



BANGLADESH POWER SECTOR

An appraisal from a multi-dimensional
perspective (part-1)

ABSTRACT

Power & Energy is one of the prime mover of economic growth. Bangladesh offers attractive investment opportunity for the private entrepreneurs in the power sector. Progressive efforts from the policymakers, effective participation from the private entrepreneurs and support from the development partners has transformed Bangladesh power sector into almost self-reliant within short span of time.

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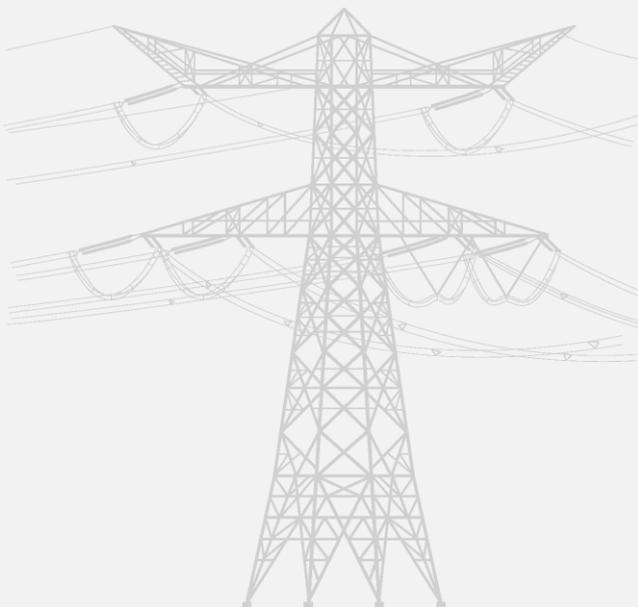
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Table of Contents

Review of the Power Sector Development in Bangladesh	2
Structural Reforms in Bangladesh Power Sector	3
Consumer Segmentation & Drivers of Growing Electricity Demand	4
Demand-Supply Scenario	4
Primary Fuel Supply Scenario	6
Local Industry Transformation: Journey From Public to Private Sector Power Generation.....	7
Investment Opportunity in Bangladesh Power Generation Sector	8
Financing Power Generation Projects in Bangladesh	8
Review of the Bangladesh Power Generation Plans.....	9
Evaluation of the Power Generation Planning in Bangladesh	12
Present tariff structure in the electricity generation sector.....	14
Reasons for Frequent Load-Shedding & Power Cut amidst Overcapacity	15
Power Transmission & Distribution System in Bangladesh	15
The Viability of Power Sector from The Financial Perspective	17
Bangladesh Private Power Generation Industry Review	19
Concluding Commentary	20



Growing demand for power indicates promising industry prospect, however, short-term over-capacity bringing new challenges to the government & industry players

The performance of Bangladesh's power sector in last decade has been impressive due to the progressive efforts from the policymakers, effective participation from the private entrepreneurs and support from the development partners

Incessant supply of power and energy is the prerequisite for the progress of an economy. The importance of energy is even more supplementary in the context of Bangladesh, an emerging economy that has been enjoying rapid economic growth but also experiencing prolonged period of energy crisis. Bangladesh is one of Asia's buoyant emerging economy that has a growing need for power and energy. Bangladesh aspires to achieve middle income country status by 2021 and also targets to be in the 'high-income country' club by 2041. The movement towards a progressive national economy strongly depends on the uninterrupted supply of power and energy to cater to the industrial and domestic demand. In order to achieve its ambitious socio-economic growth target, it has successfully identified shortage of electricity as its one of the key barrier in achieving such growth. The government of Bangladesh (GOB) has recognized that the pace of power development has to be accelerated in order to achieve overall economic development targets of the country.

To meet the increasing demand for Power, the government of Bangladesh undertook some pragmatic steps towards increasing the power supply within the short span of time by encouraging more private sector power generation as well as import of power from native countries. The performance of Bangladesh's power sector in last decade has been impressive due to the progressive efforts from the policymakers, effective participation from the private entrepreneurs and support from the development partners. The government of Bangladesh has set a target to bring the whole country under electricity coverage by 2021.

This report (Part 1) contains major highlight on the ongoing state of power generation and supply in Bangladesh, major steps and new approvals of power projects as well as financial viability of the power sector in Bangladesh. In this report, we tried to present the state and performance of power sector from various perspectives; from the view point of the government/public interest as well as from the view point of the investment potential by private power producers. We tried to appraise the sector performance both from the operational and financial perspectives. Our upcoming report (Part 2) will cover major highlights of the listed power generation companies, their comparative financial performance, investment insights and operation detail, risk assessments and investment potentials in the shares of listed power generation, distribution and transmission companies.

Review of the Power Sector Development in Bangladesh

Power sector in Bangladesh has witnessed big hit in terms of generation after the Awami League led government came to the power in 2009. Over the last decade, power sector in Bangladesh has seen impressive growth, one of the fastest in South Asia, aided by government's heavy emphasis on the power sector and favorable policy support. Last 11 years CAGR in terms of capacity was 15.3%. The Awami League government, after taking power, realized that a quick solution was required to mitigate huge power crisis at that time and decided to invite more private entrepreneurs to invest in power generation and increase power generation capacity within shortest span of time by setting up Rental Power Plants (RPPs) and Quick Rental Power



Bangladesh power sector: An appraisal from a multi-dimensional perspective (Part-1)

Plants (QRPPs). Even with significantly higher generation cost, it has significantly reduced power shortage and load-shedding within short time.

Structural Reforms in Bangladesh Power Sector

The electricity supply industry in South Asia started with the commissioning of the first power station in the 1890s. The first effort to structure a legal framework for the industry came in 1910 with the enactment of the Indian Electricity Act, 1910. In 1947, at the time of independence of India & Pakistan, the installed generating capacity in the then East Pakistan was only 21 MW. In order to formulate plans and improve power supply situation of the country, the Electricity Directorate was established in 1948. Later, in 1959, "Water & Power Development Authority" (WAPDA) was created considering the growing demand for electricity and its importance in agriculture & industry. Later the "WAPDA" was divided into two parts namely "Bangladesh Power Development Board" & "Bangladesh Water Development Board" by the Presidential Order 59 (PO-59) of 31st May 1972. As a result, Bangladesh Power Development Board (BPDB) was entrusted with the responsibilities of Operation, Maintenance, and Development of Generation, Transmission & Distribution facilities of electricity throughout the country. By the ordinance (Ordinance No-LI of 1977), Rural Electrification Board (REB) was established for the development of electricity in the rural areas for the effective benefit of rural people on October, 1977. Today there are 80 numbers of operating rural electric cooperatives called Palli Bidyut Samity (PBS), which provide service to approximately 26.459 million new connections and construct more than 0.482 million kms of line.

As part of the "Reforms-Funding" linkage agreed between the development partners and the Government, the implementation of Part (C) of the Project has been linked to redefining the franchise area of DESA and handing over of distribution networks outside Metropolitan Dhaka City to PBSs under REB, and formation of a corporatized Dhaka Electric Supply company (DESCO) which will initially take over part of the distribution network of DESA and ultimately take over all its assets. Under the reform program Dhaka Electric Supply Authority (DESA) was created for the proper management & electrification in Dhaka city and its adjoining areas in 1990. DESCO has started functioning from 1996 after taking over part of the distribution network of DESA. DESA was reformed again as Dhaka Power Distribution Company (DPDC) in July, 2008.

Under the Companies Act 1994, Power Grid Company (PGCB) was created in 1996 to look after the transmission system. The main operating function of PGCB is wheeling of energy from BPDB power stations and Generation Companies to Distribution entities utilizing transmission network. PGCB gets its energy wheeling charge from its clients (distribution entities) at the rate fixed by Bangladesh Electricity Regulatory Commission (BERC).

Ashuganj Power Station has been converted into Ashuganj Power Station Company Ltd. (APSCL) in 1996, as a subsidiary company of BPDB. Northern Electricity Supply Company Ltd. (NESCO) was created in 2016 to look after the distribution system of Rajshahi and Rangpur zone. NESCO is a distribution subsidiary of BPDB. West Zone Power Distribution Company Ltd. (WZPDCL) was created in 2002 to look after the distribution system of Barishal and Khulna Zone. WZPDCL is a distribution subsidiary of BPDB. Electricity Generation Company of Bangladesh (EGCB) has been formed as a Generation Company since 2004. EGCB has implemented 2x105 MW Peaking Power Plant at Shiddirgonj, 412 MW CCPP at Haripur and 335 MW CCPP at Shiddirgonj. North West Power Generation Company (NWPGL) was created in 2008. NWPGL has implemented 225 MW Combined Cycle Power Plant at Sirajganj, 225 MW Combined cycle Power Plant at Khulna, 360 MW Combined cycle Power Plant at Bheramara, 225 MW Combined cycle Power Plant at Sirajganj (2nd unit), 225 MW Combined cycle Power Plant at Sirajganj (3rd unit) and 105 MW power plant at modhumoti, Bagerhat.

As a part of the new reform initiative, BPDB is currently in the process of identifying Strategic Business Unit (SBU) for its generation and distribution sectors. According to the BPDB latest annual report, functional and financial performance of the SBUs will be operated like components of a corporate body and will be evaluated separately under the legal frame work of existing BPDB structure.¹

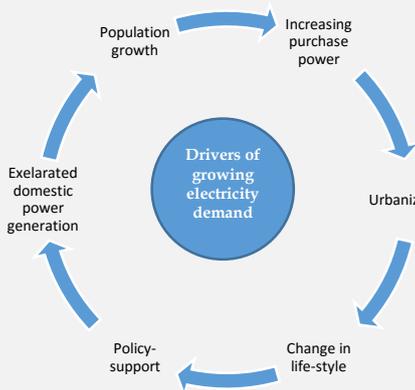
The power sector in Bangladesh has witnessed several reform initiatives over the last century.

¹ Source: BPDB and DESCO annual reports and respective company websites.

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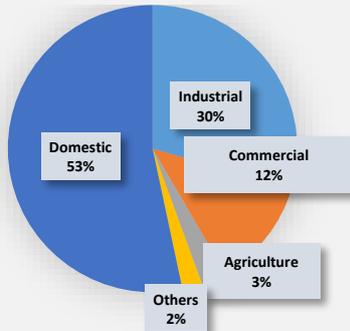
Consumer Segmentation & Drivers of Growing Electricity Demand

Majority of the power consumption demand comes from domestic & industrial sector of the country. RMG manufacturing, construction & infrastructure development, and pharmaceutical sector are key growth drivers within the industrial sector. In FY2018-19, 53% of the country's total power were consumed by domestic sector while industrial sector consumed 30% of the total power demand. Besides, commercial segment also consumed 12% of the total power consumption. In 2019-20, share of domestic users might increase while that of industrial and commercial spaces may decline due to COVID-19 pandemic outbreak and resultants general holidays for more than two months.



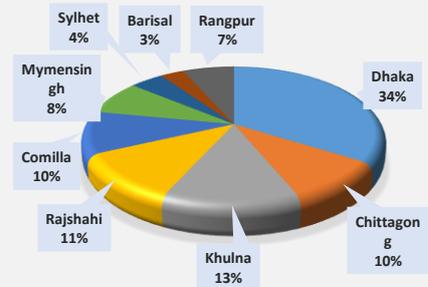
Key drivers of the power consumption growth are- steady population growth, urbanization, increasing per-capital income and higher purchase power, change in the life-style of country people, industrialization and increased digitalization. Bangladesh population has been growing by around 1.5% each year. According to "World Population Prospects (WPP) 2015", population of Bangladesh will be 202 Million in 2050. Growing population imply an increasing demand for power consumption and widening gap between supply and demand. Besides, demand for power is likely to increase substantially in line with rapid urbanization. Meanwhile, access to electricity in the country has seen steady improvement over the years as the country went through long period of economic growth while favorable government policies to generate power in line with growing demand.

Power Consumption Pattern of the Country (2018-19)



Source: BPDB Annual Report (2018-19)

Area-wise Electricity Demand



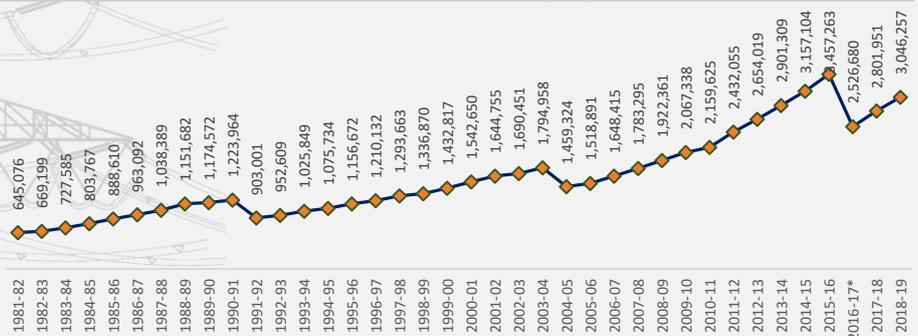
Source: BPDB (As on 26 July 2020)

Demand-Supply Scenario

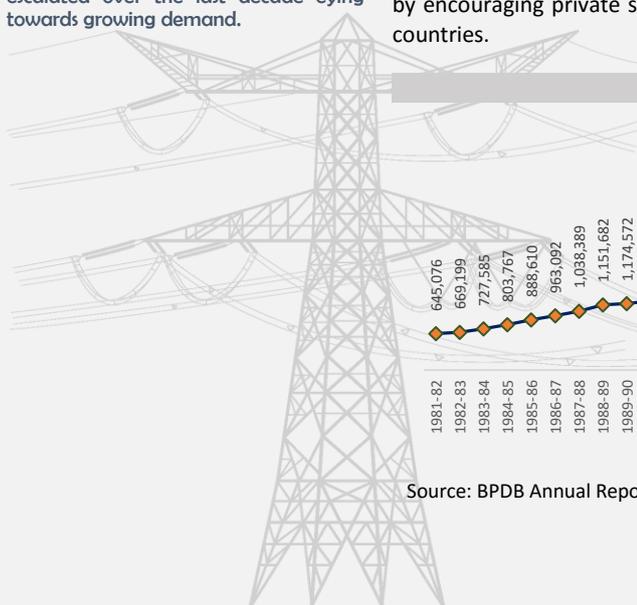
After prolonged period of scarcity, supply of power in Bangladesh is currently in excess of the demand: Power generation capacity has been escalated over the last decade eyeing towards growing demand. To meet increasing demand for Power, the Government of Bangladesh (GoB) has undertaken some pragmatic steps towards increasing power supply within short span of time by encouraging private sector power production as well as import of power from neighboring countries.

Power generation capacity has been escalated over the last decade eyeing towards growing demand.

BPDB Consumer Growth (Nos)



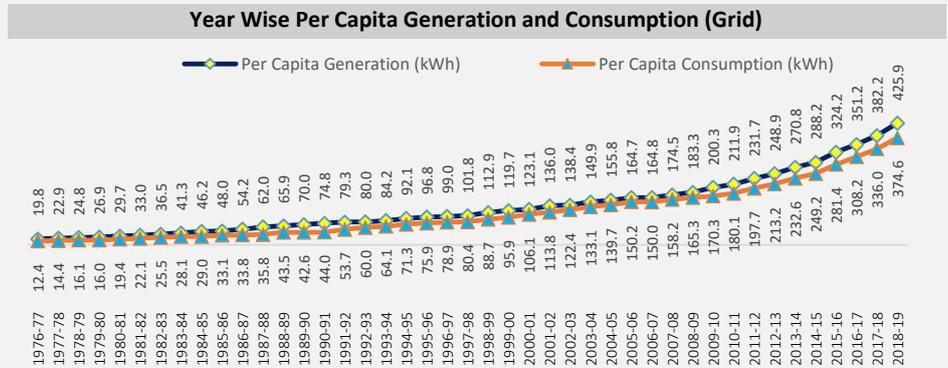
Source: BPDB Annual Report (2018-19)



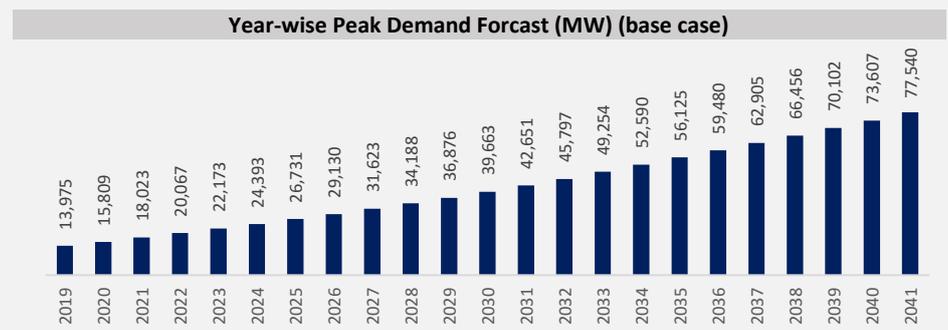
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Present power generation capacity of the country is 20,813 MW, excluding captive power & renewable energy while maximum power generation is as high as 12,900 MW

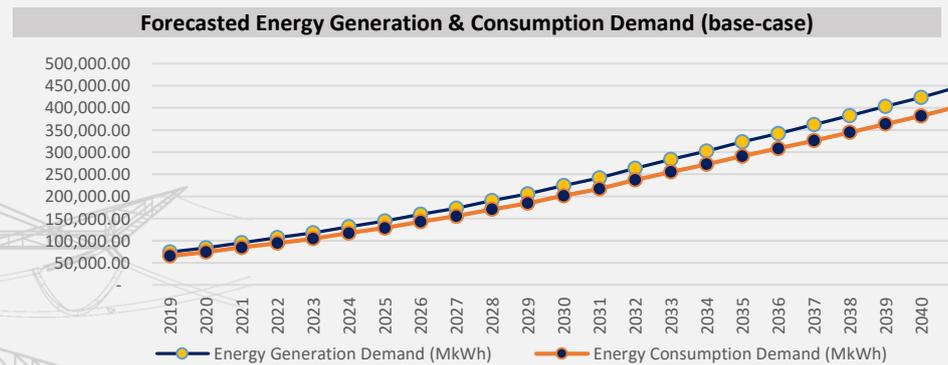
Electricity generation capacity of the country stands at 23,548 MW as on June 2020. However, excluding captive power & renewable energy, installed capacity of the country's power sector was 20,383 MW as on June 2020 against average daily electricity consumption demand of 9,000-11,000 MW, according to Bangladesh Power Development Board. However, electricity generation reaches to as high as 12,900 MW during summer while it falls down to as low as 6000MW in winter. Power demand reaches the highest level in April. Therefore, April is the highest power consumption month and December is the lowest consumption month.



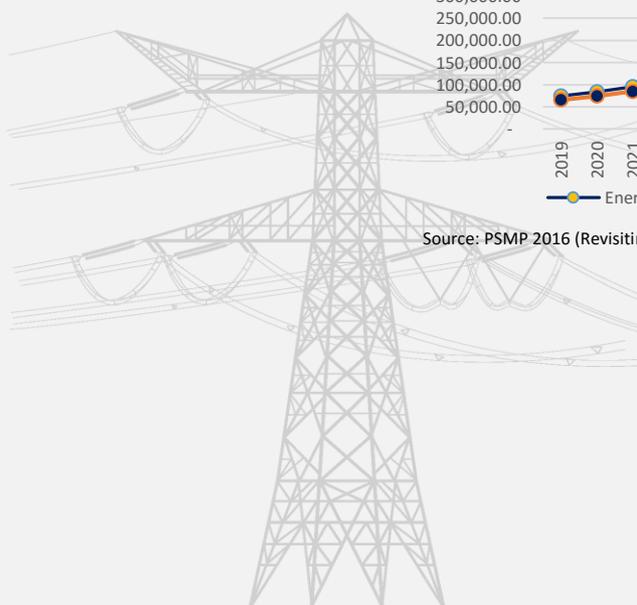
Source: BPDB Annual Report (2018-19)



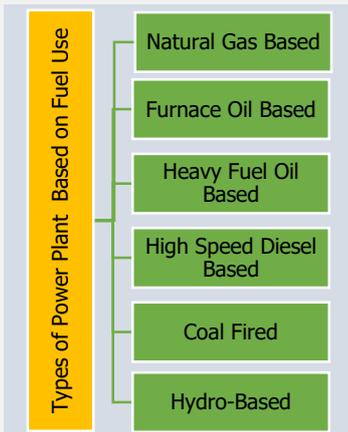
Source: PSMP 2016 (Revisiting)- Published in November 2018, Page- 27



Source: PSMP 2016 (Revisiting)- Published in November 2018



Primary Fuel Supply Scenario



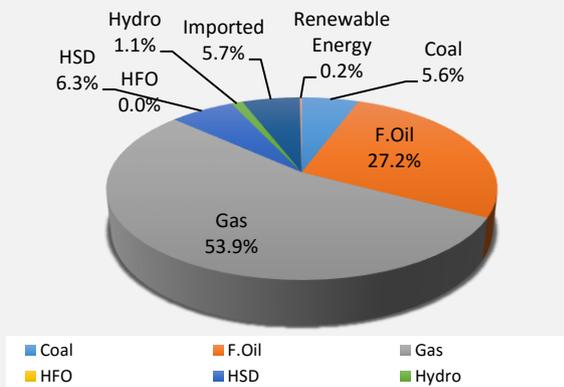
Up until 2016, the major consideration of energy source for power generation was Natural gas, which is now being shifted to Coal and LNG, as the deposited amount of natural gas remains uncertain. Due to no significant gas discovery in recent years, the country is now facing shortage of gas supply that has been discouraging gas based power generation; therefore the government is now looking for big power projects to be run on Coal or other types of Energy in the near future. Meanwhile, Bangladesh has already started to import LNG and planning to shift its concentration to LNG based power stations in future.

Import of LNG and implementation of LNG based power project might mitigate the power crisis and can be an alternative low cost fuel for producing electricity.

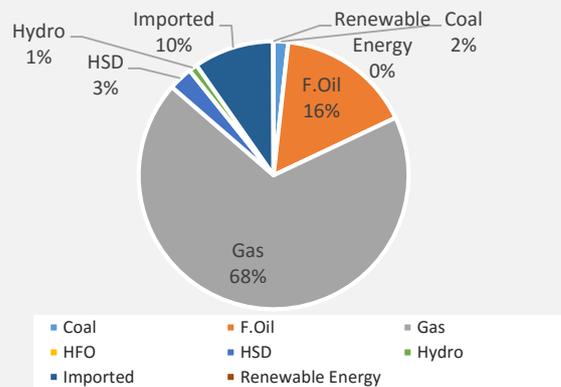
As of now, Furnace Oil, HFO and Diesel based plants are the best available alternatives for producing electricity. However, Oil based power plants are highly expensive compared to Gas based plants. So, Oil based plants are only short term solution to mitigate the supply shortage of power within the shortest period of time.

Coal is next available alternative. It can be a near term option and can be indigenous or imported. However, Coal based power projects are highly debated as they might be harmful for the environment. Since the last few years, the government has been encouraging coal based projects for mitigating electricity shortage and to reduce dependency on gas based expensive fuel oil based plants.

Installed Capacity (MW) of BPDB Power Plants by Fuel Type*



Net Generation (National) By Fuel Type (2018-19)



Source: BPDB & EBLSL Research; *As on June 2020

Nuclear energy is as safe as or safer than any other form of energy available.

Nuclear power is said to be safe technology; no pollution and expected to be future Base Load option (power stations which can economically generate the electrical power needed to satisfy this minimum demand). Nuclear energy is as safe as or safer than any other form of energy available. Though there are concerns and myths about the explosion risk of such plants, three most serious nuclear accidents- Three Mile Island, Chernobyl, and Fukushima Daiichi, suggests that the direct threat on human life has actually been overstated.² Data compiled by the U.S. Bureau of Labor Statistics shows that it is safer to work at a nuclear power plant than in the manufacturing sector, leisure and hospitality industries, and financial sectors.³ In fact, nuclear-power plant accidents aren't very frequent, but when they happen they can be very terrible.⁴ In 1986 when the Chernobyl nuclear reactor exploded, it released 5% of its nuclear reactor core into the atmosphere. The explosion resulted in the diagnosis of 237 people with Acute Radiation Syndrome (ARS) and was later confirmed in 134 cases. Of the 134 confirmed cases 28 people died as a result of ARS within a few weeks of the accident. The government of Bangladesh is investing heavily to construct nuclear based power generation plant at Rooppur, Pabna having 2,400 MW capacity.

² <https://thebulletin.org/2020/08/dont-let-nuclear-accidents-scare-you-away-from-nuclear-power/>
³ <https://www.nei.org/resources/fact-sheets/safety-nuclear-energy-industry-highest-priority>
⁴ <http://large.stanford.edu/courses/2018/ph241/antoine2/>

Bangladesh power sector: An appraisal from a multi-dimensional perspective (Part-1)

Natural Gas		Due to no significant gas discovery in recent years, the country is facing shortage of gas supply that ultimately discouraging gas based power supply
LNG		Import of LNG and implementation of LNG based power project may mitigate the ongoing gas crisis for producing electricity.
Furnace Oil, HFO and Diesel		Furnace Oil, HFO and Diesel based plants are the best available short-term alternatives for producing electricity but at high cost.
Coal		Coal based power projects are comparatively cheaper and require big investments but are highly debated as they might be harmful for the environment.
Nuclear		Nuclear is said to be the safe technology; no pollution; expected to be future Base Load option however, requires huge investments and sophisticated technological knowledge.

Though public sector accounts for highest power generation of the country, the contribution from private sector is also on the rise

Local Industry Transformation: Journey From Public to Private Sector Power Generation

Power generation sector in Bangladesh offers lucrative business opportunities for private entrepreneurs. Private sector in Bangladesh now account for almost 45% of the total generation capacity. Though public sector accounts for highest power generation of the country, the contribution from private sector is also on the rise driven by the government policy towards increasing power supply at the earliest by encouraging more private investment in this sector.

Present Installed Generation Capacity (MW)

Public Sector	30 June, 2018	30 June, 2019	30 June, 2020
BPDB	5,266	5,498	5,590
APSCCL	1,444	1,444	1,444
EGCB	839	839	957
NWPGCL	1,070	1,395	1,395
RPCL	77	182	182
Subtotal	8,696 (55%)	9,358 (49%)	9,568 (47%)
Joint Venture			
B-R Power gen (JV of BPDB-RPCL)	149	149	149
BCPCL (JV of NWPGCL & CMC, China)	0	0	622
Subtotal	149 (1%)	149 (1%)	771 (4%)
Private Sector			
IPPs			7,233
SIPPs (BPDB)	4,452	6,503	99
SIPPs (REB)	251	251	251
15 YR. Rental			169
3/5 YR. Rental	1,745	1,540	1,132
Subtotal	6,448 (40%)	8,294 (44%)	8,884 (43%)
Power Import			
Bheramara HVDC	660	1,000	1,000
Tripura	0	160	160
Subtotal	660 (4%)	1,000 (6%)	1,160 (6%)
TOTAL*	15,953	18,961	20,383

*Excluding Captive Power & Renewable Energy

The private sector has invested more than USD15 billion over the last decade by setting up power plants. BIPPA (Bangladesh Independent Power Producers Association) leaders in 2018 said that they have plans to invest USD50 billion within 2030 to keep up the private sector's participation in power sector development. To encourage private sector investment in the power sector of the country, the government of Bangladesh has adopted several policies notably Private Sector Power Generation Policy of Bangladesh, 1996 (revised in 2004) and Policy Guideline for Enhancement of Private Participation in the Power Sector, 2008. The government also took step to revise the Electricity Act 1910, which has been renamed as Electricity Act 2016, where adequate provisions have been kept to facilitate private companies to participate in developing

Bangladesh power sector: An appraisal from a multi-dimensional perspective (Part-1)

the country's power sector. As per the Private Sector Power Generation Policy of Bangladesh, the Power Cell as the agent of Government of Bangladesh assigns which organization would be the power purchaser from IPP at the time of issuance of Request for Proposal (REP).

Investment Opportunity in Bangladesh Power Generation Sector

Bangladesh offers attractive investment potential for FDI, particularly for the power sector. Its capital account is freely convertible for FDI. The Independent Power Policy of Bangladesh has been able to attract FDI since 1996 having good track records. FDI inflow to Bangladesh has been rising, and the power sector accounts for around 10.12% of total FDI at the end of March 2020. Besides, the sector also offers attractive incentives for local entrepreneurs as well in the form of tax exemption various lucrative policy support. Currently, Bangladesh power sector is offering private investment & FDI mainly in following areas⁵;

1. Coal based power plants, including secured access to coal supply
2. LNG based power plants
3. Renewable energy projects
4. Cross-border power projects including Hydro power plants
5. Projects to enhance energy efficiency, energy conservation and Demand Side Management (DSM)
6. Projects for transmission and distribution capacity expansion
7. About US\$ 17 billion invested during 2009 to 2018
8. US\$ 150 billion investment will be required for new generation between 2019 to 2041
9. US\$ 31 billion would be required for transmission network between 2019 to 2041
10. US\$ 35 billion would be required for distribution network between 2019 to 2041
11. Average US\$ 9 billion would be required each per year

The GoB has shown a strong commitment to attract private sector investments and provide an investment-friendly environment in power sector with a number of incentives and facilities.

1. Exemption of corporate income tax for a period of 15 years.
2. Exemption of customs duties, VAT and surcharges on plant, equipment and spare parts.
3. Tax exemption on capital gains from transfer of shares by foreign investors.
4. Facilities for repatriation of equity along with dividends.
5. Tax exemption on royalties, technical know-how and technical assistance for their repatriation
6. Avoidance of double taxation for foreign investors through bilateral agreements.
7. The foreign investors will be free to enter into joint ventures but this is optional and not mandatory
8. No restrictions work permit issuance to project-related foreign nationals.
9. Remittance of up to 50% of salary of the foreigners employed in Bangladesh and facilities for repatriation of their savings and retirement benefits at the time of their return
10. Exemption of income tax for up to three years for the expatriate personnel employed under the approved industry.
11. Exemption from income tax for foreign lenders to such projects.

Out of the total 20,383MW power generation capacity of the country as on 30 June 2020, public sectors capacity stands at 9,568 MW, private sector capacity stands at 8,884 MW, 771 MW is produced under JV (private and public), and 1160 MW is being imported. Besides, power generation capacity of the captive power projects and renewable energy now stands at 2,800 MW and 365MW respectively.

Financing Power Generation Projects in Bangladesh

The government formulated short and intermediate term in 2009 (PSMP-2010) and later a long term plan up to 2041 (PSMP 2016). To achieve the government's target to cover the whole country under electricity, the country requires multibillion dollar investments in the power sector.

Investment in power sector is capital intensive. The government formulated short and intermediate term in 2009 (PSMP-2010) and later a long term plan up to 2041 (PSMP 2016). To achieve the government's target to cover the whole country under electricity, the country requires multibillion dollar investments in the power sector. As a result, the government is increasingly diversifying the sources of investment.

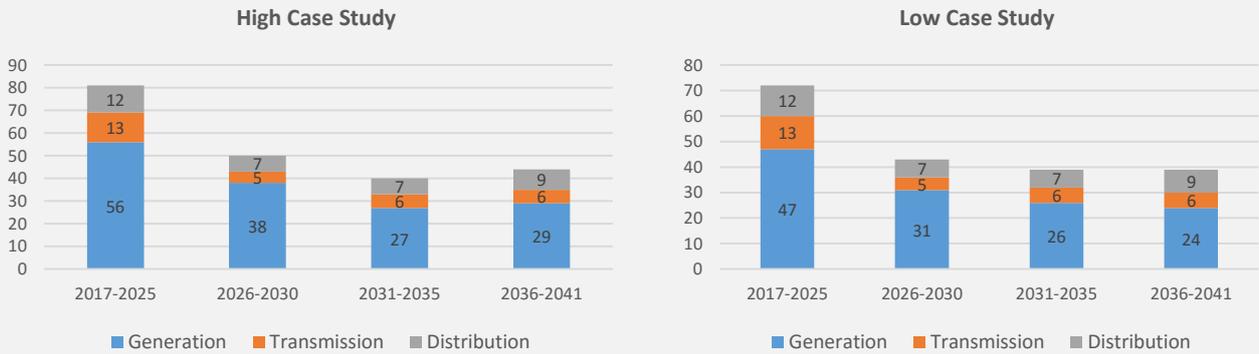
Financing any large project in Bangladesh is a bit challenging. Bangladesh money market does not have the depth, and building a long-term yield curve for BDT is a serious challenge. So, the country is likely to face challenges to finance such investment requirement. Traditionally, power projects in Bangladesh have been financed by a consortium of local banks, non-banking financial

⁵ <https://bit.ly/3imIDpD>

Bangladesh power sector: An appraisal from a multi-dimensional perspective (Part-1)

institutions (NBFIs), international financial institutions (debt or equity investments), export credit agencies (ECAs) and foreign investors.

Investment Requirement for New Generation, Transmission & Distribution (in billion US\$)



Source: PSMP 2016 (Revisiting)- Published in November 2018

Small power projects are attracting private sector investment while the government is seeking innovative financing through joint venture and the ECA (Export Credit Agency) backed financing for large power projects.

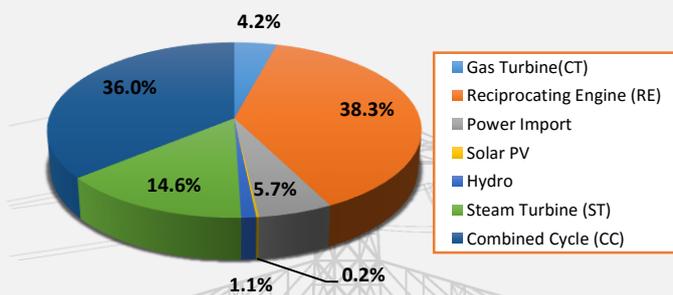
Small power projects are attracting private sector investment while the government is seeking innovative financing through joint venture and the ECA (Export Credit Agency) backed financing for large power projects, like coal based plants, considering the high capital investment requirement and modern technology and managerial skills. As the loan from development partners have been squeezed, the government has formulated strategic policy for bringing private sector investment, joint venture and innovative financing for implementing the long term plans. The government is now preparing a policy guideline to encourage more private sector investment in power transmission and distribution segments beside the current trend of investment in generation segment.

Capital Structure & Financing: Power Plants are mainly financed by debt based capital structure. The usual practice by Rental, Quick Rental and IPP Private Power Companies is 70-90% of the total project cost is financed by debt and rest 10-30% is financed by equity investment. However, for availing foreign loan, a company must have at least 30% equity investment for power project financing.

Review of the Bangladesh Power Generation Plans

The development of power sector is required to be accelerated to increase access and attain target economic development. The government has formulated ‘Power System Master Plan’ with assistance from Japan International Cooperation Agency (JICA). The capacity building of the country’s power generation is being implemented on three major stages. Resource scarcity and the associated geopolitics and economics of gas, oil, and coal supply are key factors shaping the power market policy. A long term plan of power generation up to 2030 was made in Power System Master Plan (PSMP)-2010. The PSMP is updated every 5 years due to changes of planning perspective. The Power System Master Plan (PSMP)-2016, an updated version of PSMP-2010, was prepared in aiming at formulating a comprehensive energy and power development plan, complied with the strategy of diversifying primary fuel supply. The plan period for PSMP-2016 is 2016-2041. In November 2018, the PSMP was updated further and revised version was published by the Power Division, Ministry of Power, and Energy & Mineral Resources. The revisiting PSMP was published with expectation of even higher power sector demand compared to the earlier forecast, addressing regional balances, fuel diversification, distribution infrastructure, demand side management, investment and generation cost issues. Future demand forecast and power generation plan from distribution and generation entities were considered in preparing the report.

Installed Capacity (MW) of BPDB Power Plants by Plant Type



Source: BPDB & EBLSL Research (As on June 2020)

Plant setup time and power purchase agreement duration varies based on the raw-materials and technology used: The installation timeframe is significantly lower for diesel/ HFO based plants compared to others. Diesel plants can be installed within 4-6 months and connected to

Bangladesh power sector: An appraisal from a multi-dimensional perspective (Part-1)

the grid while furnace oil-fired plants can be installed within 9-18 months. The usual agreement tenure of these QRPPs is 3 to 5 years and for RPPs it is 15 years, after which they were to be retired. More economic, larger power plants were to replace them. However, there remains provision for further extension of the contract period.

Though natural gas was the primary source of power generation previously, recent concentration was on fuel oil based generators to respond to immediate power crisis ahead of last national election.

Some key terminologies of the private power generation sector are:

Independent Power Producer (IPP)

- An Independent Power Producer (IPP) is an entity, which is not a public utility, but which owns facilities to generate electric power for sale to utilities and end users.
- Implementation agreement is guaranteed by the government.

Rental & Quick Rental Power Plants (RPP or QRPP):

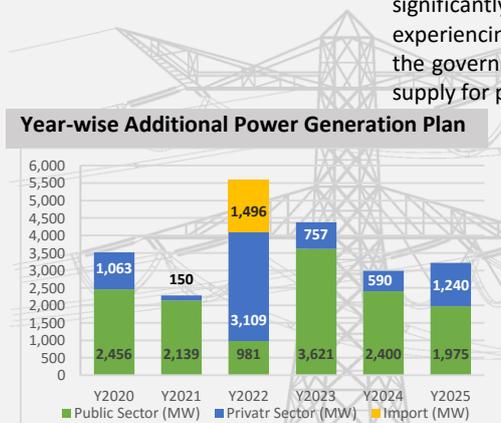
- Rental & Quick Rental power plants are set up to meet short-term and emergency requirements of a country and are typically commissioned within 4-18 months based on available technology.
- Rental periods are normally 5 years (for QRPP) to 15 years (for RPP depending on the country’s need. Generally, the power producing equipment are easily moveable and quickly installable.
- Implementation agreement is guaranteed by any utility economic entity not by the government.

Captive Power Plants (CPP):

- Captive power plants are those power plants which operate independent of wheeling to national grid. They are mostly meant by in-house power generation for industry.
- If excess electricity is generated and transmission line to national grid is available, excess power can be sold to utility company subject to the agreement between the two.

Short-term Project	Intermediate term Project	Long Term Project
Plant type: IPP, rental or quick rental	Plant type: IPP & Public	Plant type: IPP & Public
Ownership type: Private	Ownership type: Public & Private	Ownership type: Public & Private
Fuel type: HSD, HFO, Gas	Fuel type: LNG & Renewable energy	Fuel type: Coal, Nuclear
Generation Cost: High	Generation Cost: Medium	Generation Cost: Low
Implementation time frame: Fast Track Projects: HSD: 4-6 Months HFO: 9-18 Months	Implementation time frame: 2-3 Years	Implementation time frame: 3-5 Years
Contact Duration: QRPPs: 3-5 years; IPP/Rental: 15 years	Contact Duration: 20-30 years	Contact Duration: Not specified

Year wise generation projects: Presently, contribution from gas fired power projects is significantly higher compared to other forms of energy resources. However, Bangladesh has been experiencing significant gas crisis and reserve of gas has been depleting faster. In such a situation, the government of Bangladesh has devised a long term strategic plan to diversify primary fuel supply for power generating plants. Under this plan, the coal (indigenous or imported), imported



LNG, nuclear power, imported power from neighboring countries, renewable energy sources along with limited domestic gas will be used for power generation. Revised generation expansion plan updated in January 2020 targets 20,481 MW generation addition from 2020 to 2025.

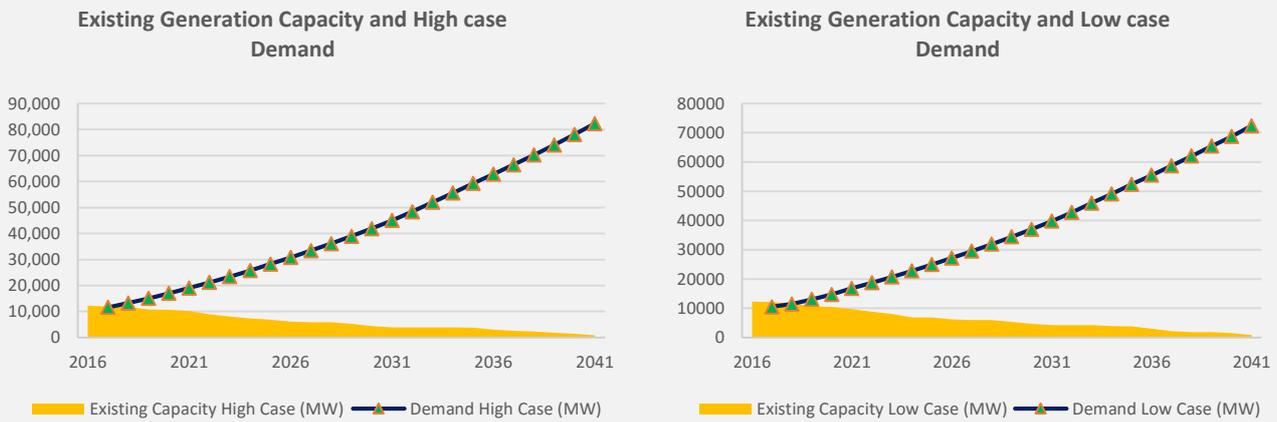
Year	Y2020	Y2021	Y2022	Y2023	Y2024	Y2025	Total
Public Sector (MW)	2,456	2,139	981	3,621	2,400	1,975	13,572
Private Sector (MW)	1,063	150	3,109	757	590	1,240	6,909
Import (MW)	0	0	1,496	0	0	0	1,496
Total	3,519	2,289	5,586	4,378	2,990	3,215	21,977

Source: <http://www.powercell.gov.bd/>; January 2020

Bangladesh power sector: An appraisal from a multi-dimensional perspective (Part-1)

Generation capacity and plant factor from existing power plants will decrease gradually as the time passes due to expiration and shut-down of some plants and consequently widens the gap between generation capacity and demand, which has also been stated in Revisiting PSMP 2016. Due to regular retirement of these power plants, this capacity will be decreased gradually and will stand at, only 830 MW in 2041. So, to meet up future demand and maintain sufficient reserve margin (most of the countries usually maintain reserve margin 10-20% of maximum demand as insurance against breakdowns in part of the system or sudden increases in energy demand), new generation capacity addition will be required from committed and candidate power plants.

Revisiting PSPM 2016: Comparison between existing generation capacity and forecasted high and low case demand (without EE&C)



Source: Revisiting PSMP 2016 (Published in November 2018)

New Contact Sign				
Plant Type	No. of Power Plant Projects	Installed Capacity	Already Commissioned	
Public	55	16,171	6,305 (37)	
Rental	20	1,653	1,653 (20)	
IPP	74	13,104	6009 (46)	
Total	149	30,748	13,967 (103)	

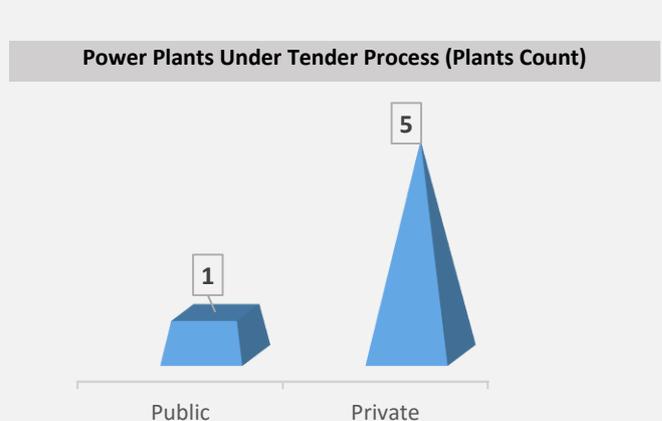
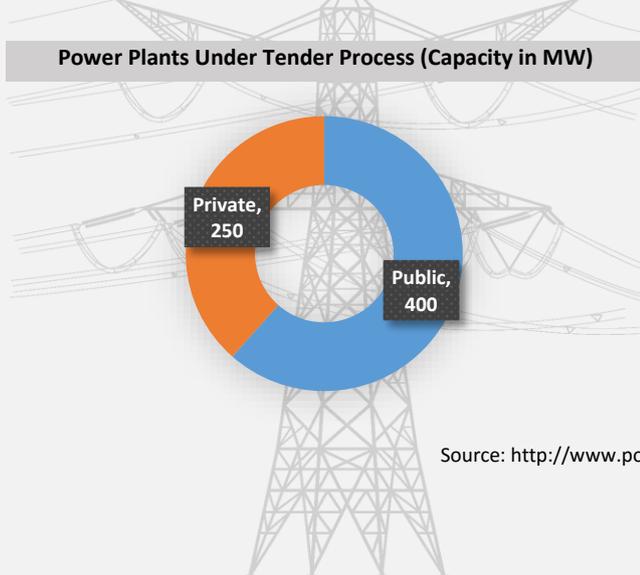
Source: <http://www.powercell.gov.bd>; February 2020

Year	Planned Generation (MW)
2020	23,000
2021	24,000
2030	40,000
2041	60,000

Source: Power System Master Plan 2016

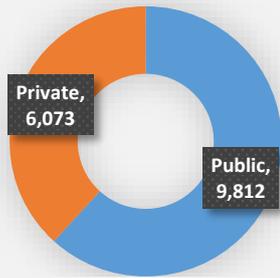
Under Construction & Tendering Process Projects: As on February 2020, 48 projects of capacity 16,875 MW were under construction stage, 149 projects of capacity 30,748 MW are now in the singing process and 6 projects of capacity 650 MW were are now in tendering process while 16 new public power plants having capacity of 19,100 were currently under planning stage.

The power demand in Bangladesh was projected to be 33,708 MW by 2030 as per PSMP 2010 and 39,663 MW as per revisiting PSMP-2016 (base-case). However, the government of Bangladesh is planning to increase its power generation capacity beyond its projected demand to 40,000 MW by 2030 in order to boost the nation’s fast-growing economy.

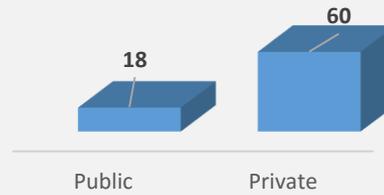


Source: <http://www.powercell.gov.bd>; January 2020

Power Plants Under-Construction (Capacity in MW)



Power Plants Under-Construction (Plants Count)



Source: <http://www.powercell.gov.bd>; January 2020

Rental or quick rental basis power projects on private ownership basis were permitted in last decade as a short term solution

Evaluation of the Power Generation Planning in Bangladesh

The country’s power generation capacity has witnessed a boost in past decade riding on short-term costly projects, however, no significant progress yet observed in intermediate & long-term projects: In the last decade, the government of Bangladesh has prioritized on the capacity enhancement of the country’s electricity generation on immediate basis (but at high cost), for which it went for some rental or quick rental basis power projects on private ownership basis as a short term solution. Moreover, to reduce the legislative delay, the government has also permitted several of the private sponsors to set up power generation stations within the stipulated timeframe. Most of those plants were awarded based on unsolicited bid offers under the Speedy Supply of Power and Energy (Special Provision) Act 2010.

Long term power generation plans still superfluous, deserves careful reassessment: In the PSMP -2010 demand forecast was made based on 7% yearly GDP growth rate forecast. Based upon this study the peak demand would be about 17,304 MW in FY2020 and 33,708 MW in 2030. Moreover, the government of Bangladesh plans to increase its power generation capacity beyond its projected demand to 40,000 MW by 2030 in order to boost the nation’s fast-growing economy. However, as on today, actual scenario is significantly different from what was earlier projected. As per the revisiting PSMP, forecasted peak demand in 2020 was 15,809 MW. However, reported maximum electricity demand served so far was 12,893 MW as on 29 May 2019 and highest power generation in 2020 YTD was 12,536 MW. Even though reduced economic activities due to COVID-19 pandemic has slowed down the consumption demand, still more than 45% of the generation capacity remains unutilized.

High dependency on coal based plants for long term power generation may not be as viable as it ought to be: The country’s future energy plan relies heavily on imported coal and liquefied natural gas (LNG). The coal has been considered as the prime source of power generation for the long term option in PSMP. As a way of low-cost sustainable power generation option, the government planned to increase Coal fired power projects in coming years. The government also planned to increase share of coal based power to 21% by 2020 (end of the Seventh Plan) and subsequently to 50% by FY2030. However, actual progress of the coal based plant didn’t happen as expected. Shares of coal based power plants within total generation capacity stands at 5.62% only as on June 2020.

Actual progress of the coal based plant didn’t happen as expected due to scarcity of financing

In PSMP-2016, the government planned to increase use of coal and reduce use of domestic natural gas for power generation. PSMP 2016 outlined 55,138 MW power generation by 2041, designing 35% electricity from coal, 35% from gas and remaining 30% from other sources including nuclear and import. On that basis the government is implementing a number of coal-fired power plants in next 5-6 years. The Government planned to set up 25 coal-fired power plants by 2022, to generate 23,692 MW, in order to meet rising electricity demand. Of the total, 16 to be built by the public sector and 9 by the private sector.⁶ Thirteen of the planned plants are funded by Chinese state-owned and private companies, and five are under construction. One of the plants is being financed by the Chinese-dominated multilateral Asian Infrastructure Investment Bank (AIIB). These ongoing coal based projects have a total capacity of 13,000 megawatts.

⁶ <https://en.prothomalo.com/bangladesh/25-coal-fired-power-plants-by-2022-despite>

Bangladesh power sector: An appraisal from a multi-dimensional perspective (Part-1)

Planned & Under-construction Coal Based Mega Plants			
Name	Capacity	Executing Agency	Completion Date
Moitri Super Thermal Power Project	1320 MW	Bangladesh -India JV	June,2019
Matarbari Coal Based Power Pant	1200 MW	CPGCBL	June, 2022
Paira Coal Based Power Plant	1320 MW	NWPGCL-China JV	June, 2022
G to G Coal Based Power Plant	1320 MW	Bangladesh –S. Korea JV	June, 2023
Moheshkhali Coal Based Power Plant	1200 MW	BPDB	June,2021
Moheshkhali Coal Based Power Plant	1320 MW	Bangladesh -Malaysia JV	June, 2022
Ashuganj 2x660 MW Power Plant	1320 MW	APSCL	November, 2019
1320 MW Coal Based Power Plant	1320 MW	BPDB –CHDHK, China JV	June, 2021

Source: <http://www.powercell.gov.bd/>

However, due to slow implementation progress, poor planning, funding crisis etc. coal based power generation lagging far behind the plan. Under the new thought, the use of LNG or gas for power generation will go up and the use of coal as primary fuel will be reduced as the government has been facilitating more LNG import beyond the plan and allowing to set up more LNG-based power plants beyond the PSMP 2016.

Meanwhile, long term supply of coal is becoming uncertain as future mining of coal is becoming uncertain due to pro-active efforts by the anti-coal lobbies. Use of coal bears threats to biodiversity. The anti-coal lobby has targeted the insurers and re-insurers of coal mines and projects and the withdrawal of insurance has the potential to make coal mining and coal-fired power generation businesses unsustainable because no project can run without insurance. According to March 14, 2020 report of the Carbon Tracker Initiative, a nonprofit research organization, it is already cheaper to build new renewables than to build new coal plants, in all major markets (including USA, China, India, Bangladesh etc.). By 2030, it could be cheaper to build new renewables than to run existing coal.⁷ International financiers such as the Asian Development Bank and Work Bank have also changed their policies and do not want to finance coal projects. Even some Chinese banks have also walked away from financing coal. So, it is becoming increasingly difficult to secure financing for coal based plants.

The government is now shifting its concentration to imported LNG, as way for low cost long term energy sources for power generation: Though Coal was initially considered as the prime fuel for long term project, there is no visible success till date. Besides, coal power has become costlier in recent years than clean power. Hence, the government has revised its long term power system master plan by incorporating more power contribution from LNG rather than Coal. Generation capacity share of Gas/LNG fired plants will now be higher in comparison to coal-based capacity, as per revisiting PSMP-2016. Power Division suggested to convert coal based power plants that made little progress or could not secure financing into LNG based plants. Ministry of Power, Energy and Mineral Resources has already sought the prime minister's approval to convert 13 large coal power projects out of 18 ongoing projects into clean liquefied natural gas (LNG) based plants. Meanwhile, a total of five LNG-based projects with a capacity of 8,750 megawatts of electricity are in the pipeline, sponsored by local and international groups.

Currently, the government is importing 1000 mmcf (million cubic feet) LNG per day through two floating storage units. However, Bangladesh plans to increase its LNG import capacity to 2,000 mmcf gas per day by 2030.

Renewable energy can be a better alternative for long term power generation, however, so far limited success has been seen: Presently, Bangladesh generates around 365MW of electricity from renewable energy sources. Bangladesh has an enormous potential for solar and wind capacity. However, prime constraints for renewable energy in Bangladesh are limited land availability and the meteorological conditions of the land not being suitable for hydro electricity generation. Estimated maximum renewable energy potential in Bangladesh is up to 3,700MW, according to energy specialists. The government planned to meet 10% of the total electricity generation from Renewable Energy sources by 2020. However, actual scenario as on day is far away from the plan as most of the plants failed to complete their installation within the stipulated timeframe. The Bangladesh power sector master plan envisages that around 35% of the country's power generation will be procured from renewable energy sources or clean power imports by 2041. For instance, some of the solar projects under implementation include a 200 MW Solar Park in Tekhnaf, 500 MW Solar Power energy project in Feni, 100MW Solar Photo Voltaic based

Long term supply of coal is becoming uncertain as future mining of coal is becoming uncertain due to pro-active efforts by the anti-coal lobbies and unwillingness of major lenders

Under the new thought, generation capacity share of Gas/LNG fired plants will now be higher instead of the coal-based capacity

Due to unwillingness of private investors, renewable energy usage in Bangladesh didn't progressed as expected.

⁷ <https://www.thedailystar.net/opinion/news/why-are-we-still-depending-coal-1919329>

Bangladesh power sector: An appraisal from a multi-dimensional perspective (Part-1)

Grid-Connected Power Generation Plant which is also in Feni, 200MW Grid-tied Solar PV Power Plant in Latshal, 60MW and 30MW windmill energy project in Cox’s Bazar and a 1 MW garbage based power plant in Keraniganj and other areas. Currently, there are several other renewable energy development projects running in Bangladesh. If all the projects progress in accordance with their plan, there will be mentionable electricity generation contribution from the expansion into renewable energy. As a part of the long term energy generation plan, the government also plans to generate 4,000 MW electricity from Nuclear Energy Source.

Power import: Bangladesh-India Regional Grid first Interconnection project has already been established and now Bangladesh imports 1,160 MW power through this line. 100 MW power is being imported Tripura, India to Cumilla from 2016, another 60 MW power is being imported from same point from July 2017 and another 500 MW is imported by bohorampur-bheramara line from September, 2018. BPDB Planned to import 340 MW power from Tripura by 2021. Another 1496 MW electricity plan to import from Jharkhand, India by 2022.

Present tariff structure in the electricity generation sector

Tariff structure in Bangladesh power sector can be classified:

- i. Bulk or wholesale tariff- the rate at which BPDB purchases power from the generating entities;
 - ii. Wheeling charges paid to PGCB; and
 - iii. Retail tariffs-the rate at which the distribution companies sell to consumers.
- The Bulk or wholesale tariff varies based on the power plant types and fuel used.

Tariff for Bulk Purchase of Power at Busbar

The power produced by the Independent Power Producer (IPP) is purchased (as per Power Purchase Agreement) by BPDB/DESA/REB or any large consumer EPZs. The Power Cell as the GOB agent indicates which organization will be the power purchaser at the time of issuance of Request for Proposal (RFP). Electricity generation technology, cost structure and tariff varies based on the types of fuel used. The rate at which BPDB purchases power from the generating entities is termed as Bulk or Wholesale Tariff. The Bulk or Wholesale Tariff varies based on the power plant types and fuel used. The tariff structure consists of two parts:

1. Capacity Payment: This covers debt service, return on equity, fixed operation and maintenance cost, insurance and other fixed costs. The capacity payment is further divided into an escalating and non-escalating portions. The capacity payment is linked to a certain level of availability of the power plant which is made known to the bidders at the time of issuance of RFP. The companies will be entitled to capacity payments even if the government doesn’t buy electricity from them. The capacity payment is a sort of penalty, which the BPDB is bound to pay to the power plant owners, if the government fails to purchase a certain portion of the electricity readily available

2. Energy Payment: This covers the variable costs of operation and maintenance, including fuel. The payment are further divided into fuel component which are a pass-through and a non-fuel component which escalates. In case of pass-through energy payment agreements- respective company procures required fuel oil for its plants on their own and bills to BPDB for liquid fuel payment. It is mentionable here that, there is no impact of price fluctuation in international oil market on the profitability of private power generation companies as its costs are structured as a pass through item.

In the solicited bids, the bidders offer bulk power tariff based on the capacity payment and energy payment and also provide the equivalent levelized tariff over the contract period, based on discount rate, tariff profile restriction and plant factor to be specified during the solicitation of bids. The evaluation will be based on the criteria to be provided in the RFP.

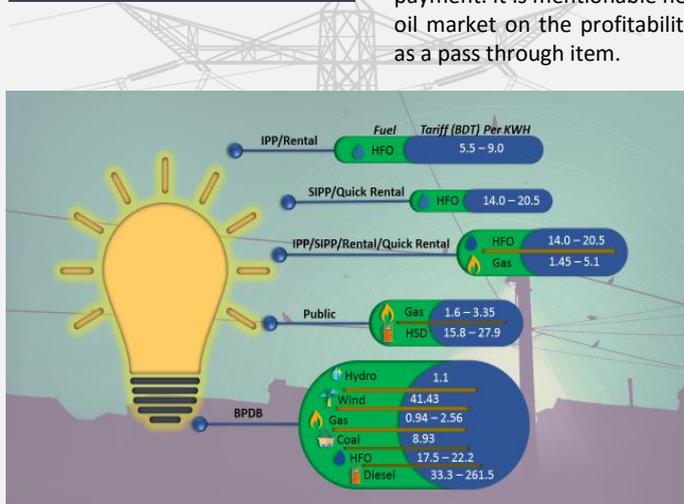
The sponsors of private power project are required to provide year wise tariff profile over the contract period in a manner that matches their annual debt service requirements.

The tariff structure for Diesel/ HFO is higher while Hydro and Gas based power projects supplies low cost energy: Bangladesh is heavily dependent on natural gas to its energy requirements due to limited hydro and wind resources, as well as a lack of available land for the development of solar projects. Currently

The rate at which BPDB purchases power from the generating entities is termed as Bulk or Wholesale Tariff.

Key Facts:

- Diesel/HFO based power generation is highly costly compared to that of gas based generation
- Even though unit price of gas based power plants is the lowest, it enjoys the highest margin
- Execution period is the lowest for HSD (Diesel) and HFO based power plants
- Companies from power sector enjoy higher margin than companies from other sectors
- Companies remain debt dependent while initiating power plant projects
- Companies from power sector are becoming increasingly focused on cash dividend



Bangladesh power sector: An appraisal from a multi-dimensional perspective (Part-1)

average cost of producing electricity is BDT13-14 for HFO based rental plants, BDT25-30 for HSD based quick rental plants and BDT 2.5-3 for gas based plants.

As the government is relying highly on costly sources to meet growing demand of power, retail price of electricity has also increased over the years. The power production and transmission costs went up following increases in capacity charge, VAT on coal exports, depreciation, and oil and gas prices. Average per unit retail price of electricity is now BDT7.13 which was BDT 3.60 in 2009. Lower middle income class now spend on an average BDT800 on power.

Reasons for Frequent Load-Shedding & Power Cut amidst Overcapacity

Load-shedding and power failure prevails even with significant unused capacity due to inadequate power transmission & distribution system: Even though almost 44% of the available power capacity remains unused even during the peak season, the country still faces frequent load shedding even on urban areas. The country faces inadequate supply of power to meet aggregate demand from diverse sectors including household, industrials as well as agricultural sector, even with having almost half of the installed capacity unused. Daily one or two hours of load shedding is a common occurrences in major city areas as well while rural people, belonging to large area of the country, still experiences heavy power cut in each day. Poor quality distribution lines are primarily responsible for the frequent power cuts.

The distribution system has not grown in line with the growth in power generation capacity. Quality of power supply system remained poor due to substandard and obsolete distribution lines, old breaker in some substations and daily exploding of transformers (after a fuse is burnt in the transformer). Besides, there are also questions on the quality of the equipment, including transformers, cables and barrels used in the lines, which are also causing frequent power cuts. Besides, short circuits caused by various other factors also causing unwanted power cut.

In FY 2019, total duration of Power interruption in the grid network was 79 hours 27 minutes.

INTERRUPTION OF NATIONAL GRID FOR FY 2018 & FY 2019							
S.N.	Type of Fault	Total Number of Faults			Total Duration (Hours: Minutes)		
		FY 2017	FY 2018	FY 2019	FY 2017	FY 2018	FY 2019
1	Partial Power failure due to trouble in generation	102	227	171	18:06	1:56	0:53
2	Partial Power failure due to trouble in grid S/S Equipment	10	46	55	12:47	64:18	45:43
3	Partial Power failure due to fault in transmission line	4	7	17	07:33	10:13	31:37
4	Partial Power failure due to the lightning on transmission line/Thunder Storm	0	0	0	00:00	00:00	00:00
5	Partial Grid failure	1	7	2	00:41	6:19	01:14
6	Total Grid failure	0	0	0	00:00	00:00	00:00
	Total	117	287	245	39:07	82:46	79:27

Source: BPDB Annual Report 2018-19

Power Transmission & Distribution System in Bangladesh

Even though power generation has seen special attention from the government with massive private and public sector investments in last decade, distribution and transmission sub-sectors had remained largely unnoticed. There has not been adequate investment in the distribution & transmission system. Hence, even with overcapacity, supply of power is being disrupted.

Transmission Line Type (Circuit km)	2016-17	2017-18	2018-19	2019-20
400 kV Transmission Line	560	698	698	861
230 kV Transmission Line	3,325	3,343	3,407	3,658
132 kV Transmission Line	6,551	7,082	7,546	7,671
Others	0	0	0	93
Total Transmission Line	10,436	11,122	11,650	12,283
Transmission Loss (%)	2.72%	2.76%	2.75%	

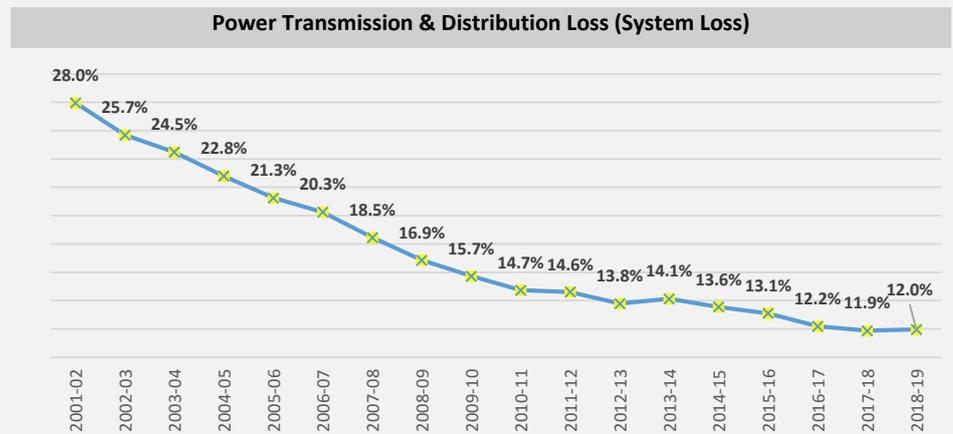
Source: BPDB Annual Report*As on June 2019

Insufficient development in power distribution can be indicated by increase in grid substations, lines, and transformers of the distribution companies compared to their growth in total consumers. For instance, DESCO has seen 139% growth in consumer acquisition since 2009 but its number of transformers registered only 55% growth.

Sub-station Type	No of Sub-station	Capacity (MVA)
400 kV HVDC Sub-station (MVA)	1	1,111
400/230 kV Sub-station Capacity (MVA)	4	3,770
400/132 kV Sub-station Capacity (MVA)	1	650
230/132 kV Sub-station Capacity (MVA)	24	12,475
132/33 kV Sub-station Capacity (MVA)	135	23,640
Total	165	41,646

Source: BPDB Annual Report*As on June 2019

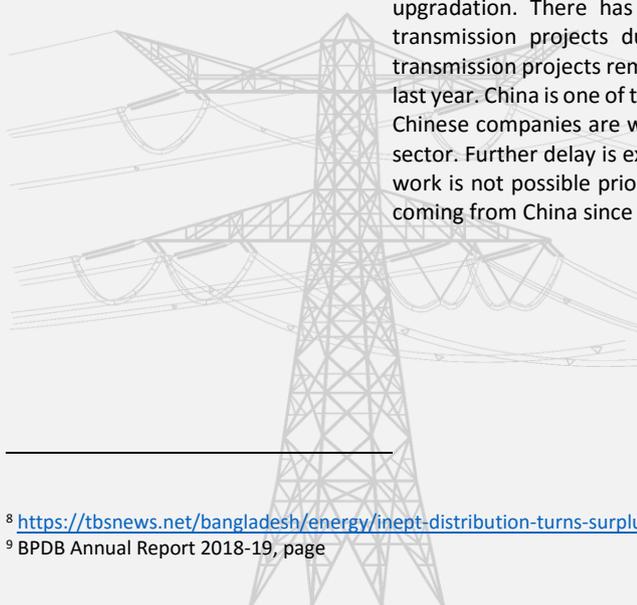
According to media report, the government has so far invested around BDT 2,550 billion (\$30 billion) in the power sector since 2009. Of this, BDT 2,000 billion (\$24 billion) was spent on power generation, while the rest was spent on the improvement of electricity transmission from power plants and distribution lines at the customer level.⁸ In order to reap the optimum benefit of aggressive power generation capacity expansion, transmission of generated power from power plants to the load centers and then distribution to the end users must be ensured.



Source: BPDB annual report (2018-19) & EBLSL Research

Further delay in transmission line set up likely due to COVID-19 and resultantly unused capacity to linger: The government lately has realized the importance of development in power transmission and distribution system. At present, a total 12,283km (Circuit Km) transmission lines and 5,81,000 Km distribution lines have been connected to power system network. To mitigate power cuts, the government has started to work with underground cable system and smart grid technology. To strengthen transmission & distribution system, the government is preparing plans to construct 18,126 ckt km transmission line, 90,382 MVA capacity-based grid sub-station, 497 thousand km new distribution line and related distribution substation by 2021, according to BPDB.⁹

However, Covid-19 has slowed down the progress of the transmission and distribution system upgradation. There has arisen big concern regarding fast implementation of the ongoing transmission projects due to COVID-19 pandemic. Field-level work on 25 ongoing power transmission projects remained suspended since the coronavirus outbreak in China in December last year. China is one of the major partner in power sector development in Bangladesh and many Chinese companies are working as a subcontractor as well in Bangladesh’s power transmission sector. Further delay is expected by at least one year as monsoon will start from July. Field level work is not possible prior to next winter. Neither the Chinese workers, nor the equipment are coming from China since the pandemic started in Wuhan.



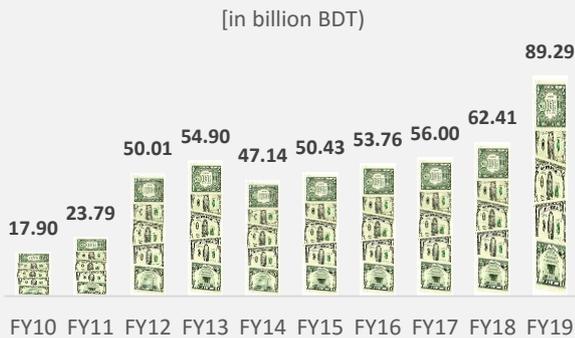
⁸ <https://tbsnews.net/bangladesh/energy/inept-distribution-turns-surplus-power-useless-107800>

⁹ BPDB Annual Report 2018-19, page

The Viability of Power Sector from The Financial Perspective

Government subsidy in power sector: The government has been subsidizing power sector for years. The government provided BDT522.60 billion as subsidy to power sector over the last 10 years¹⁰. As the government has been prioritizing short-term costly projects to generate power, average cost per unit also grew up significantly. Thus, the growing financial burden is becoming major concern for the BPDB due to excess generation capacity developed over the years. BPDB has been incurring huge losses over the year as retail tariffs for electricity are lower than the cost of generation or purchasing electricity from private plants and such losses are requiring need for larger subsidies in each year. The cost of per unit supply of electricity at the bulk level of Power Development Board in 2018-19 was BDT6.50 and its average sales price at the bulk level is BDT 5.01.

Capacity Payments for Idle Power Capacity



Large number of power plants are sitting idle or generating almost half of their capacity. Bangladesh Power Development Board (BPDB) needs to pay a minimum capacity payment to individual power producers for the unutilized/ underutilized capacities. As almost half of our generation capacity remains unused (reserved), government has to pay a capacity charge to all those power plants to keep them on board as per the power purchase agreement. Huge capacity payments for excess (reserve) capacity necessitating the government to provide subsidies to the Bangladesh Power Development Board (BPDB) to cover its mounting financial losses. For instance, the government has spent BDT 505 billion on paying capacity charges in last decade (FY10 to FY19)¹¹. Amount of overcapacity stood at 8989 MW, which is 56% of the total capacity, as on 08 August 2020. The capacity payment in fiscal year 2018-19 jumped to BDT89.23 billion (US\$1.1 billion) against BDT63.41 billion in FY2017-18 which was only BDT17.90 billion in FY2009-10. This is greater than

the value of Bangladesh's top export industries such as leather, leather products and footwear, which are US\$1.08 billion. The amount may go up further as more oil-fired power plants have commenced commercial operation recently.

Purchase of electricity from independent power producers (IPPs) and quick rental power plants (QRPPs) accounts for large portion of the BPDB's expenditures. Besides, import cost of coal is also another big head of expenditures. Huge amount of import of fossil fuel has also been contributing to the growing financial burden of BPDB. The import cost for petroleum was significant in recent years- \$4.1 billion in fiscal 2018-19 against \$4.5 billion in fiscal 2017-18. The government subsidy to the BPDB rose to BDT 80 billion or \$936 million in FY2018-19 which was BDT45 billion or \$530 million in the previous year. The entire subsidy provided in 2018-19 was treated as a 'grant' and not a loan.

Utility wise Bulk Energy Sales by BPDB As Single Buyer (In GWh)	
Year	Sales Quantity (GWh)
2004-05	20,398
2005-06	21,961
2006-07	22,061
2007-08	23,433
2008-09	24,757
2009-10	26,626
2010-11	28,627
2011-12	32,443
2012-13	35,466
2013-14	39,256
2014-15	42,616
2015-16	48,895
2016-17	53,916
2017-18	59,221
2018-19	66,547

Source: BPDB

¹⁰ <https://thefinancialexpress.com.bd/economy/bangladesh/power-sector-received-tk-5226b-as-subsidy-in-10-years-1582035643>

¹¹ <http://www.dailyindustry.news/load-shedding-even-double-capacity>

Bangladesh power sector: An appraisal from a multi-dimensional perspective (Part-1)

Generation cost of BPDB's own plant and Electricity purchase from other sources					
Particulars	Amount (Crore Tk.)	Cost (Tk/kWh)	Amount (Crore Tk.) ²	Cost (Tk/kWh) ³	Increase/ (Decrease)
BPDB's Generation	9,431.39	6.44	7,648.06	4.58	-18.91%
Purchase from IPP	10,410.59	5.72	15,748.50	7.42	51.27%
Purchase from Rental	6,281.73	8.77	5,013.62	8.4	-20.19%
Purchase from Public Plant	7,289.54	4.52	6,839.30	3.82	-6.18%
Purchase from India	2,812.58	5.87	3,702.63	5.46	31.65%
Interest on budgetary support	1,188.31	0.2	1,294.80	0.19	8.96%
Provision for Maintenance & Development fund	1,162.67	0.19	998.20	0.15	-14.15%
Total	38,576.81	6.33	41,245.11	6.01	6.92%
Energy Sales	29,741.16		33,064.03		11.17%

Operating income and operating expenses of BPDB			
Head of Accounts (in BDT mn)	FY 2017-2018	FY 2018-2019	Growth
Operating Revenue (1)	306,044.10	345,068.70	12.75%
Sale of Electricity	297,411.60	330,640.30	11.17%
Other Operating Revenue	8632.6	14,428.40	67.14%
Operating Expenses (2)	368,118.90	395,533.00	7.45%
Fuel Cost	61,220.00	42,493.50	-30.59%
Generation Expenses (Excluding fuel cost)	24,063.30	24,423.90	1.50%
Electricity purchase from IPP	104,105.90	157,485.00	51.27%
Electricity purchase from RENTAL	62,817.30	50,136.20	-20.19%
Electricity purchase from Public Plant	72,895.40	68,393.00	-6.18%
Electricity purchase from India	28,125.80	37,026.30	31.65%
Wheeling Charge to PGCB	1829.2	2150.2	17.55%
Distribution Expenses	9235.3	9475.1	2.60%
General & Administrative Expenses	3826.8	3949.7	3.21%
Operating Profit/(Loss) = (1-2)	-62,074.70	-50,464.30	-18.70%

Growing tariff structure to reduce mounting subsidy: In response to huge losses by BPDB, with a view to minimize losses, the government has been raising retail tariffs of the power to raise revenue of BPDB. Retail tariff was increased by 5.3% to Tk7.13 per unit in February 2020 and expected to increase further in future.

Further deepening of financial burden is expected if planned significant addition of coal- and LNG-fired power plants comes into operation while COVID-19 pandemic has been worsening the situation: As per the long term power generation plans, a number of large coal- and LNG-fired power plants are scheduled to be operational within next few years. Unused capacity in the sector likely to increase significantly with the commencement of those plants. Such plants have major financial implications and overall financial burden likely to soar up further by 2030, if the current plan for coal- and LNG-based power capacity additions is continued. Besides, with completion of the coal-fired Payra thermal power plant, unused capacity is supposed to be increased. The China-funded Payra coal-fired power plant is reportedly receiving capacity payments of BDT1600 million (US\$19 million) in a month whilst half its capacity is remaining idle since there the transmission line connection has been delayed owing to lower power demand.

Meanwhile, the COVID-19 pandemic will also cause lower than forecasted long term demand for power, as industrial growth will become slower in post COVID-19 era. Hence, the pandemic-induced economic downturn threatens to reduce BPDB's revenues further while it continues to make capacity payments to the power producers. The BPDB is expecting that the subsidy required in 2019-20 will rise again to US\$1.1billion, however, the figure could be worse than that due to COVID-19 pandemic.

Improper demand-supply analyses, superficial demand forecast, under-looked transmission and distribution system are the key problems in power sector: As the government failed to articulate appropriate demand for power, while forecasted demand were significantly higher than the actual demand, under-utilization or even keeping some plants idle has become a reality in this sector. While BPDB is bound to pay them capacity payment for agreed capacity, as they are ready to supply electricity as per the contract. However, in spite of huge surplus capacity, rural areas and even in some urban areas are still deprived from uninterrupted supply of electricity, due to inadequate transmission and distribution system.

Unnecessary extension of some plants escalating the financial burden further: Many retirement-age expensive power plants are still in operation while a number of RPPs and QRPPs were granted extra life from 3-15 years with a provision that if the units remains idle, they will continue to get capacity payment. Even though, actual plant factor remained significantly below the installed generation capacity of the country, such extension of costly projects has accelerated losses by power division. The extension policy remained faulty in that, such plants have already absorbed fixed cost from capacity payment that they have received from the government over the agreement period. So, even if power purchase agreement with such plants need to be extended, the tariff structure should have been variable depending on the volume of power purchased. Besides, extension of such plants were beyond the long term power generation plans, and resulted into excess power capacity compared to demand.

Inefficient Public power generation plants: Most of the public power generating companies are hardly able to cover their costs incurred to supply electricity to the end-user. However, such plants are always pressed for demand, and hence, cannot stop. Additionally, many plants in the country have outdated technology, and suffer with low power generation capability (low plant load factor) with higher fuel consumption.

Power import amidst over-capacity: Even though the country has been experiencing over-capacity at local power generation sources, it has been gradually increasing import of power from neighboring countries. However, as generation cost of most of the private plans (mainly HFO fired) are significantly higher than the import cost, import of power is cost effective even after payment of capacity charges by keeping such plants idle. Average cost of power import is Tk 5.5-6.5 per kWh while that of most of the local rental plants are as high as Tk 15-30 per kWh.

Bangladesh Private Power Generation Industry Review

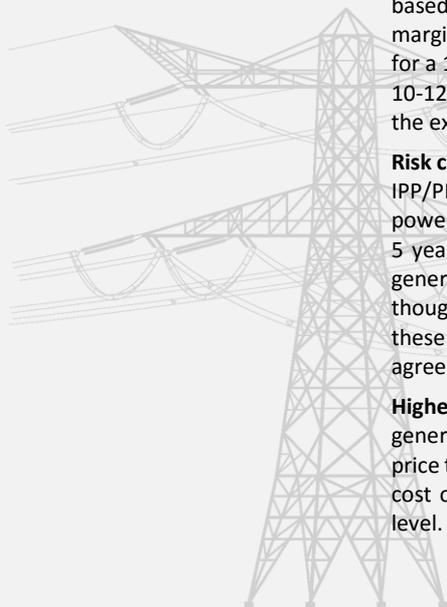
Though industry is dominated by few large players, new players are joining the rally with fresh investment: Private sector power generation was mostly dominated by a few large business group like Summit Group and United Group while Orion, Baraka, GBB, Shahjibazar etc. had some presence in the sector. However, as the sector proved to be one of the most lucrative and safe investment destination for investors offering significantly higher return on investment compared to other sector, a number of new business groups has joined the group with major investment in this sector and greatly contributed to expand the country's total power generation capacities by almost five times within a decade. Some mentionable new players in the industry are, Doreen, Confidence Cement group, midland, Precision, Powerpac, Energyprima, Desh, Bangla Trac, Agreeco, Paramount, Rajlanka, Shikdar group, S.Alam group, Unique group, etc. along with handsome FDI investment in this sector.

Favorable policy support has been working as a key catalyst for massive investment in power producing facilities: Favorable policy support from the government to increase country's power generation capacity within shortest possible time, easy credit facility by banks, attractive profit margins and early pay-back period of investment, tax exemption facility etc. has lured most of the private business groups to expand footprint in power sector.

Profitability of the power generation companies: The profit margins mostly depends on the capital structure and tenure of the power generation companies. For companies with higher debt based capital structure, interest income becomes higher that ultimately results in lower profit margins. The margin goes up as the company continues to repay its loan outstanding. Generally for a 15 year HFO fired plant, estimated average profit margins hovers around 7-8% in first year, 10-12% in the second year. Due to much higher tariff structure for quick rental power projects, the expected profit margin is also comparatively higher.

Risk concerned with investment in power sector: Generally the power generation project under IPP/PPP bears a licensed tenure of 5, 15 or 22 years, eying to meet short and intermediate term power crisis. Upon considering the industry demand the plants may get extension for further 2-5 years. Hence, there remains significant risk regarding the business continuity of the power generation projects. Moreover, industry practice is to depreciate machineries for 30 years tenure though contractual tenure is significantly lower. So, earnings are usually inflated/ overstated. If these companies fail to sell of the plants at a price higher than the book value at the end of agreement expiration, significant loss may incur for divesting the plants at expiration.

Higher tariffs structure for private plants leading to national loss: With growing cost of power generation, retail & bulk tariffs are also on the rise. The government has been increasing power price to reduce subsidy. However, the frequent power price hike increases the overall production cost of businesses and industries causing Bangladesh to lose its competitiveness at the global level. Retail consumers, commercial sector and SME will also suffer with higher utility expenses.



Concluding Commentary

Power sector in Bangladesh has passed a decent period over the last decade. The government's pragmatic and visionary plans to mitigate unbearable power crisis and commitment to bring 100% households under electricity coverage has turned out to be successful with timely initiatives and policy supports. However, even though electricity generation capacity is now higher than the demand, poor transmission and distribution system causing significant power cuts mostly in rural areas. Significant improvement in transmission and distribution sector is required so that rural people can get uninterrupted electricity supply. We need to upgrade our transmission and rural distribution infrastructure to such a level that will encourage small industries to grow in the villages and reverse the flow of rural people moving to the cities for livelihoods. That will help in decentralization of industries faster as industrialization requires uninterrupted power supply. Meanwhile, to reduce excessive financial burden and minimize price pressure on consumer level, the country needs to regain control of its power sector by reviewing its power policy and renegotiating with private sponsors, mostly in upcoming coal and LNG plans to a more appropriate tariffs rates, eliminating capacity payment or incorporating "force majeure" clause in the contracts- by maintaining both side interest. Old, inefficient and expensive power projects should be retired as early as possible. No farther RPPs and QRPPs plans having less than 20 years of tenure should be allowed. Besides, to reduce generation cost of power, it is necessary to accelerate the local gas exploration and shift the focus to renewable sources for the long term. As private companies are enjoying significant return on their investment, that should be brought to a justified level to bring financial stability of the power sector. If the government fails to bring financial stability in this sector, retail consumers, industries and households will be ultimately affected with higher cost of power consumption and that will slow-down the country's industrial as well as overall economic growth of the country in the long run.



Bangladesh power sector: An appraisal from a multi-dimensional perspective (Part-1)

Annexure 1: List of the power generation plants in Bangladesh

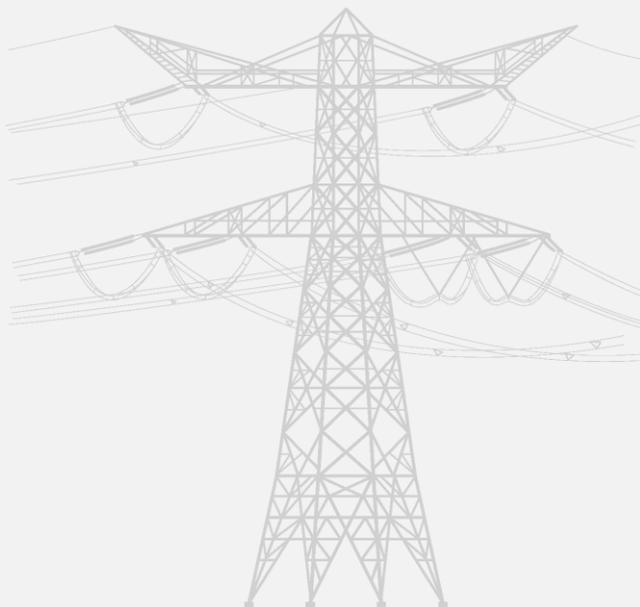
Sl. No.	Name of the Power Station	Fuel	Producer	Installed Capacity	Present Capacity	Plants status/ remarks
				MW	MW	
1	Ghorasal TPP (Unit-1&2)	Gas	PDB	110	85	Unit-2 Under maint
	Ghorasal Repowered CCPP Unit-3	Gas	PDB	210	170	Under maint
	Ghorasal Repowered CCPP Unit-4	Gas	PDB	210	180	Gas shortage
	Ghorasal TPP Unit-5	Gas	PDB	210	190	Gas shortage
2	Ghorasal 365 MW CCPP Unit-7	Gas	PDB	365	365	Under maint.
3	Ghorashal 78.5 MW PP(MAX)	Gas	QRPP	78	78	Gas shortage
4	Ghorashal 108MW PP (Regent)	Gas	IPP	108	108	Gas shortage
5	Haripur GTPP	Gas	SBU, PDB	32	20	Under maint.
6	Haripur 412 MW CCPP	Gas	EGCB	412	412	DCT
7	Haripur 360MW CCPP(HPL)	Gas	IPP	360	360	
8	Meghnaghat 450 MW CCPP(MPL)	Gas	IPP	450	450	
9	Meghnaghat 100 MW(IEL)	HFO	QRPP	100	100	
10	Meghnaghat CCPP(Summit)	Gas	IPP	305	305	GT-1 S/D for gas shortage
11	Madanganj 102 PP(Summit)	HFO	QRPP	102	100	
12	Madanganj-55 MW PP(Summit)	HFO	(IPP)	55	55	
13	Keraniganj 100 MW PP (Powerpac)	HFO	QRPP	100	100	
14	Narshingdi 22 MW PP (Doreen)	Gas	SIPP, REB	22	22	
15	210 MW Siddhirgonj TPP	Gas	PDB	210	115	Under maint.
16	Siddhirgonj 2*120 MW GTPP	Gas	EGCB	210	210	Gas shortage
17	Siddhirganj 100 PP(Dutch Bangla)	HFO	QRPP	100	100	
18	Siddhirganj 335 MW CCPP	Gas	EGCB	335	335	
19	Gagnagar 102 MW PP (Digital Power)	HFO	IPP	102	102	
20	Katpotti 52 MW PP (Sinha)	HFO	IPP	51	51	Fuel shortage
21	Kamalaghat 54 MW PP(Banco Energy)	HFO	IPP	54	54	
22	Kodda 150MW PP	HFO	BPDB-RPCL	149	149	
23	Manikganj 55 MW PP (Northern)	HFO	IPP	55	55	
24	Nababganj 55 MW PP (Southern power)	HFO	IPP	55	55	
25	Bosila 108MW PP(CLC)	HFO	IPP	108	108	Fuel Shortage.
26	Summit Power,(Madhabdi+Ashulia)	Gas	SIPP,REB	80	80	Engine problem
27	Maona 33 MW PP(Summit)	Gas	SIPP,REB	33	33	
28	Rupganj 33 MW PP(Summit)	Gas	SIPP,REB	33	33	
29	Gazipur 52 MW PP	HFO	IPP	52	52	
30	Tongi 80 MW GTPP	Gas	PDB	105	105	Gas shortage
31	Kodda 300 MW PP Unit-2 (Summit)	HFO	IPP	300	300	
32	Keranigonj 300 MW PP (APR)	HSD	IPP	300	300	
33	Bramhangoan 100 MW PP (Aggreko)	HSD	IPP	100	100	
34	Aurahati 100MW PP (Aggreko)	HSD	IPP	100	100	
35	Kodda 149 MW PP Unit-1 (Summit)	HFO	IPP	149	149	Engine problem
36	Gazipur 100 MW PP	HFO	RPCL	105	105	
37	Meghnaghat 104 MW PP (OPCL)	HFO	IPP	104	104	
	Dhaka area Total			6119	5895	
38	Chattogram TPP-1	Gas	PDB	210	180	Gas shortage
	Chattogram TPP-2	Gas	PDB	210	180	Gas shortage
39	Raozan 25 MW PP	HFO	IPP	25	25	
40	Teknaf 20MW PP (Solartech)	Solar	Teknaf Solartech Energy Ltd.	20	20	
41	Patenga 50MW PP (Baraka)	HFO	IPP	50	50	
42	Karnaphuli Hydro PP Unit-1,2,3,4, 5	Hydro	PDB	230	230	Low water level
43	Sikalbaha 225MW CCPP	Gas/HS D	PDB	225	225	ST under maint.
44	Sikalbaha Peaking GT	Gas/HS D	PDB	150	150	Under maint.
45	Sikalbaha 105 MW PP (Baraka Sikalbaha)	HFO	IPP	105	105	
46	Hathazari 100 MW peaking PP	HFO	PDB	98	98	Under maint.
47	Dohazari -Kalaish 100 MW Peaking	HFO	PDB	102	102	
48	Juldah 100 MW Unit-1 (Acorn)	HFO	QRPP	100	100	
49	Juldah 100 MW PP Unit-3 (Acorn)	HFO	IPP	100	100	

Bangladesh power sector: An appraisal from a multi-dimensional perspective (Part-1)

50	Barabkunda 22 MW PP (Regent)	Gas	SIPP, PDB	22	22	
*	Malancha, Ctg. EPZ (United)	Gas			0	
51	Chattogram 108 MW PP (ECPV)	HFO	IPP	108	108	Engine problem
52	Kaptai 7 MW Solar PP	Solar	PDB	7	7	
53	Anwara 300 MW PP (United)	HFO	IPP	300	300	
54	Jodiac Power	HFO	IPP	54	54	
55	Karnaphuli Power Ltd.	HFO	IPP	110	110	
56	Juldah unit-2 (Acorn)	HFO	IPP	100	100	
	Chattogram area Total			2326	2266	
57	Ashuganj TPP Unit- 3	Gas	APSCL	150	135	Gas Shortage
	Ashuganj TPP Unit- 4	Gas	APSCL	150	129	Gas shortage
	Ashuganj TPP Unit- 5	Gas	APSCL	150	134	Gas shortage
58	Ashuganj 225 MW CCPP	Gas	APSCL	221	221	
59	Ashuganj 450 MW CCPP(North)	Gas	APSCL	360	360	
60	Ashuganj 450 MW CCPP(South)	Gas	APSCL	360	360	
61	Ashuganj 50 MW PP	Gas	APSCL	53	45	Gas shortage
62	Ashuganj 55 MW PP (Precision)	Gas	RPP	55	55	Gas shortage
63	Ashuganj 195MW PP (APSCL-United)	Gas	IPP	195	195	Gas shortage
64	Ashuganj 51 MW PP (Midland)	Gas	IPP	51	51	
65	Ashuganj 150MW PP (Midland)	HFO	IPP	150	150	
66	Titas 50 MW Peaking PP	HFO	PDB	52	52	
67	Chandpur 150 MW CCPP	Gas	PDB	163	163	ST under shut down
68	Chandpur 200MW (Desh energy)	HFO	IPP	200	200	
69	Feni 22MW PP (Doreen)	Gas	SIPP, PDB	22	22	
70	Feni 11 MW PP (Doreen)	Gas	SIPP, REB	11	11	
**	Impoprt (Tripura)		Imported power	160	160	
71	Jangalia 33MW PP (Summit)	Gas	SIPP, PDB	33	33	
72	Jangalia 52 MW PP (Lakdanavi)	HFO	IPP	52	52	Engine problem
73	Cumilla 25 MW PP (Summit)	Gas	SIPP, PDB	25	25	Engine problem
74	Daudkandi 200 MW PP (B.Trac)	HSD	IPP	200	200	
75	Feni Lanka Power	HFO	IPP	114	114	
76	Chowmuhani 113 MW	HFO	IPP	113	113	
	Cumilla Area Total			3040	2980	
77	RPCL 210MW CCPP	Gas	IPP	210	202	Gas shortage
78	Tangail 22 MW PP (Doreen)	Gas	SIPP, PDB	22	22	
79	Jamalpur 95 MW PP(Powerpac)	HFO	IPP	95	95	Engine problem
80	Sarishabari 3 MW Solar Plant	Solar	IPP	3	3	
81	Mymensingh 200 MW PP (United)	HFO	IPP	200	200	
82	Jamalpur 115 MW PP (United)	HFO	IPP	115	115	
	Mymensingh Area Total			645	637	
83	Fenchugonj CCPP Phase-1	Gas	PDB	97	70	
84	Fenchugonj CCPP Phase-2	Gas	PDB	104	90	Unit-4 under shut down
85	Kushiara 163 MW CCPP (KP)	Gas	IPP	163	163	
86	Shajibazar 330 MW CCPP	Gas	PDB	330	330	Engine problem
87	Fenchugonj 51 MW PP (Barakatullah)	Gas	RPP	51	51	
88	Fenchuganj 44MW (Energyprima)	Gas	RPP	44	44	
89	Hobiganj 11MW PP Cofidence-E	Gas	SIPP, REB	11	11	
90	Shahjibazar GTPP Unit- 8 & 9	Gas	PDB	70	66	
91	Shahjibazar 86MW PP (Shahjibazar)	Gas	RPP	86	86	
92	Sylhet 225 MW CCPP	Gas	PDB	231	231	Machine problem
93	Sylhet 20 MW GTPP	Gas	PDB	20	20	
94	Sylhet 50MW PP (EPL)	Gas	RPP	50	50	Contract Expired
95	Shahjahanulla 25 MW PP	Gas	SIPP, REB	25	25	
96	Bibiana-II 341 MW CCPP (Summit)	Gas	IPP	341	341	
97	Bibiyana-III 400 MW CCPP	Gas	PDB	400	400	Under maintenance
98	Sylhet 10MW PP (Desh)	Gas	RPP	10	10	
	Bibiyana South 400 MW	Gas	PDB	0	0	
	Sylhet Area Total			2033	1988	
99	Bheramara GTPP Unit-3	HSD	PDB	20	16	
**	Bheramara (HVDC)	0	Imported power	1000	1000	
100	Khulna 115 PP MW (KPCL-2)	HFO	QRPP	115	115	
101	Faridpur 50 MW Peaking PP	HFO	PDB	54	54	
102	Khulna 225 MW CCPP	HSD	NWPGCL	230	230	
103	Gopalganj 100 MW Peaking PP	HFO	PDB	109	109	
104	Bheramara 410 MW CCPP	Gas	NWPGCL	410	410	
105	Noapara 40 MW PP (Khanjahan Ali)	HFO	QRPP	40	40	

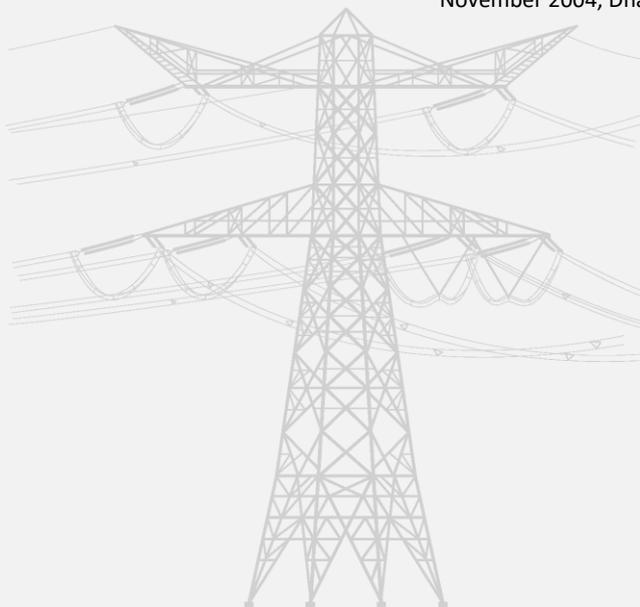
Bangladesh power sector: An appraisal from a multi-dimensional perspective (Part-1)

106	Noapara 100 MW PP (Bangla Trac)	HSD	IPP	100	100	
107	Rupsha 105 MW PP (Orion rupsha)	HFO	IPP	105	105	
108	Madhumati 100 MW PP	HFO	IPP	105	105	
	Khulna Area Total			2288	2284	
109	Barisal 110 MW PP (Summit)	HFO	IPP	110	110	
110	Bhola 33 MW PP (Venture)	Gas	RPP	33	33	
111	Bhola 225 MW CAPP	Gas	PDB	194	194	GT-2 & ST Under maint.
112	Bhola 95 MW PP (Aggreko)	Gas	QRPP	95	95	Engine problem
113	Payra 1320 MW	Coal	BCPCL	622	622	Unit-2 Test. Unit-1 under S/D
	Barisal Area Total			1054	1054	
114	Baghabari 71 MW GTPP	Gas	PDB	71	71	Gas shortage
	Baghabari 100 MW GTPP	Gas	PDB	100	100	Gas shortage
115	Baghabari 50 MW Peaking PP	HFO	PDB	52	52	
116	Bera 70 MW Peaking PP	HFO	PDB	71	71	
117	Amnura 50 MW PP (Sinha)	HFO	QRPP	50	50	Fuel shortage.
118	Katakali 50 MW PP (Northern)	HFO	QRPP	50	50	
119	Katakali 50 MW Peaking PP	HFO	PDB	50	50	
120	Sirajgonj 225MW CAPP Unit-1	Gas/HS D	NWPGCL	210	210	Gas shortage
121	Sirajgonj 225MW CAPP Unit-2	Gas/HS D	NWPGCL	220	220	FGMO
122	Sirajgonj 225MW CAPP Unit-3	Gas/HS D	NWPGCL	220	220	FGMO
123	Sirajgonj 400 MW CAPP Unit-4	Gas/HS D	SNWPGCL	414	414	FGMO
124	Santahar 50 MW Peaking PP	HFO	PDB	50	50	
125	Bogra 22 MW PP (GBB)	Gas	RPP	22	22	
126	Bogura 20 MW PP (Energyprima)	Gas	RPP	20	10	
127	Ullapara 11 MW PP (Summit)	Gas	SIPP, REB	11	11	
128	Natore 52 MW PP (Rajlanka)	HFO	IPP	52	52	Engine problem
129	Chapainawabganj 100 MW Peaking PP	HFO	PDB	104	104	
130	Baghabari 200 MW PP (Paramount)	HSD	IPP	200	200	
131	Bagura 113 MW PP (Confidence)-2	HFO	IPP	113	113	
132	Confidence Power Bogura Unit-1 113 MW	HFO	IPP	113	113	
	Rajshahi Area Total			2193	2183	
133	Barapukuria TPP Unit-1	Coal	PDB	125	85	Coal Shortage.
	Barapukuria TPP Unit-2	Coal	PDB	125	85	Coal Shortage.
134	Barapukuria 275 MW TPP Unit-3	Coal	PDB	274	274	Coal Shortage.
135	Rangpur 20 MW GTPP	HSD	PDB	20	20	Under maint.
136	Saidpur 20 MW GTPP	HSD	PDB	20	20	Engine problem
137	Rangpur 113 MW PP (Confidence)	HFO	IPP	113	113	
138	Sympa Solar Power 8MW	Solar	IPP	8	8	
	Rangpur Area Total			685	605	
	Total			20383	19892	



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