

3.5 Fossil Fuel Phaseout and New IPPS

- During this quarter, a new **coal-based** power plant called 'Chattogram 2x612 MW (2nd Unit)' has started operating with **a capacity of 612MW, which was expected to be commissioned in December 2022**
- On the other hand, an **oil-based** plant called 'Keranigonj **300 MW PP (APR)**' with a capacity of 300MW was phased out in August, when its contract expired in April 2023 (Table 2)
- In both cases, **a delay** has been observed.
- By 2030, an **additional 8,082** MW of installed capacity from fossil fuel-based plants is planned
- 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)

Table 2 : Status of Fossil Fuel Phase-out

Fuel		Contract Expired IPP		
		July	August	September
Gas	Number	-	-	-
	Capacity	-	-	-
Coal	Number	-	-	-
	Capacity	-	-	-
Oil	Number	-	1	-
	Capacity	-	300	-

Fuel		New IPP		
		July	August	September
Gas	Number	-	-	-
	Capacity	-	-	-
Coal	Number	-	-	1
	Capacity	-	-	612
Oil	Number	-	-	-
	Capacity	-	-	-

Source: BPDB and authors' compilation of news articles



4. Energy Sector During July to September 2023

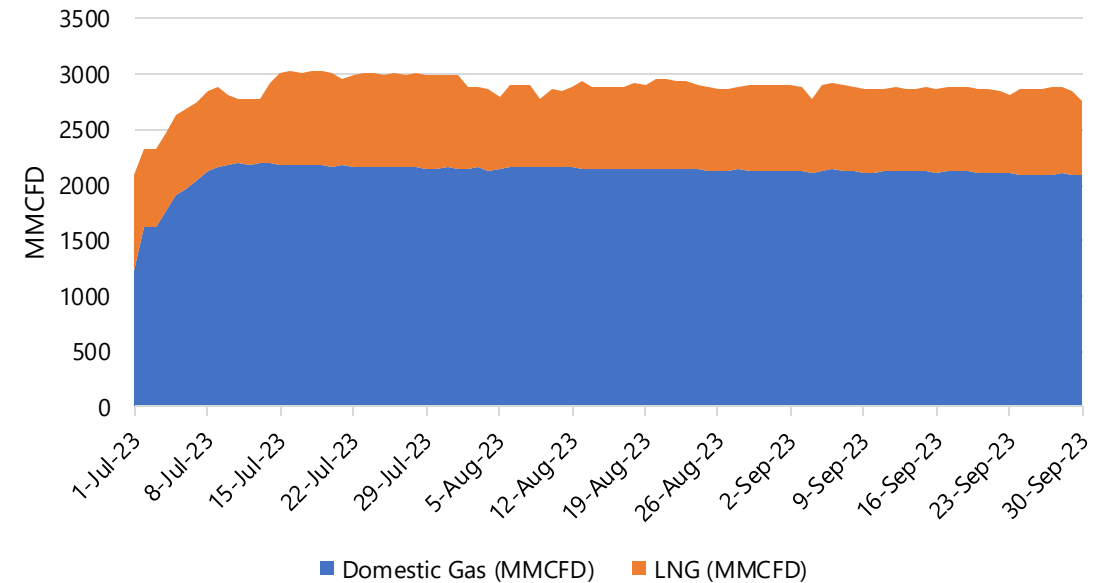
4.1 Present Gas Supply and Demand Scenario

- Gas Reserves: Primary gas reserve, including the newly discovered Ilisha gas field, totals **40.43 trillion** cubic feet.
 - Extractable gas reserve stands at **28.76 trillion** cubic feet.
 - Approximately **19.94 trillion** cubic feet of gas has already been extracted from the extractable gas reserve.
 - The remaining gas reserve stands at **8.82 trillion** cubic feet.
- LNG Import: Bangladesh presently imports approximately **3.5 million** metric tons per annum (MTPA) of LNG from its two established long-term suppliers, namely Qatargas and OQ Trading (formerly known as Oman Trading International).

4.2 Gas Supply and Demand during July- September 2023

- Quarter 1 (July to September) of FY2023–24 witnessed **stable gas supply**, including LNG
- Gas shortage in early July 2023 was primarily due **to unavailability or inadequacy in domestic gas fields**, as it can be noticed in the figure 9

Figure 9: Supply of Natural Gas including LNG



■ Domestic Gas (MMCFD) ■ LNG (MMCFD)

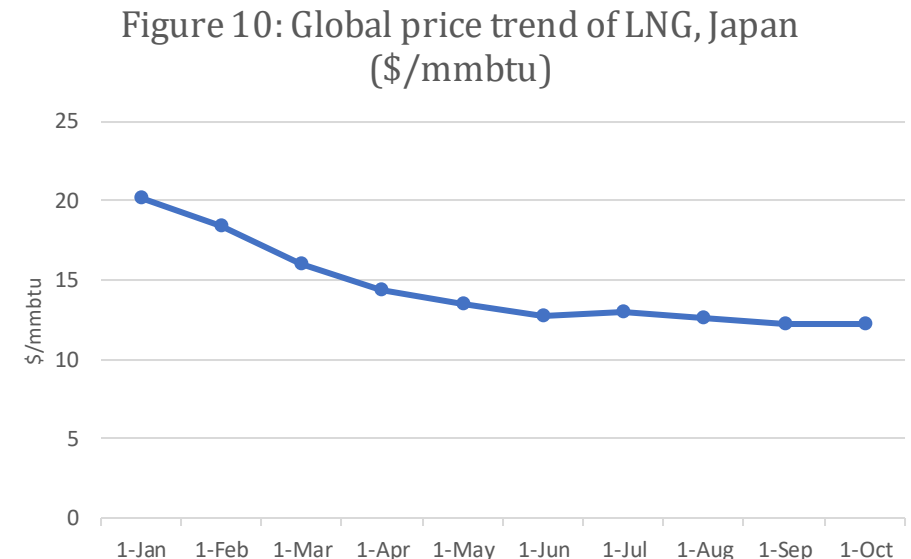
Source: BAPEX

4.3 Gas Exploration and Production

- Well Drilling Initiative: Petrobangla **initiates drilling 46 wells** by 2025 to extract 618 MMcf of gas daily
- Current Progress: Only **six out of eight wells completed within a year**, adding 93 MMcfd as of Q1 FY2024
- Government Exploration Status: The government is currently **not actively pursuing** gas well exploration, or explorations are not being conducted to the expected extent

4.4 LNG Imports and Contracts

- LNG Imports: Bangladesh has been importing LNG from Qatar and Oman based on long-term contracts
- Until September 2023, **a total of 40 LNG** cargoes have been imported
- In addition to existing agreements, Bangladesh signed a new contract on 1 June 2023 with Qatar to secure an additional 1.5 million metric tonnes per annum (MTPA) of LNG for 15 years starting in 2026
- In September, the government planned to import **two LNG cargoes from the international spot market at a total cost of Tk 1,243 crore**
- Petrobangla decided to import one cargo from the spot market in September 2023, down from the two.
- However, the global LNG price trend seems to be downward-sloping



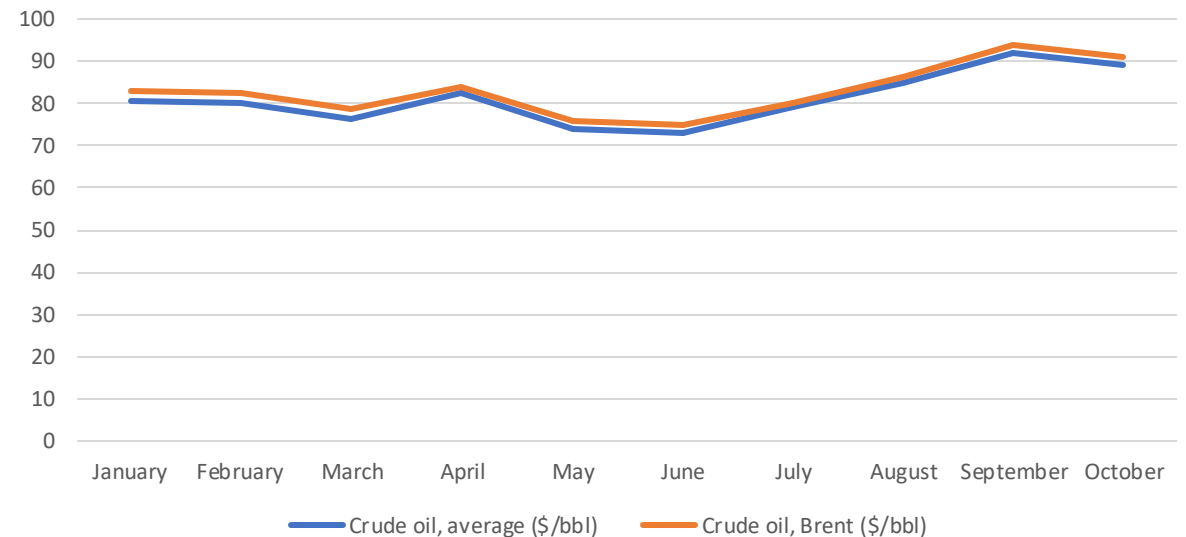
4.5 LNG Infrastructure in Bangladesh

- The government agreed to start fresh agreements with Summit Group and Excelerate Energy to secure a long-term supply of LNG beyond their current contracts as LNG terminal service providers.
- According to a proposal, Excelerate 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
- 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
- Both the contracts have been signed for a 15 years time period

4.6 Fuel Import Overview

- BPC decided to **import 15.85 lakh MTs of fuel oil** from Unipet Singapore Pte Ltd. and Vitol Asia Pte Ltd. (Singapore) from July to December 2023.
- Bangladesh will import **20% less high-sulphur fuel oil (HSFO)** in October due to a shift in power generation sources to coal and cooler temperatures, according to a report by S&P Global Commodity Insights.
- Bangladesh imported about **250,000 tonnes of HSFO in September, 2023**
- In October around **200,000 tonnes of 180 CST HSFO with 3.5% Sulphur content** was imported
- Which is half of what it was in the same month in 2022 when the country imported approximately 450,000 tonnes of HSFO
- This decision was mainly taken because of the price hike of crude oil in international market during September 2023 figure 11

Figure 11: Global price trend of Crude oil (\$/bbl)



4.7 Financial Challenges and Assistance

- Payment Struggles: Both Petrobangla and BPC faced **challenges in paying** fuel import bills during the last quarter
 - Petrobangla's outstanding overdue payments to these LNG suppliers have accumulated to approximately **US\$300 million**
- Bangladesh Bank Assistance: Energy Division seek **urgent assistance from Bangladesh Bank to help BPC** settle overdue import bills
- Syndicated Fund: Petrobangla took a **USD 500 million loan from the International Islamic Trade Finance Corporation (ITFC)-led** syndicated fund for six months.
- Bangladesh Bank **contributed USD 100 million** as part of a USD 500 million syndicated fund led by ITFC to provide loans for Petrobangla's LNG imports
- Overdue Payments: BPC's overdue payments to international suppliers **increase to USD 670 million as of September 30, 2023**
- Financial Planning Urgency: The need for financial planning to reduce import dependency, especially for LNG is an urgent matter

5. Renewable Energy Progress during July-September 2023

5.1 Current Renewable Energy Status

- Against the renewable energy target of **40% by 2041 (24,000 MW)** the total installed renewable energy- based generation capacity **at present is only 1,195 MW (on grid+ off grid) MW** (table 3)
 - Which is only 4.6% of total installed capacity of electricity
- The new Master Plan (**IEPMP**) has set to undermine the potentials of renewable energy target set by the Prime Minister
 - The target is faultily revised to “Up to 40 per cent of power from cleaner energy by 2041” (Figure 13)
 - The cleaner energy includes non-tested technologies such as ammonia, hydrogen, critical and super critical carbon capture unit
- Currently, there are 108 renewable projects that are under process and are projected to generate 10,000MW of power according to the statement from the state minister of the Power, Energy, and Mineral Resources of Bangladesh

Table 3: Present situation of RE in Bangladesh

Technology	Off-grid (MW)	On-grid (MW)	Total (MW)
Solar	366.07	594.98	961.05
Wind	2	0.9	2.9
Hydro	0	230	230
Biogas to Electricity	0.69	0	0.69
Biomass to Electricity	0.4	0	0.4
Total	369.16	825.88	1195

Source: SREDA

5.2 Renewable Energy Progress

- Progress in 2023 fell short of **expectations**
- Up to July 2023, a total of **13 renewable energy power plants** were scheduled to start commercial operation with the total generation capacity of **531 MW**
- None of the scheduled RE based power plant commercially operated on time
- On the other hand, **9 power plants couldn't start their operation on time**

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, BPDB Website and SREDA

- If there were no delays in commercially operation of the renewable power plants, Bangladesh could have gained an **additional 267 MW** of renewable energy by **September 2023**



5.3 Financial Overview of Renewable Energy Progress

- The combined total cost of **ten out of thirteen** power plants set to operate in 2023 is known
- The source of financing the power plants are **diversified** and **equally distributed** among the stakeholders, but a large burden comes from foreign stakeholders
- Notably, according to the available data, about **46% of this total cost is funded by foreign assistance, grants, or loans, with 34.5%** contributed through foreign investments (table 5)
- Denmark's green investment proposal worth \$1.3 billion for developing Bangladesh's first offshore 500MW wind energy project has secured government approval to advance to a comprehensive feasibility study

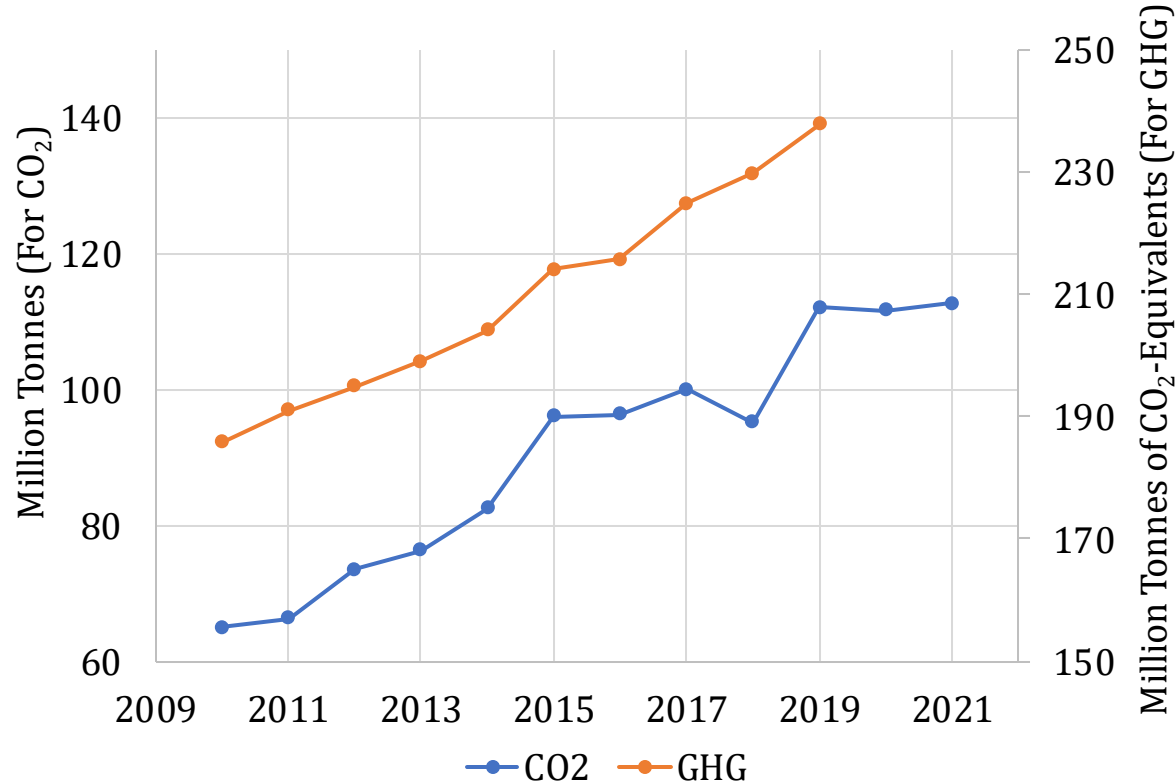
Type of Financing	Number of Power Plants
Government Funded	3
Domestic Private Investment	4
Foreign Investment, Grant or Loans	3 (2 Foreign Investment & 1 Foreign Assistance + Loan)
Joint Ventures	3

Source: BPDB Monthly Reports 2023, SREDA and authors' compilation of news articles

6. Research Findings

6.1 Trends and Key Statistics Associated With Environment, Power and Energy Sector (as of September, 2023)

Figure 12 :Total Emission of CO₂ and Greenhouse Gas (GHG) in Bangladesh

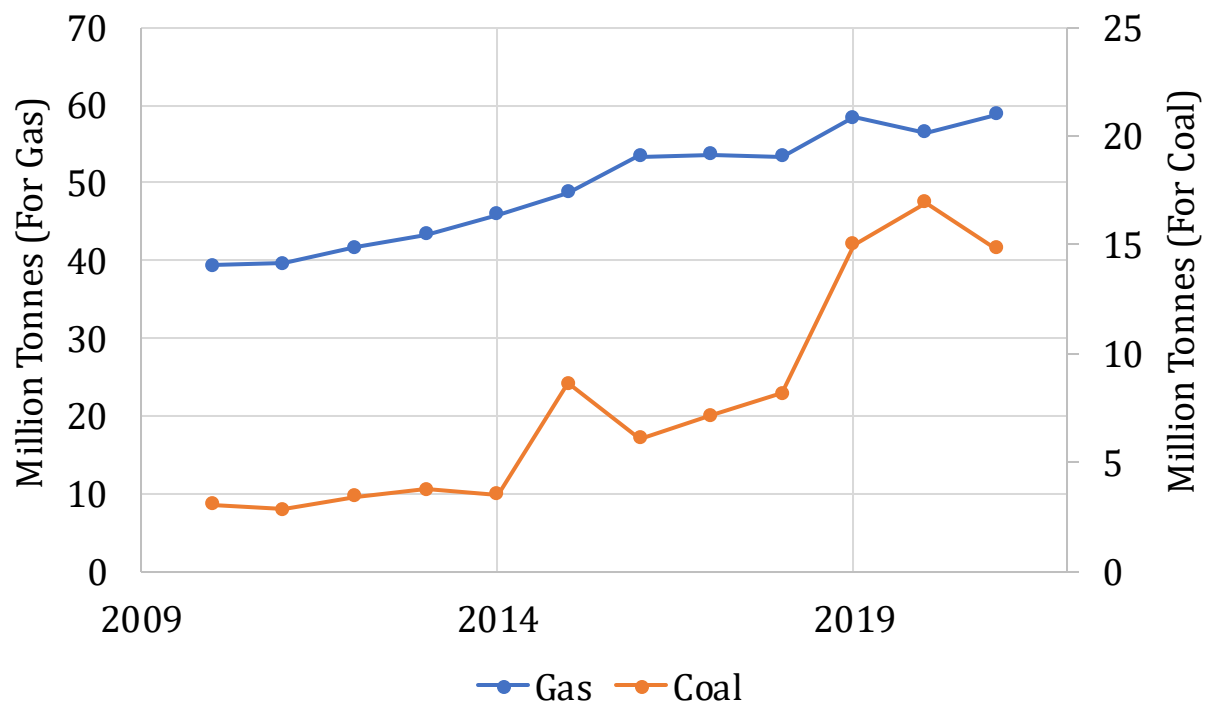


Source: Global Carbon Budget 2022 and Our World in Data based on Climate Analysis Indicators Tool.

- The total **CO₂ emission has increased by 42.3%** from 2009 to 2021. Similarly, Greenhouse Gas has increased by **21.87%** from 2009 to 2019 (see the axis labeled as Million Tonnes of CO₂ - equivalent units)
- **Deforestation is a key factor.** The loss of forests, which act as carbon sinks, intensifies the release of CO₂. There has been little progress in capturing and storing carbon (sequestration), making the deforestation impact worse
- Bangladesh's robust economic growth over the past decade has fueled increased industrial activities. Rapid urbanization, coupled with a growing population and industrial expansion, has led to heightened demand for infrastructure and energy, which contributed significantly in the rising trend

6.1 Trends and Key Statistics Associated With Environment, Power and Energy Sector (as of September, 2023)

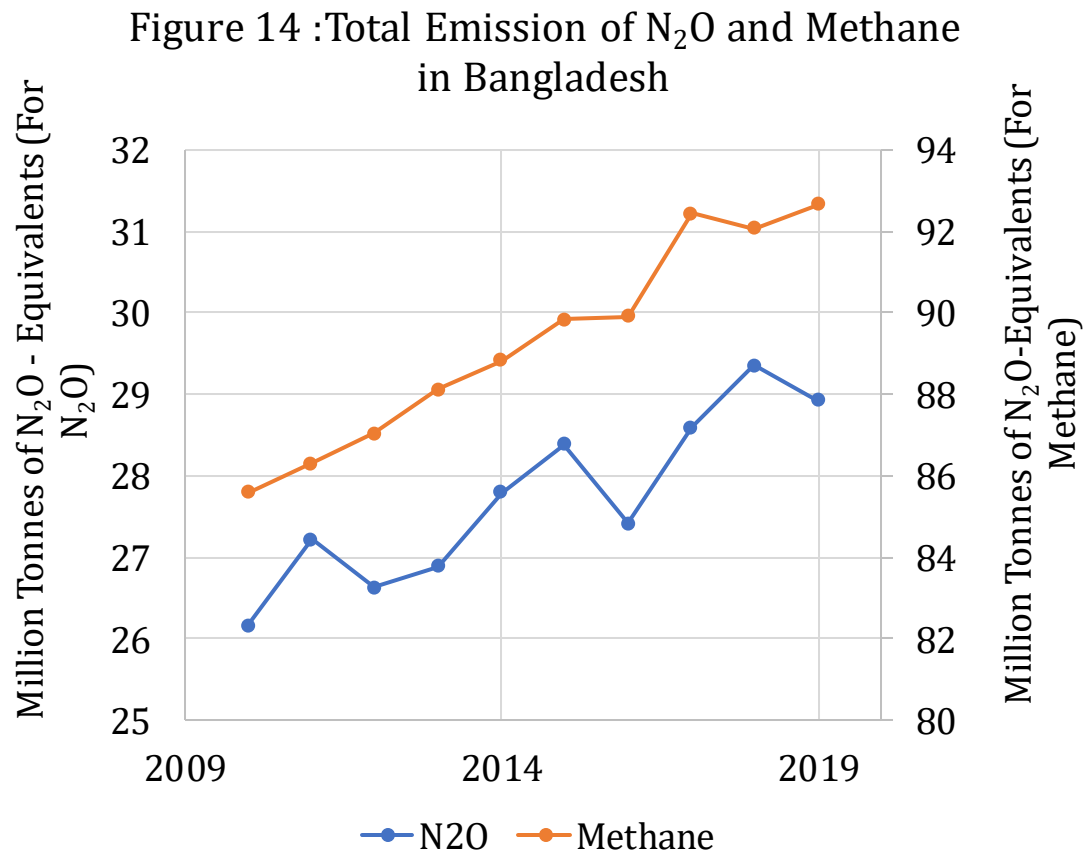
Figure 13: Total CO₂ Emissions from Coal and Gas in Bangladesh



Source: Global Carbon Budget 2022.

- During 2010 and 2021, total CO₂ emissions from gas production has risen by 49.1%. Additionally, total CO₂ emissions from coal production sky-rocketed by 383.18% during this time frame
- Both gas and coal are significant sources of energy in the country, and the surge in economic activities has driven up production from these sources to meet the growing energy needs
- The higher utilization of gas and coal for power generation and industrial processes has contributed to the substantial rise in CO₂ emissions
- Bangladesh has been working towards expanding its power generation capacity to meet the electricity demand of its growing population and industries

6.1 Trends and Key Statistics Associated With Environment, Power and Energy Sector (as of September, 2023)

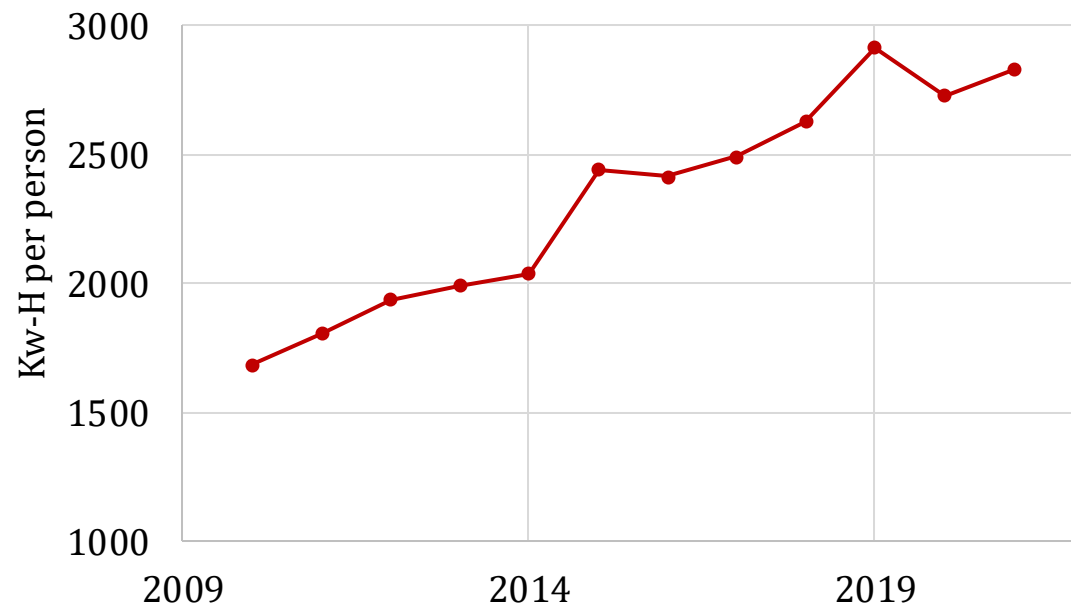


Source: Our World in Data based on Climate Analysis Indicators Tool.

- From 2010 to 2019, the total **N₂O emission has risen by 9.57%** (see the vertical axis on the left-side). Likewise, the total volume of **Methane emissions has also grown by 7.6%** during the same time frame (see the vertical axis on the right side)
- Increased cultivation and the widespread use of nitrogen-based fertilizers have contributed significantly to the observed increase in N₂O emissions
- The 7.6% increase in methane emissions is largely attributed to the expansion of rice paddy cultivation and the growing population of livestock in Bangladesh over time
- Notably, there have been limited measures and efforts to control or mitigate these emission

6.1 Trends and Key Statistics Associated With Environment, Power and Energy Sector (as of September, 2023)

Figure 15: Per Capita Energy Consumption in Bangladesh

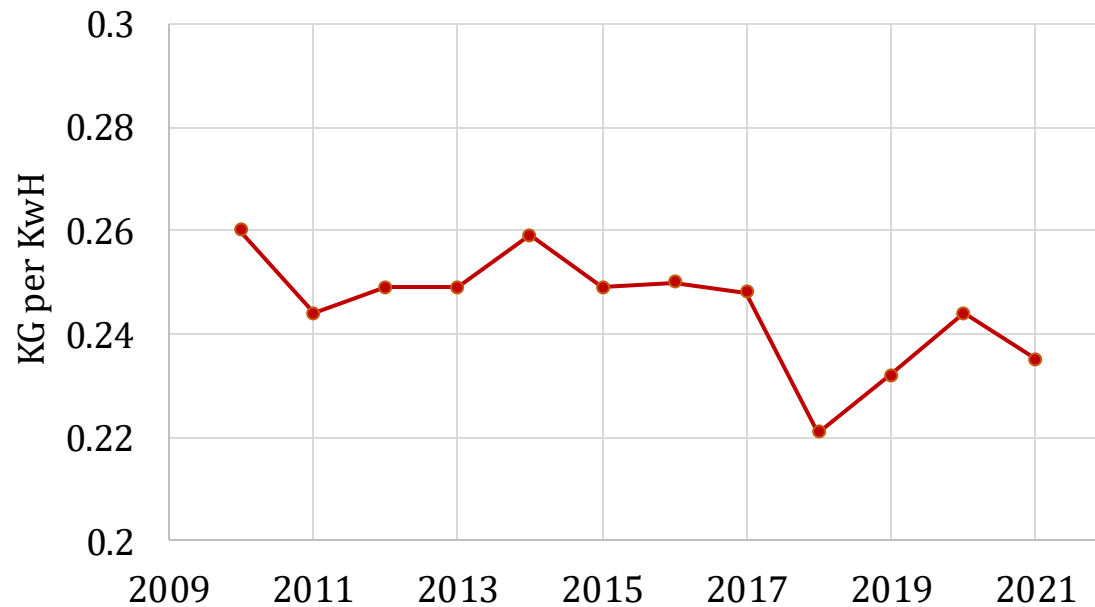


Source: U.S. Energy Information Administration (EIA), and The World Bank.

- Although the population of Bangladesh grew by 14.15% during 2010 and 2021, the annual energy consumption or energy usage of an individual grew by an average of 68% during these 11 years
- The migration of people to urban areas, rapid urbanization and the expansion of industrial activities often lead to increased energy demands because urban lifestyles and industrial processes tend to be more energy-intensive, contributing to the substantial growth in per capita energy consumption
- As living standards improve, there's a proliferation of energy-intensive appliances and technologies. However, the lack of awareness or infrastructure for energy efficiency measures in households has led to unnecessary energy waste

6.1 Trends and Key Statistics Associated With Environment, Power and Energy Sector (as of September, 2023)

Figure 16: CO₂ Emissions Per Unit of Energy Consumption in Bangladesh

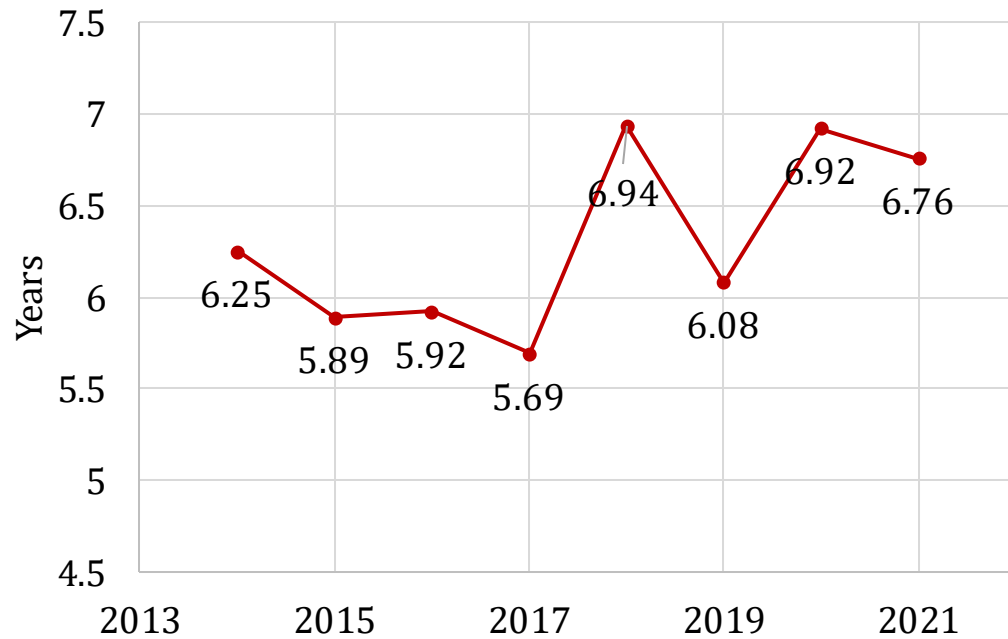


Source: Global Carbon Budget 2022.

- Even though per capita energy consumption increased along with the increase in population during 2010 and 2021, the CO₂ 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.
- Increased adoption of renewable energy, such as solar and wind power, and improvements in energy efficiency technologies have played a role in reducing the carbon intensity of energy production in recent years.
- The slow decrease in CO₂ emissions per unit of energy consumption may be attributed to the persistent use of conventional energy sources, such as coal and natural gas.

6.1 Trends and Key Statistics Associated With Environment, Power and Energy Sector (as of September, 2023)

Figure 17 : Net Life Expectancy Lost in Bangladesh Due to Poor Air Quality



Source: University of Chicago.

- Being in the top position for consecutive years, in 2021, on an average, an individual living in Bangladesh could have gained **6 years and 9 months (6.76 years) more of life expectancy if the air quality were to meet WHO guideline**
- This stark statistic underscores the direct correlation between air quality and the potential for a healthier and longer life
- High levels of air pollution can lead to increased healthcare costs, reduced workforce productivity, and a higher burden on the healthcare system

6.1 Trends and Key Statistics Associated With Environment, Power and Energy Sector (as of September, 2023)

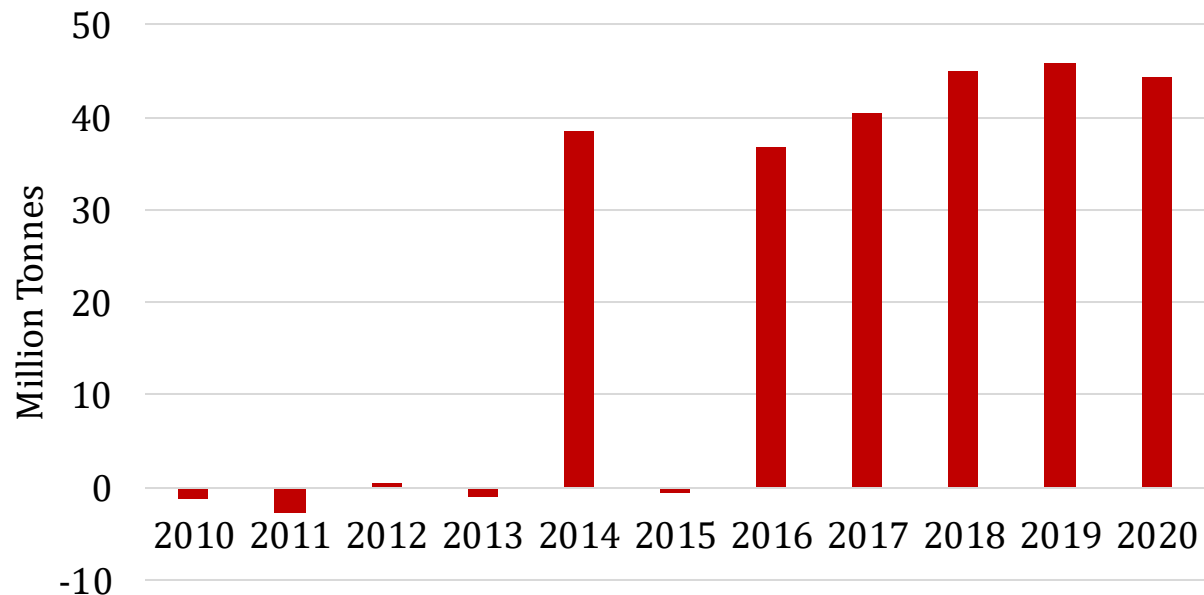
Table 6 : Country-wise Air Quality Index Ranking (in terms of worst air quality) from 2018 to 2022 (Average)		
South Asian Ranking	World Ranking	Name of the country
1	3	Pakistan
2	5	Bangladesh
3	8	India
4	16	Nepal
5	46	Sri-Lanka
6	90	Maldives
Data for Bhutan and Afghanistan cannot be found, but literatures showed that they are in a better position than Bangladesh.		

Source: <https://www.iqair.com/Bangladesh>, U.S. Embassy of State

- 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 2nd in terms of poor air quality**
- The inadequacy of instruments for air quality management, including monitoring, enforcement, and regulatory frameworks, hampers the ability to address the root causes of pollution. The limited capacity to enforce and regulate emissions from industries, vehicles, and other pollution sources contributes to the ongoing struggle with poor air quality
- Dhaka, being a densely populated city, faces additional challenges with vehicular congestion and industrial emissions, placing it in the 2nd position in South Asia for poor air quality

6.1 Trends and Key Statistics Associated With Environment, Power and Energy Sector (as of September, 2023)

Figure 18 : Annual Net CO₂ Emission Embedded in Trade in Bangladesh



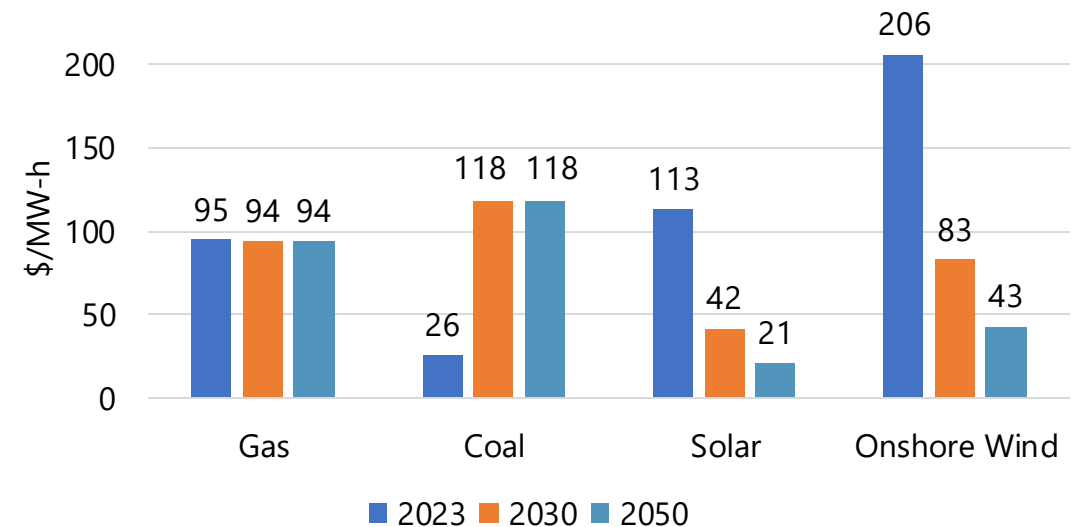
Source: Global Carbon Budget 2022

- By the transition of annual net CO₂ emission embedded in trade from negative to positive over time, it can be said that Bangladesh went being a net exporter to a net importer of CO₂ emissions as the goods Bangladesh has imported produced more CO₂ than that of the exported goods.
- As Bangladesh develops and industrial activities increase, there is a corresponding rise in the production and consumption of goods with higher carbon footprints. The importation of goods with a more carbon-intensive production process contributes to the shift in net CO₂ emissions.
- This change reflects the evolving nature of Bangladesh's economy, transitioning from primarily exporting low-carbon goods to importing more carbon-intensive products.

6.2 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 19)
 - The levelised cost of electricity from renewable sources is expected to significantly decrease by 2025 and 2030 if Bangladesh continues progressing at the current pace.
 - Renewables, in particular solar, are set to be the cheapest option for Bangladesh to meet growing electricity demand
-
- The levelised cost of electricity (LCOE) for a **new utility-scale solar project in Bangladesh ranges from \$97-135/MWh today**, compared to \$88-116/MWh for a combined cycle gas turbine (CCGT) and \$110-150/MWh for a coal power plant
 - By 2025, solar becomes the cheapest option, thanks to continued technology cost reduction.
 - **By 2030, solar with batteries will also achieve a cheaper LCOE than new thermal power plants**

Figure 19: Levelised cost of electricity generation from various sources



Source: Bloomberg Report Bangladesh Power Sector at the Crossroads

6.2 Energy Generation Cost from Various Sources

- According to the Bloomberg report, 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
- Imported hydrogen procurement could be four to five times more expensive than natural gas procurement
 - Ammonia procurement could be **seven to nine times more expensive** than coal procurement
 - The new IEPMP plans to introduce hydrogen and ammonia by 2030 to achieve the clean energy target
- Such reliance on hydrogen as a fuel for electricity would significantly increase the financial burden on Bangladesh

7. Overall Observations from the Energy Transition Point of View

7.1 Power Sector Challenges

1. *Further extension of fossil fuel based power generation capacity*

- Despite **excess unutilised** power generation capacity, BPDB extends installed power generation **capacity further**, mainly relying on **coal, gas, or oil-fired plants**
- 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.

2. *The ancient inefficient grid system is causing power outage*

- Despite progress in transmission lines and substations, power interruption and outage frequency increases in during July and September of 2023
- Highlights the need for a **smart grid and modernised** transmission and distribution system

7.2 Observation on Energy Power Sector

1. Gas Well Drilling Urgency

- Urgent need to expedite drilling of **46 gas wells to reduce dependency on expensive petroleum oil and LNG imports**
- The government should allocate more resources to expedite the drilling of 46 gas wells as committed

2. Import Cost Concerns

- **The fiscal pressure created by the skyrocketing import costs** for petroleum oil and LNG require immediate attention
- The MoPEMR should try to immediate reduce the import dependency and invest in sustainable domestic sources such as natural gas exploration and RE in the upcoming quarter
- Allocating resources from the Annual Development Programme (ADP) and national budget for exploring old and new gas fields and wells can be a short to medium term solution

7.3 Renewable Energy Initiatives

- Ministry of Power, Energy and Mineral Resources (MoPEMR) showed optimistic performance in attracting foreign investment, grants, and loans for renewable energy
- Progress in completing and operating renewable energy-based power plants during July and September of 2023 was **below expectations**
- 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.
- Suggests **redirecting capacity payment from zero-production plants towards innovation policies for renewable energy**. Examples include tax-adjusted energy prices, renewable R&D subsidies, etc
- Bangladesh can facilitate the development of local, cost-effective technology by implementing **innovation policies**, paving the way for a sustainable future in renewable energy

Thank you!