Discussion Session on
Energy Realities in Bangladesh and Pakistan: New Challenges and Investment Opportunities

New Economic and Energy Realities in Bangladesh and the Potential of Local RE Development

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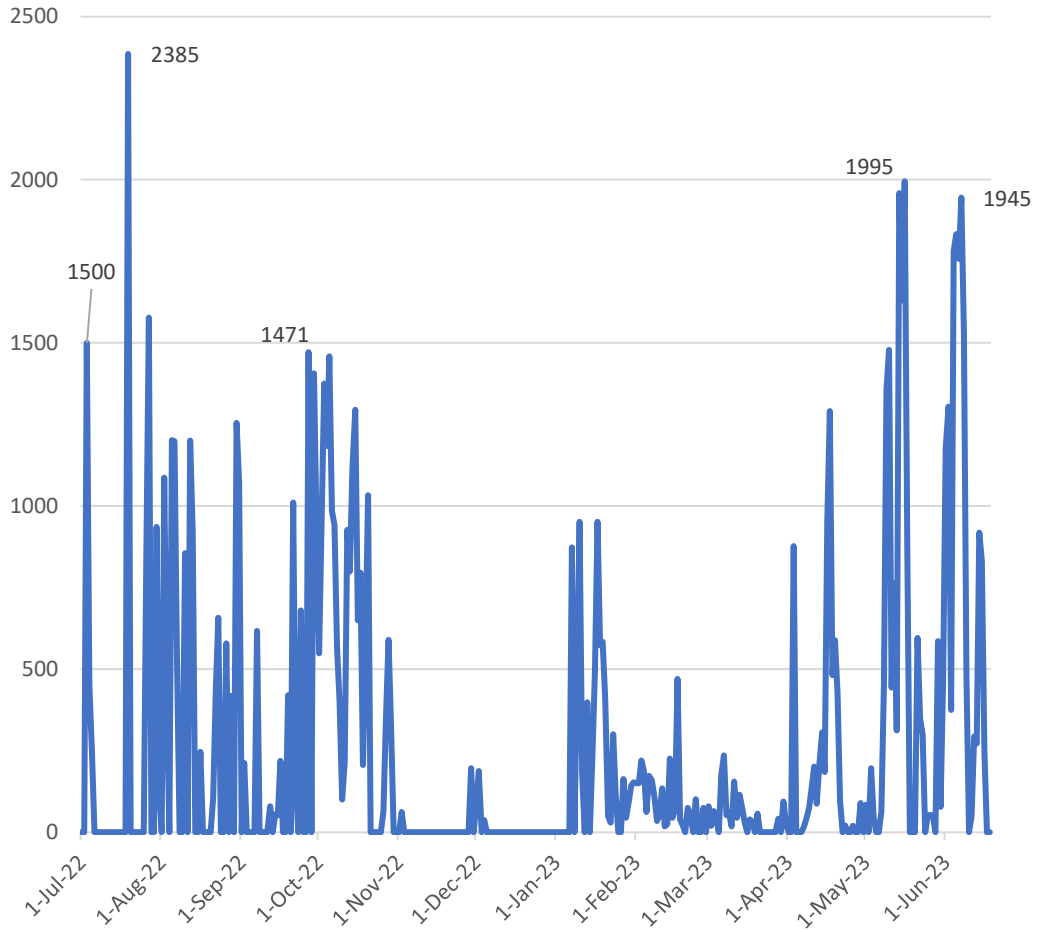
1. Introduction

1. Introduction

- Bangladesh's power and energy sector has been passing a **difficult time** after experiencing considerable attainments over a decade
  - Indicators of this difficult period include **overwhelming dominance** of imported fossil-fuel, inappropriate selection of energy mix, rising debt burden, subsidy-based power generation, rising electricity tariff, using fiscal-budgetary support for the promotion of fossil-fuel and lack of attention to alternate sources of energy particularly renewable energy)
- Consequently the sector has confronted a **number of challenges** over the last one year
  - Lack of capacity to pay bills of imported fossil fuels, disruption in power supply due to ongoing energy crisis, overburdened with dues of capacity payment to IPPs and requirement of substantial amount of subsidy
- The country is suffering for a regular power outages (load shedding) **over the last one year** (Figure 1)

Figure 1: Daily Load Shedding (MW): July, 22-June, 23



Source: Authors' Illustration from BPDB Load shedding Data

1. Introduction

- A number of big power plants were **intermittently** shut down **(Rampal & Payra Power Plants)**
  - With the imported coal, the electricity generation in full capacity can only sustain **4 days (8 days if 1 unit is being operated)**
- A huge amount of payment is **due to a number of IPPs** which is as much as **BDT 20,000 crore**
- The supply of energy for the power plants were found to be low against the operation with the maximum capacity
- **A number of measures** have been undertaken to address those challenges but with little impact in lessening the adversities
  - Measures taken to reduce electricity use in **government offices** as well as in private offices (Jun'22)
  - Measures taken to **early shut down of shops**, departmental stores and other commercial places at night (Jun'22)
  - **Rationing of supply of gas** to different industries and household level (Apr'22)
  - **Raising the gas tariff** with a view to reduce the loss incurred by the Petro Bangla as well as assuring uninterrupted gas supply for the industries (Jan'23)
  - Raising the tariffs of diesel and furnace oil with a view to reduce the loss incurred by the BPC (Aug'22)
  - Raising the electricity tariff with a view to reduce the loss incurred by the BPDB (Jan'23)
  - Signing **long term agreement with** Qatar and Oman for importing LNG for 10-15 years (25 Sep'17, 6 May'18)
  - **Loan taken from China** to make payment of the dues of energy import bills (Mar'23)
  - Signed contract with **IMF** with the commitment of taking a number of reform measures (Jan'23)
- Except the measures committed/initiated under the IMF loan, **none of the other measures** are found to be of high merit in addressing the energy and power crisis

2. New Economic and Energy Realities

2.1 Generation related Challenges

- Huge power generation capacity (**27,361 MW**) has become a **growing concern** for the power and energy sector (Fig. 2)
  - **About 97% of this capacity is dependent** on fossil fuel and the dominance has increased (Fig. 3)
  - **Share of coal in** power generation has increased (**additional 6167 MW** of coal- based generation capacity to be added into the grid by 2026)
  - BPC have **limited financial capacity** to import energy to operate the power plants in maximum capacity
  - **Rise of reserve margin** (excess generation capacity) (Fig. 4)
  - The **burden for capacity payment**
  - Overall the fossil-fuel based energy infrastructure in the country is in **big question**

Figure 2: Trend in Power Generation Capacity: FY2015-FY2023

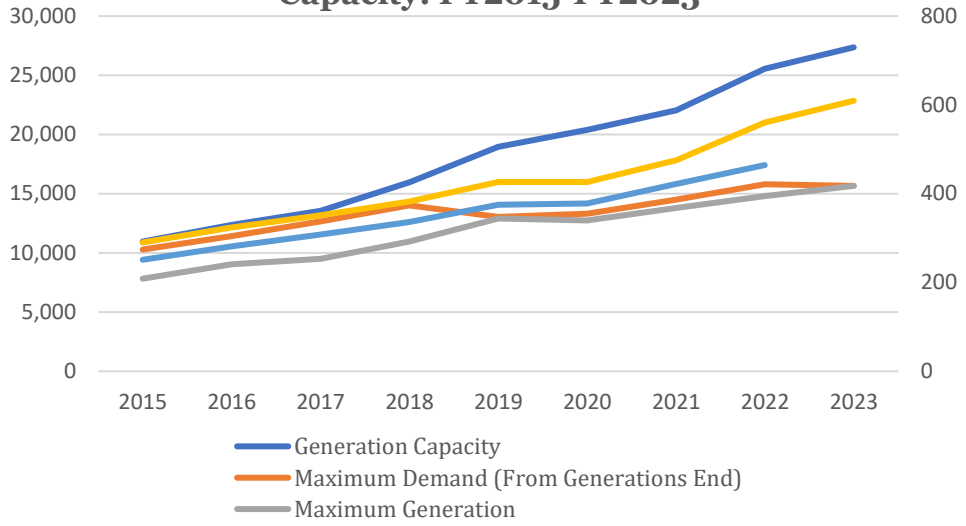


Figure 3: Share in Fuel Mix (in %)

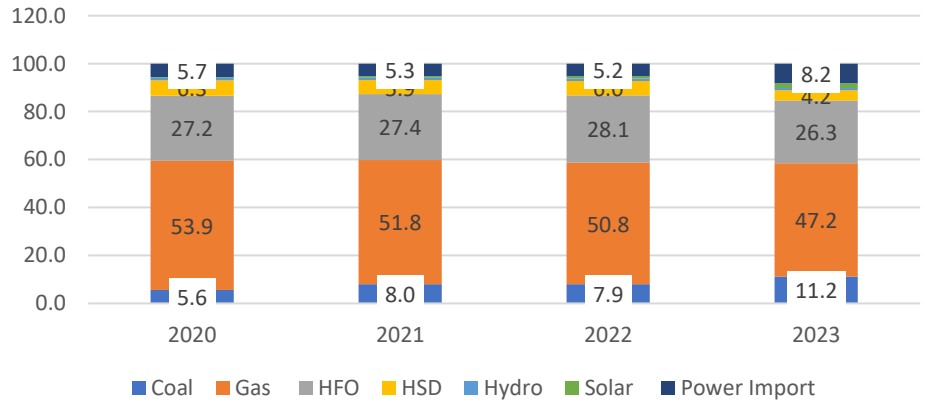
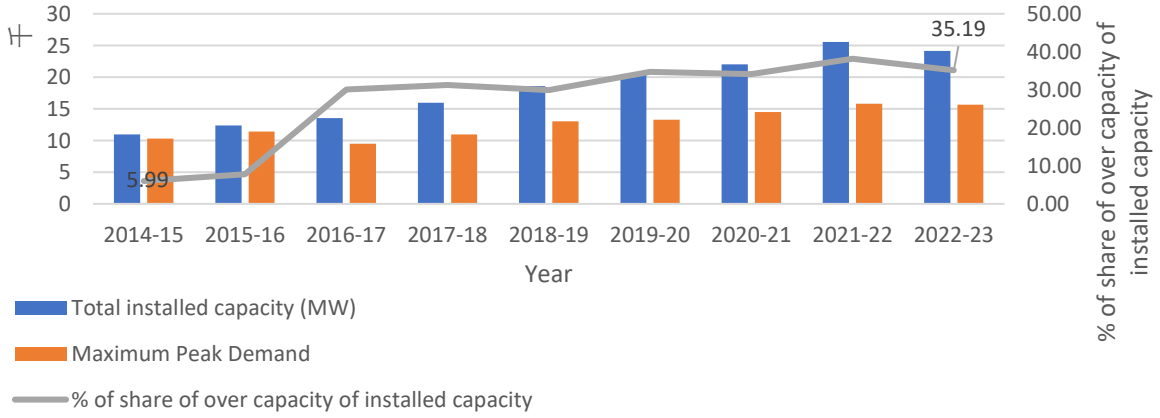


Figure 4: Rise of Reserve Margin



Source: Authors' Illustration from BPDB Data

2.2 Growing Difficulty in Adjustment of BPDB's Huge Losses

- Against the backdrop of huge generation capacity, the BPDB's financial condition is **getting worse o**ver the years– operating loss reached from Tk.-6,200 crore in FY18 to Tk.-27,477 crore in FY22 (Fig. 5)
- **This is because of increasing requirement** of capacity payment (Fig. 6)
  - From Tk.5,376 crore in FY17 to as high as Tk.28,000 crore in FY23 (estimated)
- The payment has been made by the BPDB **through borrowing from** the government as 'subsidy'
  - Amount of subsidy has apprehended to rise **to Tk.32,000 crore in** FY24 (Table 1)
  - The subsidy to the power sector alone is accounted for 37.9% (Table 2)
- Over the last few years, BPDB is **passing through its capacity payment** in the following years which made it difficult to understand its actual state of financial condition – the **actual situation seems much bleak**

Figure 5: BPDB's Financial Condition

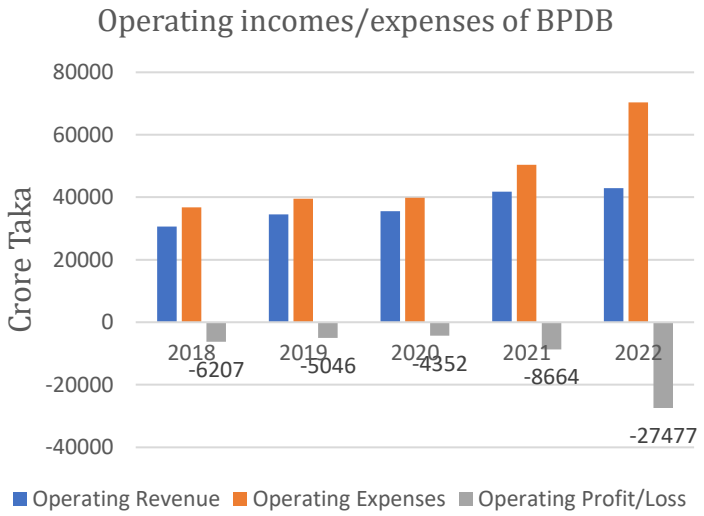
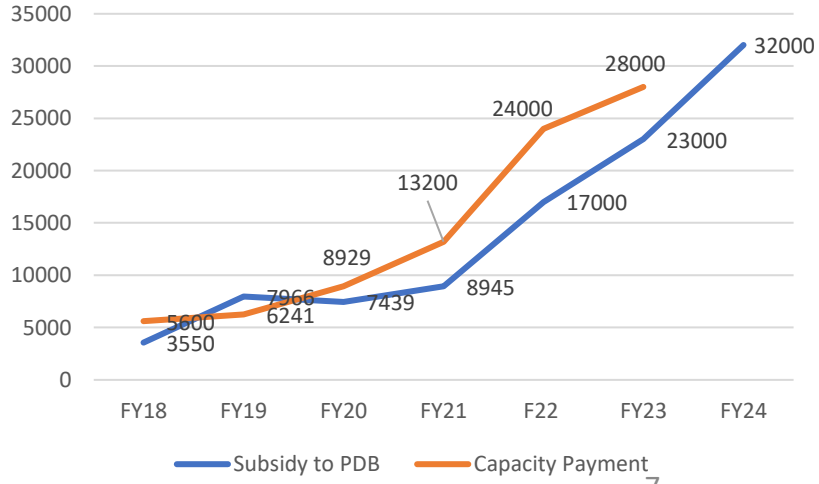


Table 1: Capacity Payment over the Years

	Subsidy to PDB (Crore Taka)	Share of subsidy in total subsidy (%)	Subsidy to Gas and others (Crore Taka)	Share of subsidy in total subsidy (%)
FY17	4000	24.8	300	1.9
FY18	3550	19.4	3605	19.8
FY19	7966	24.7	2514	7.8
FY20	7439	17.7	3516	8.4
FY21	8945	23.4	5297	13.8
FY22	12000	28.1	11487	26.9
FY23	23000	29.5	21300	27.3
FY24	32000	37.9		

Figure 6: Trend of Subsidy and Capacity Payment



Source: Authors' Illustration from MoF and BPDB Data

2.3 Huge subsidy use in Bangladesh deprived social sectors for adequate funding

- Most of the net energy-importing countries have undertaken various **subsidisation measures** in order to address the global high price of energy in recent years
- Among the peer countries, Bangladesh has been **providing highest level of subsidy**
  - Its subsidization rate in 2021 was **34%**
  - However amount of subsidy per capita is still at modest level
  - The subsidy-GDP ratio is also highest in Bangladesh
- In other words, **social sectors are deprived of** getting adequate fund from the government

Table 2: Share of subsidies of some energy-importing Asian countries, 2021

Country	Average subsidisation rate (%)	Subsidy per capita ($/person)	Total subsidy as share of GDP (%)
China	5%	37	0.6%
India	16%	34	2.6%
Indonesia	32%	89	2.7%
Malaysia	9%	93	1.0%
Pakistan	21%	37	3.3%
Thailand	5%	34	0.6%
Sri Lanka	21%	49	1.6%
Viet Nam	11%	46	2.3%
Bangladesh	34%	45	5.6%

Source: IEA website, accessed on 20 June, 2023

2.4 IMF Condionalities would not be sufficient to subsidy from the power and energy sector

- Increasing green initiatives to **address the challenges of the Power and Energy Sector**
- IMF conditionalities related to the power and energy sector have touched upon **two broad areas:**
  - **Reducing fiscal burden** by withdrawing address the climate vulnerabilities
- Although the measures have implications on the sector but **those are not sufficient and in some instance** counter-productive to address the key challenges

Table 4: Phase-wise implementation of the reform conditions

Reforms for Bangladesh	Periodic Reviews					
	1st	2nd	3rd	4th	5th	6th
Adoption of periodic- formula-based price						
Implementation of periodic formula-based price						
Adjustment mechanism for petroleum products						
Setting price adjustment mechanisms for petroleum products						
Adoption of a sustainable PPP paper and an associated action plan						
Adoption and implementation of a methodology for embedding climate change in the MTMF						
Issuing a circular on an update to the Green Book						
Adoption of an updated PPP policy and framework						
Updating green bond financing policy, particularly the green taxonomy						
Adoption of an updated PPP policy and framework						
Conducting and publishing climate stress testing by BB						
Updating the policy on Green Bond Financing by BB						

Source: Authors' illustration

2.5 High Energy Price Continues to Dominate the Global Market and High Import Bills for Energy Would Cause Major Part of Depletion of country's Forex Reserve

- The market for fossil fuels have started to decline since early to mid-2022 (Fig. 7 & 8). However the deceleration **may not continue further** given the recent declaration.
  - Saudi Arab has **declared to reduce supply**
- The projected high price of crude oil, natural gas and coal reflects the same (Tab. 5)
  - **Energy prices are likely to rise** end of 2023 and early 2024
- Hence, the financial burden for importing coal, LNG and furnace oil would not be eased within the next one year

Figure 7: Coal and Crude oil price trend

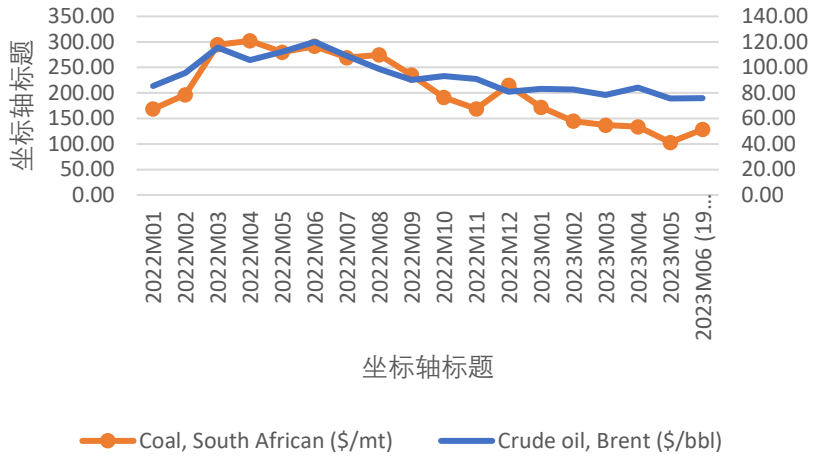


Figure 8: Natural Gas and LNG price trend

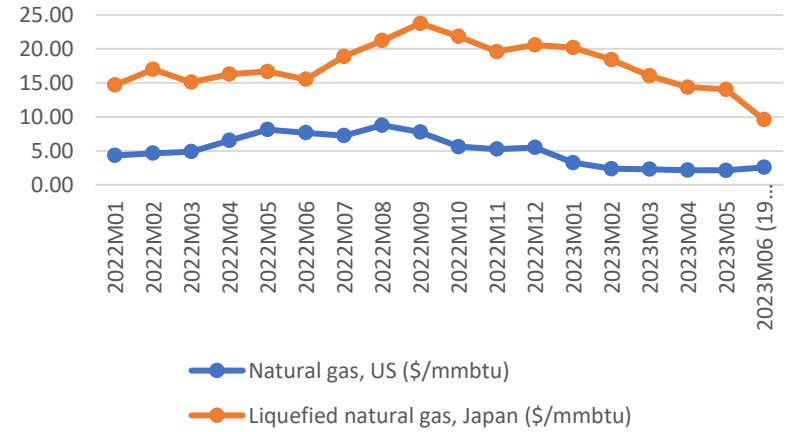


Table 5: Energy Price Forecast

	Q3/23	Q4/23	Q1/24
Crude oil, Brent ($/bbl)	81.122	83.626	86.199
Natural gas ($/mmbtu)	2.9913	3.1952	3.4131
Coal ($/mt)	138.93	144.49	150.27

Source: WB Pink Sheet

2.6 Difficulty in continuing import of fossil fuels at high cost to operate the power plants in maximum capacity

- **Between FY19-FY22**, the costs for importing furnace oil and crude oil has increased by **36.6%** (Table 8)
  - An additional amount of **Tk.2694.7 crore** were spent within three years
  - The additional expenditure is made to reduce the load-shedding which failed in ensuring operation with maximum capacity
- To operate the power plants at their maximum capacity (15000 MW), the **companies need to spend USD10 billion per year** or, USD833 million per month (Table 6)
  - Whereas, in a normal fiscal year of 2018-19, only BDT7,363 crore (USD883.7 million) was required to import the required amount of fossil fuels
- Given the situation of forex reserve, will the banks be **able to open LCs in favour** of public entities for importing such a high amount every month?

Table 6: Estimated Fuel Import Requirement and Dollar Needed to Import

Fuel type	Requirement to generate per MW	Unit	Peak Capacity	Requirement for 1 year	Unit	Billion USD required to import
Coal	9.2	TON	2,668	8959144	TON	1.39
HFO	2.2	TON	5,255	4282106	TON	3.2
HSD	1.2	TON	787	333216	TON	0.27
Gas (including RLNG)	0.14	MMCF	7,406	378447	MMCF	
LNG						5.3
Total (Billion USD)						10.16
Total in BDT (lakh crore)						1.1

Source: Authors' Estimation

2.7 Burden of capacity payment will continue to rise and made it difficult to pay in the future

- Ongoing plan of setting up new power plants by 2025 (6,218 MW) will further rise the excess capacity in the upcoming years and thereby will further rise the pressure on capacity payment
  - **14,166MW worth** of overgeneration capacity (share: 46%)
  - If the power demand remain same as it is in current year, the over generation capacity **would be as high as 50%**
- BPDB is behind in clearing the capacity payment due to its weak financial situation.
  - BPDB cleared the capacity payment of FY21-22 in FY22-23 using the allocated subsidy of FY23 (Tk 17,000 crore)
- The **aggregated unpaid capacity payment in FY22-23** is expected to be Tk 28,000 crore
  - This big chunk of due is also supposed to be settled using FY24's allocated subsidy for power and energy sector

Table 7: Estimates of Power Generation Capacity and Reserve Margin (Excess Capacity)

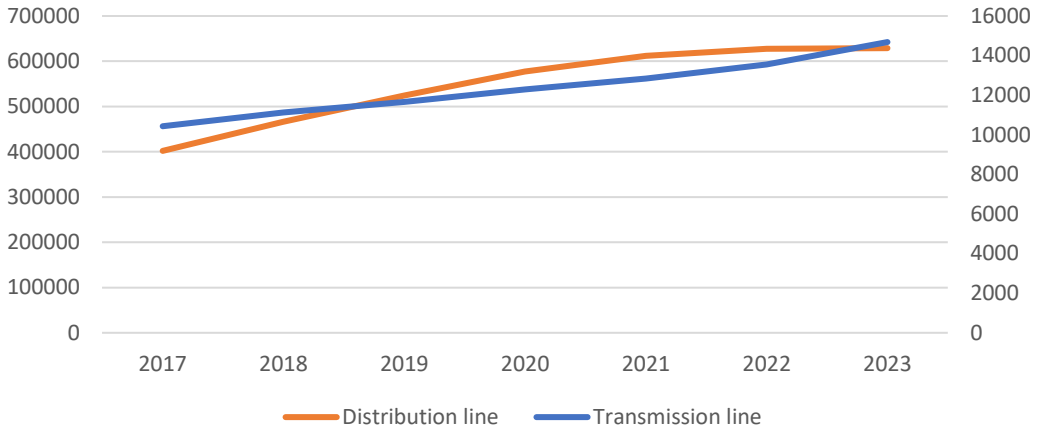
	Capacity in MW
Present Generation Capacity	27361
Generation to be added by 2025	6218
Capacity to be phased out	2487.9
Generation Capacity by 2025	31091
Possible Maximum Demand as per BPDB	19900
Possible Maximum Demand considering 4% growth rate in demand	16925
Overgeneration capacity as per PDB's demand	11191
Share of overcapacity (%)	36
Overgeneration capacity as per CPD's estimation	14166
Share of overcapacity (%)	46
The demand will remain same as the current year	15648
Overgeneration capacity	15443
Rate of overgeneration capacity	50%

Source: Authors' Estimation

2.8 Flattening the Progress in Transmission and Distribution Continuously Made it Difficult to Get the Maximum Benefit

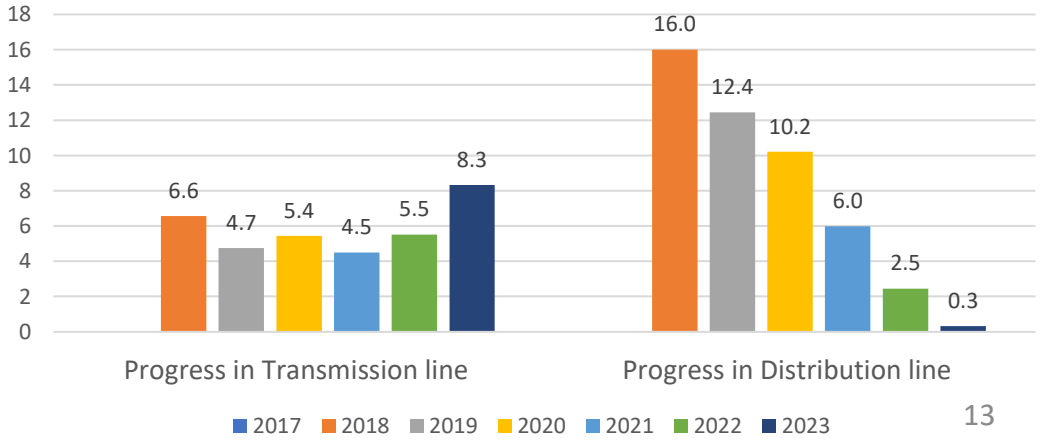
- While the length of transmission and distribution lines have increased over the years, the growth has been flattened particularly in distribution lines (Fig. 11)
  - **Distribution lines** have increased by merely 0.3% - **a gradual deceleration over the years** (Fig. 10)
  - The growth of transmission lines is noticeable- transmission lines have increased at 8.3% in FY2023 maintained a **change in 4-6% level** over the years
- **Slow progress in transmission** and distribution lines is a major reason behind **poor load management**
  - This is happened at a time when a huge excess power generation capacity remains - a paradoxical situation indeed!

Figure 9: Transmission and Distribution Lines: FY2017-23



Source: BPDB Annual Reports

Figure 10: Changes in Lines of Transmission and Distribution



2.9 Neglecting the domestic gas sector at the cost of promoting import of LNG

- With depleting domestic reserve of natural gas, there is a considerable **rise of unmet demand for natural gas** (Tab. 8)
  - The unmet demand has been increasing – 1.35% in FY18 to **16% in FY22**
- This unmet demand has been partly met by **increasing import of LNG**
  - Its import has been increasing – from 0.12tcf in FY2019 to **0.26 tcf in** FY2023
  - However, this amount of supply met **only 26%** total demand
- Unfortunately, the government **put less effort to explore** more gas
  - Instead there is a tendency to import LNG at a high cost
- Since 2009**, only 19 wells have been** drilled which is very low to meet the requirement – despite having fund no major effort is taken to generate gas wells
- According to the MTMPS, government has a plan to dig **another 46 wells by 2024 with** the objective of increasing gas generation capacity 618 million cubic ft.
- According to the Gas Development Fund, at present only **7 drilling of wells** (exploratory and appraisal cum development) are ongoing.
  - The allocated budget for these drilling projects are Tk.1074.7 crore
- Interestingly, the fund for gas development has been used for **purchasing LNG (Tk.2000 crore)**
  - As per CPD's calculation, majority of the **required fund for importing energy in the coming years,** as estimated (USD5.3 billion) will go for importing LNG
  - This large amount of money can be saved if the focus is **given to invest on local production and reducing LNG import**

Table 8: Domestic Production, Demand for Gas and Imported LNG

FY	Domestic Production (TCF)	Total Consumption (TCF)	% of Demand unmet with only natural gas reserve	R-LNG Supply (TCF)
2017-18	0.97	0.98	-1.35	
2018-19	0.96	1.04	-7.69	0.12
2019-20	0.89	0.99	-10.6	0.2
2020-21	0.88	1.02	-13.26	0.22
2021-22	0.84	1.0	-16.0	0.26

Source: Authors' Estimation from Bangladesh Economic Review

2.10 Tariff rate adjustment as part of IMF conditionality faultily passed on the burden to the consumer

- Government has been increasing the **tariffs of fuels and electricity** as a part of adjustment of subsidy (Figures 12, 13 and 14)
- In January 2023, the retail **price of gas** has been increased by as much as **179%** (Figure 14)
- From January to March 2023 **power tariff** has been hiked from Tk. 7.49 to Tk. 8.25/kwh
  - The tariff has been increased by **5% every month from** January to March
- The **tariff of petrol, octane, kerosine** and diesel have been last revised on 30th August 2022 (Figure 12)
- However, the burden is **fully passed on to the consumers** which is supposed to be adjusted from 'capacity payment'.
  - Hence, measures to be taken to phase out capacity payment for IPPs power generation

Figure 12: Change in Fuel Oil Price

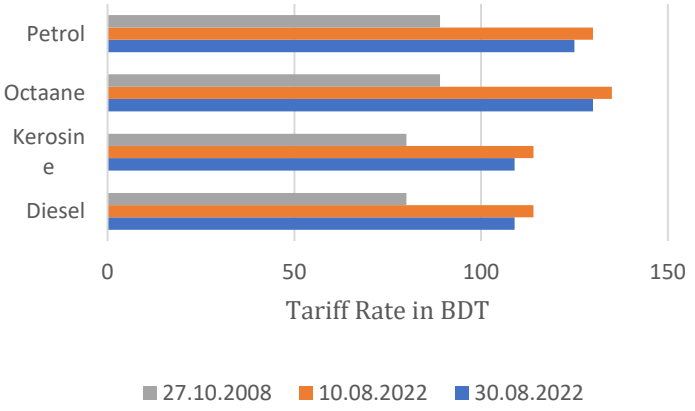


Figure 13: Change in Electricity Tariff

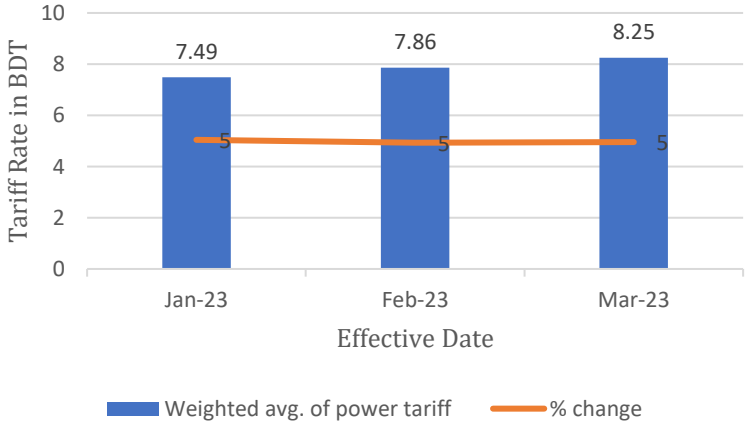
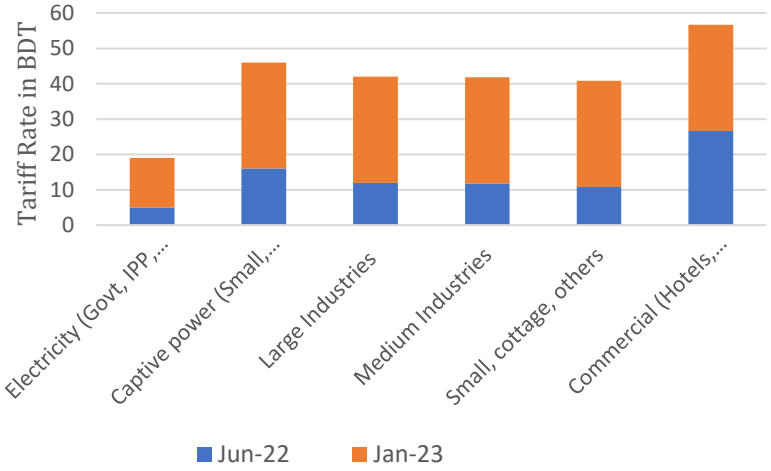


Figure14: Change in Gas Price (Tk per CM)



Source: Authors' Illustration from BPC, BPDB and BAPEX Website

2.11 Amendment to the BERC Ordinance 2022 has weaken the governance structure

- Bangladesh Energy Regulatory Commission (BERC) now consults with the government before any move towards holding a public hearing on retail power tariff hike proposals
- The GoB has amended the BERC Act 2003 to **create scope for the government to take arbitrary decisions** on raising retail and bulk power and energy prices
- This decision has further **weakened the institutional capability** of BERC
- In fact under the IMF's condition of adopting the market based pricing mechanism, BERC could have played the role **to monitor and adjust** the prices regularly
- This system could have for both electricity and fuel oil prices similar to that of LPG
- BERC's role will be much-needed during the period of **market-based pricing system** which is difficult to ensure in its current stature.

2.12 Continuation of the Quick Enhancement of Electricity and Energy Supply (Special Provision) Act 2010 is anti-competitive which is perhaps the reason for inefficient and less competitive contracting parties

- The **Quick Enhancement of Electricity and Energy Supply (Special Provision) Act 2010** has been **extended on** 2021 for another five years till 2026
- Such an act is highly **anti-competitive and stops** opportunity to go for competitive bidding to find out the most efficient contracting party
- As part of reform, this law should be **repealed and to create space** for a competitive market environment

3. Potentials of Local RE Development

3.1 Scopes of Power Generation from Solar Energy

- In a study by Mondal & Islam (2011), annual electricity generation was calculated for **Dhaka, Rajshahi, Sylhet, Khulna, Rongpur, Cox's Bazaar, Dinajpur, Kaptai, Chattogram, Bogura, Borishal, Jashore, Mymens**ingh, and Sherpur based on the amount of equivalent direct current (DC) electrical energy delivered to the utility by the proposed **1 MW solar grid-connected system**.
    - The planned facility can generate an average of **1,728 MWh/year of power** in Bangladesh from anywhere in the country.
- In the article "What Causes Climate Change?", Huque (2016) noted following due consideration that only **building rooftop solar PV** plants can produce over **2GW of electricity alone in Dhaka city**
    - It might **exceed 6GW throughout** the country [utilizing **60 per cent of usable rooftop area** and leaving the remaining 40 per cent for other types of use.
- Chakraborty et al. (2016) considered and evaluated the potential of solar tilts, radiation, and available roof surface area of 2,000 registered trawlers of Chattogram Fishery Ghat, Bangladesh in their research to assess the **solar photovoltaic potential of the trawlers**, which would usher in and establish a new zone for power generation through PV application.

3.1 Scopes of Power Generation from Solar Energy

- Mazumder et al. (2017) presented a preliminary evaluation of a **coast side building's rooftop - utilizing it as a wind and solar energy** harvesting site in Chattogram. The location was close to Chattogram's seacoast.
    - The structure utilized was an apparel factory in Chattogram EPZ. The authors estimated that the total annual energy output might be **6,960 kWh.**
- Rahman et al. (2017) calculated electricity generation by **floating solar panels on Kaptai Dam** (Rangamati, Chattogram Hill Tracts, Bangladesh).
    - Using 17,500 total array units and considering the maximum ideal power of the solar panel to be 435.5W, the total power output **was estimated at 7.62 MW**.
- As per IDCOL, 1,500 representatives of the Bangladesh Textile Mills Association possess **42 million square feet of rooftop** area that might be used **to build 400 MW solar PV systems.** Rooftop solar systems, according to SREDA, have enormous potential in Bangladesh.
    - Using this capacity, 1,000 MW of power may be generated, **400 MW of which will be generated on government/semi-government** owned buildings (Ahmed et al., 2020).

3.1 Scopes of Power Generation from Solar Energy

- According to Hossain and Chisti (2020), given Bangladesh's average capacity factor of **4.5 hours per day,** the power output from 1 per cent (one percent) of agricultural land would roughly be **82,000 GWh**
- According to the draft Bangladesh's National Solar Energy Action Plan 2021-2041, major riverbanks can provide the land required **to generate 15,000 MW solar electricity by 2041**.
    - Land on the Meghna River **can yield 3,000 MW solar power generation**, whilst Jamuna banks at Gaibandha, Jamalpur, and Sirajganj can each fetch 2,000 MW.
- Another **3,000 MW can be generated** on the Padma's banks in the **Munshiganj and Rajbari districts**.
    - **Pabna, on the banks of the Padma and Jamuna rivers**, has the potential to generate **another 1,000 MW.**
- According to the action plan, if the industry receives the attention it deserves from the government and receives consistent foreign financial patronage, **solar energy will generate 30,000 MW, or 40 per cent** (forty percent) of the total capacity, by 2041. (Amin, 2021)

3.1 Scopes of Power Generation from Solar Energy

Solartech Power Plant

3.1 Scopes of Power Generation from Solar Energy

- A study by Saifullah et al. (2016) measured the wind speed at six coastal zones near the Bay of Bengal in the south: **Patenga, Cox's Bazaar, Teknaf, Char Fession, Kuakata, and Kutubdia**.
- A near-shore wind farm was considered at these locations, with a **574-kilometre coastline**.
- This sea-side wind farm **generated 1,855.25 MW of electrical power** with an array of 5,104 horizontal axis wind turbines with hub heights of 100 m, rotor diameters of 75 m, **and wind speeds of 7 m/sec.**

Khurushkul Wind Power Station

3.1 Scopes of Power Generation from Solar Energy

- BPDB has proposed to expand the **Karnafuli Hydro Project by 100 MW**.
  - Sangu and Matamuhuri Rivers have been identified as the possible hydropower generating sites by the BPDB.
- The Sangu Project will be a new project with a **capacity of 140 MW** and an approximate annual energy output of **300 GWh/yr**.
  - The Matamuhari Hydropower Project might have a capacity of **75 MW** and an annual energy output of 200 GWh/yr. (Wazed & Ahmed, 2008)
- In his article "Hydropower in Bangladesh", Mahadi (2016) stated that a credible analysis estimates a small-scale hydropower generation capacity of 60 MW, allowing for the production of 200 GWh of electricity per year.
  - Through private initiatives, the first **micro hydropower plant of 10 kW** was deployed in a Bandarban community.

3.2 Scopes of Power Generation from Biogas & Biomass Energy

- Using data of the year 2013, Nahian & Islam (2016) determined the total volume of biogas production and energy generation from organic waste in Bangladesh. **Poultry waste generated 3,033 MW** power, **cattle dung generated 12,211 MW power**, and **municipal waste generated 2,301 MW power**.
    - In collaboration with JB Biogas, Aisin Seiki Ltd launched an initiative to evaluate the potential of biogas-fired power generation in Bangladesh. They began by conducting a survey in five Upazilas in the Gazipur district. It has been discovered that there are **over 500 poultry/dairy farms where biogas-fired** generators can be installed.
    - According to the survey results, there is potential for installing more than **20,000 biogas generators in the country**. Given that the average generator size is 5kW, these generators' total power generation capacity would be 100MW (Rana, 2017, p. 115).
- In a collaborative effort with Noakhali Science and Technology University and Practical Action, an INGO, the Bangladesh Biogas Development Foundation (BBDF) studied the 'Potential of Maize as Biogas Raw Materials'. It was estimated that an acre of land produces around 20 tons of biomass.
    - Biogas technology can generate 2,000 m3 of biogas. Maize is grown on around **800,000 acres of land in Bangladesh**. Approximately half of this area is cultivated for two crops every year. Based on this, **16,000,000 tons of biomass could be generated annually, fetching 2,400 million m3 of gas.** (Gofran, 2020, p. 88-96)
- The Dhaka-based Amin Bazar Waste to Energy Project has a capacity **of 42.5 MW.** The project is now being implemented. It will only go through one phase of development. When construction is completed, the project is expected to be operational in 2024. (Carmen, 2021)
- There is enough evidence to establish that Bangladesh has enough potential to generate power from renewable sources. Due to technical obstacles and/or policy gaps, these potentials are still unexplored.

3.2 Renewable Energy Has Yet to Get Attention which reduces the opportunity to diversify the fuel-mix and address fossil fuel related challenges

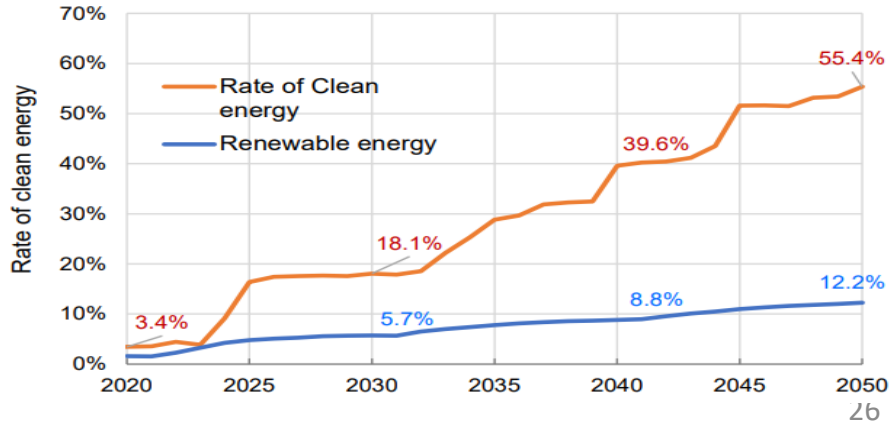
- Although the renewable energy target is set at **40% by 2041 (24,000 MW),** total installed renewable energy based generation capacity **at present is only 1184 MW** (share of installed capacity: **4.3%**) (Tab: 9)
- No major effort is taken to **address the renewable energy** based power sector development
- **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 11)
  - Such a shift in **narratives weakens** the government's stance and creates confusion among the masses regarding renewable energy
  - The cleaner energy includes **non-tested technologies** such as ammonia, hydrogen, critical and super critical carbon capture unit
- IEPMP shows that **only 8.8% of total electricity (5280MW) to** be generated from renewable energy sources

Table 9: Present Renewable Energy Situation

Technology	Off-grid (MW)	On-grid (MW)	Total (MW)
Solar	365.51	584.13	949.64
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	368.6	815.03	1183.63

Source: SREDA

Figure 11: IEPMP on RE and so-called Clean Energy

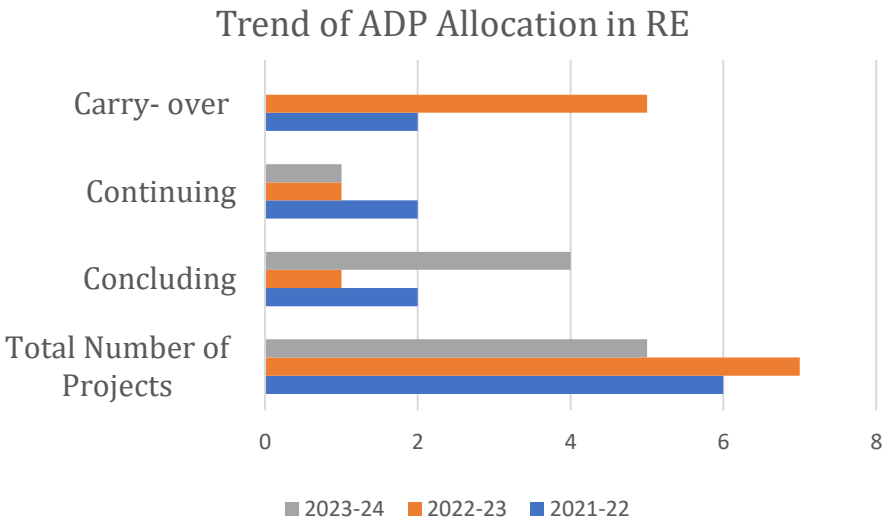


Source: IEPMP 4th Draft

3.3 Renewable Energy in the National Budget FY23- 24

- The number of projects has been **decreased in the ADP** allocation for FY 2023-24 compared to FY 2022-23 (Fig. 20)
  - From 7 projects in FY2023 to 6 projects in FY2024
- Majority of the renewable energy based projects are **concluding projects** (4 out of 6) that has been increased over the last three years
- Simultaneously the number of carry over projects have reached to zero in FY 2023-24
- Surprisingly, the **lower number of public funded renewable** energy projects are a major weakness in allocative priorities
- **Only two out of 6 'concluding'** projects completed within the upcoming fiscal year- the rest four will **turn to be 'carry over' project** (Tab. 10)
  - **Unless properly funded**, the one continuing project (implementation rate: 40%) would turn to be carryover project

Figure 20: Implementation Rate RE related Projects



Source: Authors' Estimation from ADP FY2023-24

Table 10: Renewable Energy based Major Development Projects for FY2023-24

Name of the Project	Maximum Completion Rate	Type of Project	Project Status
Sonagaji 50MW solar power plant building	89%	Generation	Concluding
Technical support project for renewable energy resource assessment and piloting	98%	Generation	Concluding
TA for strengthening and development of sustainable power sector in Bangladesh	40%	Generation	Continuing
Agriculture irrigation through solar driven pump	93%	Distribution	Concluding
100 MW solar power plant building in Madariganj	54%	Generation	Concluding

3.3 Renewable Energy in National Budget FY23- 24

- A total of 14 renewable energy based power plants with the generation capacity of **460 MWs are** in the pipe line by 2025 (Table 11)
  - Adding the upcoming power into the grid the renewable energy based generation will be **1644 MW**
- Only three projects are currently under pipeline of public investment with a total capacity of meagre **53 MW**
  - Only **11.5% of total** RE projects in pipeline
- The projects under the pipeline should be commissioned with **proper allocation**
- Providing **fiscal support as** well as gradually reducing fiscal support for fossil-fuel based energy and power is important to attract private investment
- Foreign investment and foreign aid will be needed to undertake **more G-G, G-P and P-P projects** for the development of the renewable energy sector development

Table 11: Upcoming Renewable Energy based Projects

Name of the Power Plant	Capacity (MW)	Fuel Type	Possible Commissioning Date
Public Projects			
Sirajganj 2 MW Wind Power Station	2	Wind	Jun-23
Barishal 1 MW Solar Power Plant	1	Solar	Jun-23
Sonagaji 50MW solar power plant building	50	Solar	Dec-23
Sub- total	53		
Private Projects			
Patgram Lalmonirhat 5 MW Solar Power Plant	5	Solar	Dec-23
Goyangat 5 MW Solar Power Plant	5	Solar	Dec-23
Dharmapasha Sunamganj 32 MW Solar Power Plant	32	Solar	Dec-23
Tetulia Panchgar 30 MW Solar Park	30	Solar	Dec-23
Bera Pabna 3.77 Solar Power Plant	3.77	Solar	Dec-23
Pabna 100 MW Solar Power Plant	100	Solar	Dec-23
Sirajganj 68 MW Solar Power Station	68	Solar	Dec-23
Cox's Bazar 60 MW Wind Power Plant	60	Wind	Dec-23
Mongla Bagerhat 55 MW Wind Power Plant	55	Wind	Sep-24
Narayonganj 5 MW Biogass Power Plant	6	Biogass	Dec-24
Aminbazar 42.5 Biogass Power Plant	42.5	Biogass	Oct-25
Sub- total	407.3		
Total (MW)	460.3		

Source: BPDB Progress Report, May'23

3.3 Renewable Energy in National Budget FY23- 24

- **Prime Minister has** instructed officials to take steps to power all irrigation pumps in the country with solar energy
  - This initiative will save **3.4-3.5 million tons** of diesel, which is equivalent to **about US$1 billion**
  - At present, a total of **2,954 pumps are** being operated under solar which is only **0.22% of total** pumps irritated in Bangladesh (**13.4 lakh irrigation pumps**)
- Indian government launched the **"KUSUM"** (Kisan Urja Suraksha evam Utthaan Mahabhiyan) program to support the installation of solar pumps for irrigation
  - Main features of the programme include (a) **promoting decentralization** of solar power generation by encouraging the installation of small-scale solar power plants; (b) supporting the Indian solar industry by promoting **domestic manufacturing** of solar components and equipment
- Provinces like Gansu, Hebei, and Jiangsu of China had been implementing solar irrigation for the last few years
  - Main features of the programme include – (a) **both off-grid and grid-connected** systems are present; and (b) they are **scalable and customizable** i.e. they can be tailored to meet the specific needs of different **agricultural settings**, including small-scale farms or large-scale commercial operations

Thank you!