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**Power Sector in the 8th Five Year Plan**  
*Reflection on Its Strategy and Initiatives*

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ASM Shamim Alam Shibly



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**Centre for Policy Dialogue (CPD)** was established in 1993 as a civil society initiative to promote an ongoing dialogue between the principle partners in the decision-making and implementing process. Over the past 28 years, the Centre has emerged as a globally reputed independent think tank, with local roots and global reach.

A key area of CPD's activism is to organise dialogues to address developmental policy issues that are critical to national, regional and global interests, with a view to seeking constructive solutions from major stakeholders. The other key area of CPD's activities is to undertake research programmes on current and strategic issues.

CPD's research programmes are both serviced by and intended to serve, as inputs for particular dialogues organised by the Centre throughout the year. Major research themes are: macroeconomic performance analysis; poverty and inequality; agriculture; trade; regional cooperation and global integration; infrastructure; employment, and enterprise development; climate change and environment; development governance; policies and institutions, and the 2030 Agenda for Sustainable Development.

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Dissemination of information and knowledge on critical developmental issues is another important component of CPD's activities. Pursuant to this, CPD maintains an active publication programme, both in Bangla and in English. As part of its dissemination programme, CPD has been bringing out **CPD Working Paper Series** on a regular basis. Research work in progress, background papers of dialogues, investigative reports and results of perception surveys which relate to issues of high public interest are published under this series.

The present paper titled *Power Sector in the 8th Five Year Plan: Reflection on Its Strategy and Initiatives*, has been prepared by the *Dr Khondaker Golam Moazzem*, Research Director, CPD ([moazzem@cpd.org.bd](mailto:moazzem@cpd.org.bd)) and *Mr Abu Saleh Md. Shamim Alam Shibly*, Research Associate, CPD ([shibly@cpd.org.bd](mailto:shibly@cpd.org.bd)).

**Series Editor:** *Dr Fahmida Khatun*, Executive Director, CPD.



The 8th Five Year Plan (8FYP) is one of the important policy documents during the period between FY2020–21 and FY2024–25. Like earlier Five Year Plans, the power sector has got special attention in the new Plan with a view to ensuring access to electricity, supporting economic activities and promoting industrialisation. In the backdrop of persistent weaknesses and challenges in the power sector during the immediate-past FYP period (7FYP) as well as economic slowdown caused by the COVID-19 pandemic, the study examines how the 8FYP addresses on the challenges in the power sector and whether the long-term targets set in the Plan is consistent with the future outlook of the power sector including development of the clean power sector. The study observed positive changes in the power sector during the 7FYP period which include higher public and private investment, better access to electricity to consumers and gradual reduction of transmission and distribution losses. However, the 7FYP period ended with a number of challenges including: (i) over-generation capacity, (ii) under-utilisation of power plants, (iii) poor efficiency of power plants, (iv) increasing public debt of the Bangladesh Power Development Board (BPDB), (v) fiscal-financial pressure on importing fossil-fuel, and (vi) little attention on the renewable energy development. These challenges have received little attention in setting targets for the 8th plan period. In case of primary energy, the 8FYP has little shift from the earlier policy stance. There is no comprehensive outlook on renewable energy in power generation—8FYP focuses mainly on hydro-power. Without appropriate measures and initiatives, the problems would further exaggerate during the coming years. In this backdrop, the study suggests to emphasise in the 8FYP period on undertaking proper measures such as demand rationalisation and demand-side management, enhancing efficiency of power plants, cost reduction, abandoning coal-fired power plants, abandoning old, expensive fuel-based and quick rental and rental power plants, gradual shifting towards cleaner energy-mix by enhancing use of non-conventional renewable energy mix for power generation.



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# Acronyms

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7FYP	Seventh Five Year Plan
8FYP	Eighth Five Year Plan
ADP	Annual Development Programme
BAU	Business as Usual
BERC	Bangladesh Energy Regulatory Commission
BPDB	Bangladesh Power Development Board
COVID-19	Coronavirus Disease
CPD	Centre for Policy Dialogue
CVF	Climate Vulnerable Forum
DESC	Dhaka Electric Supply Company
DPDC	Dhaka Power Distribution Company Ltd.
DSM	Demand-Side Management
ENDC	Enhanced Nationally Determined Contribution
FY	Fiscal Year
GoB	Government of Bangladesh
GW	Giga Watt
GWh	Giga Watt per Hour
HFO	Heavy Fuel Oil
ICS	Improved Cooking Stove
IEEFA	Institute for Energy Economics and Financial Analysis
IPP	Independent Power Producer
kWh	Kilo Watt per Hour
LNG	Liquified Natural Gas
MoPEMR	Ministry of Power, Energy, and Mineral Resources
MW	Mega Watt
NLDC	National Load Dispatch Centre
PP	Power Plant
PPP	Public and Private Partnership
PSMP	Power Sector Master Plan
PV	Photovoltaic
RE	Renewable Energy
SME	Small and Medium Enterprise
SREDA	Sustainable and Renewable Energy Development Authority
Tcf	Trillion Cubic Feet
T&D	Transmission and Distribution
VRE	Variable Renewable Energy



## 1. INTRODUCTION AND OBJECTIVES

The power sector has been playing a major role in accelerating economic growth in Bangladesh, just as in many developing countries, by ensuring the basic infrastructural facility for the people. The successive long term economic policies, particularly five year plans, have been laying special emphasis on the power sector with a view to ensuring access to electricity, supporting economic activities and promoting industrialisation. In June 2020, Bangladesh has completed the phase of implementing its Seventh Five Year Plan (7FYP) for the period of FY2016–FY2020. Since 1 July 2020, the country has entered into the next phase of FYP—Eighth Five Year Plan (8FYP July 2020–June 2025). Jatiyo Sangsad, the National Parliament, has approved the 8FYP in December 2020; delay by at least six months, but not without reasons. The official approval process of the new 8FYP has been delayed because of the number of revisions made in the draft plan to accommodate the changing dynamics caused by the COVID-19 pandemic. In fact, the crisis demanded major revision in the economic outlook for the next five years and subsequently required modification, and changes in overall macroeconomic and sectoral strategies.

Since 2009, the power sector has been projected as a successful case of infrastructure development under the present government. According to the official data, significant progress has been made in the power sector during this period with regard to ensuring access to electricity across the country. This is reflected in setting up power plants, and increasing power generation capacity resulting in enhanced per capita electricity, transmission and distribution (T&D) lines, number of consumers, irrigation connection, etc. Moreover, a full-scale rural electrification programme is being implemented in 361 upazillas since January 2020 (Annex 6). Such upgradation in the power infrastructure has contributed to improving country's overall ranking in terms of global competitiveness during the ongoing FYP period. By the end of 6FYP (June 30, 2015), country's ranking in terms of quality of infrastructure and quality of electricity supply were 127 and 124 respectively. These indicators effected positive changes in 2019 during the 7FYP period (FY2015–FY2020): to 114 and 68 respectively. As a result, Bangladesh's rank in terms of electricity generation and supply has surpassed many comparator countries, including India, Pakistan and Cambodia, during this period.

Since the power and energy are part of the priority sectors in country's long term economic planning, overall sectoral outlook needs to be revisited amidst the changing COVID19 pandemic context. Demand for electricity is likely to decline during COVID and post-COVID period mainly due to slow economic recovery and discouraging private investment. Therefore, projection made on the future outlook of the power sector based on a 'business as usual' (BAU) situation would be erroneous and highly disappointing. A number of fault lines is quite discernable in the ongoing power sector development strategy amidst the pandemic. These fault lines warrant immediate attention from the policy makers before any major crisis intervenes in the power sector. The challenges include over generation capacity beyond required reserve capacity, huge debt burden, over dependence on fossil-fuel, huge capacity payment to private power producers, inefficient operating power plants, and limited effort to enhance renewable energy-based power plants (Nicholas & Ahmed, 2020; Moazzem, 2020).

Against this background, it is important to revisit the outlook, focus and strategies of the power sector that were relevant prior to COVID-19 pandemic towards a fresh perspective under the changing context. The 8FYP is expected to reflect on and consider the demand-and supply-side changes with pragmatism in its overall outlook, focus and strategies during the period from July 2020 to June 2025. Therefore, the study examines how the 8FYP focuses on the changing issues relating to demand and supply of electricity, apart from reviewing the performance of the power sector during the 7FYP period.

## 2. REVIEW OF THE PERFORMANCE OF THE POWER SECTOR DURING THE 7FYP PERIOD (JULY 2015–JUNE 2020)

### 2.1 Targets and achievements regarding power generation capacity during the 7FYP period

The power generation capacity has improved during the 7FYP period—from 11,534 MW in FY2015–16 to 20,383 MW in FY2019–20. This improvement in power generation is attributed to major compositional changes during the 7FYP period. Unlike the public sector-led power generation during the 6FYP period (FY2010–FY2015) (GED, 2011), the private sector in power generation was increasingly visible during the 7FYP period. Generation of 12,584 MW electricity was targeted during the period providing for 7,682 MW by public sector (61 per cent) and 4,902 MW by private sector (39 per cent) (Table 1). The projected target as above was however not achieved: about 8,849 MW of electricity being generated which was 70 per cent of the target. Given the limited rise in electricity demand against the planned estimated demand, failure in reaching the target by 30 per cent can be positively acknowledged (Annex 1). At the end of the 7FYP in 2020, the share of power generation distribution has been 9,568 MW on account of public sector (47 per cent), 8,884 MW on account of private sector (43 per cent), followed by 771 MW by joint venture (4 per cent) and 1,156 MW imported from neighbouring India (6 per cent).

**Table 1: The 7FYP power generation programme by ownership**

Fiscal year	Public sector (MW)	Private sector (MW)	Total (MW)
FY16	937	334	1,271
FY17	2,599	738	3,337
FY18	1,076	867	1,943
FY19	1,320	1,716	3,036
FY20	1,750	1,247	2,997
<b>Total</b>	<b>7,682</b>	<b>4,902</b>	<b>12,584</b>

Source: Power Division, Ministry of Power, Energy and Mineral Resources; GED (2015).

During the 6FYP, power generation capacity was substantially reliant on gas in view of large amount of remaining reserve (proven and probable) of natural gas supply in the country (11.12 Tcf in 2011) (Hydrocarbon Unit, Energy and Mineral Resources Division, 2012). A large volume of domestic coal and gas reserve was perhaps the reason to depend on gas and coal as the major energy mix for power generation during the 7FYP. A total of 12,584 MW power generation had been targeted during the plan period where gas and coal had been the main sources of energy-mix. These two energy components, gas and coal, were scheduled to contribute 32 per cent and 36.2 per cent respectively to the power generation process. The other two sources include Liquefied Natural Gas (LNG)—5.9 per cent and import—4.8 per cent. To offset the use of fossil-fuel in power generation, renewable energy (RE) was to contribute a meagre part of the total energy-mix (0.8 per cent) (Table 2).

**Table 2: Proposed 7FYP electricity generation by fuel type (MW)**

Fuel type	FY16	FY17	FY18	FY19	FY20	Total
Gas	973	2,401	657	-	-	4,031 (32 per cent)
Gas/LNG	-	-	-	-	1,750	1,750 (13.9 per cent)

(Table 2 contd.)

(Table 2 contd.)

Fuel type	FY16	FY17	FY18	FY19	FY20	Total
Dual Fuel	75	395	512	-	-	982 (7.8 per cent)
HFO	55	511	-	-	-	566 (4.5 per cent)
Coal	-	-	274	3,036	1,247	4,557 (36.2 per cent)
Import	100	-	500	-	-	600 (4.8 per cent)
Renewable	68	30	-	-	-	98 (0.8 per cent)
<b>Total</b>	<b>1,271</b>	<b>3,337</b>	<b>1,943</b>	<b>3,036</b>	<b>2,997</b>	<b>12,584</b> <b>(100 per cent)</b>

Source: Power Division, Ministry of Power, Energy and Mineral Resources; GED (2015).

The targeted power generation capacity has been largely attained; about 80 per cent of the total generation capacity has been achieved (Table 2). A major part of the generation target was achieved in 2018, while the lowest level of achievement resulted in 2020. The achievement of targeted energy-mix for power generation failed mainly due to the inability of pressing coal-based projects into action. Coal was supposed to contribute 36.2 per cent of total installed capacity during the 7FYP period (Table 2). Against these, coal contributed only 4.2 per cent of total generation capacity (Table 3). Thus, the energy-mix was largely dominated by gas, imported LNG and liquid fuels, share of gas and LNG being 71.8 per cent followed by liquid fuel adding 13.4 per cent (Table 3). Imported electricity had exceeded the targeted generation share, which portrays growing importance of cross-border energy trade for Bangladesh. Besides, the target for RE was not achieved as it was attached less priority. The meagre target for power generation through RE was not achieved (Annex 1). While the 7FYP experienced moderate changes in energy-mix within fossil-fuel, little progress had been made in diversification in energy-mix, particularly the expansion of RE in power generation. Several adjustments in administered power tariff and price of energy have taken place during the plan period (Annex 9).

**Table 3: Energy mix for power generation**

Fiscal year	Installation capacity targets (MW)	Achievement in installation capacity (MW)	% of target achieved	Energy-mix (%)				
				Gas	Coal	Liquid fuel	Hydro	Import
FY16	1,271	1,232	96.9	68.63	1.62	20.57	1.84	7.32
FY17	3,337	1,247	37.4	66.44	1.76	21.96	1.71	8.13
FY18	1,943	4,263	219.4	63.31	2.7	24.72	1.63	7.63
FY19	3,036	2,404	79.2	68.49	1.74	19.07	1.03	9.62
FY20	2,997	915	30.5	71.8	4.2	13.4	1.2	9.3
<b>Total</b>	<b>12,584</b>	<b>10,061</b>	<b>79.9</b>	-	-	-	-	-

Source: Power Division (2020).

## 2.2 Progress with investment in renewable energy

The 7FYP did not have a special focus on RE in power generation (Annex 8). In the absence of a comprehensive outlook, the plan targeted to generate 98 MW solar energy which is only 0.8 per cent

of total generation capacity at the end of the 7FYP. Even this targeted solar energy generation was not achieved (Annex 8). Consequently, the share of RE to the total electricity generation (% including hydro) declined from 3.6 per cent in FY2014–15 to 3.25 per cent in FY2018–19.

### 2.3 Changes in excess capacity

One of the major weaknesses of the 7FYP has been its unrealistic projection in electricity demand (Annex 1). According to the Power System Master Plan (PSMP) 2016 (BPDB, 2016), the demand for electricity was projected to rise from 8920 MW in 2015 to 13300 MW in 2020. As a consequence to this, Ministry of Power, Energy, and Mineral Resources (MoPEMR) promoted new investments for enhancing power generation capacity. Against the targeted installed capacity, maximum electricity generation was 62.5 per cent. In other words, demand for electricity was lower than the maximum generation capacity, and as high as 37.5 per cent of total capacity remained unutilised. This excess generation capacity shot up over the years (Table 4). The excess capacity would be much higher if the targeted generation were fully realised during the Plan period. This is because, the excess reserve would be as high as 55.6 per cent in 2020. In other words, more than half of the grid-electricity would remain unutilised. In that context, all future power generation plans should be considered from the surplus generation perspective towards a least cost generation state and increased use of RE during the 8FYP period (Annex 1).

**Table 4: Year-wise power generation capacity**

Distribution of installed capacity			Fiscal year	Year-wise power generation capacity		
Ownership	Installed generation capacity (MW)	Share (%)		Total installed capacity (MW) (cumulative)	Maximum power generation	% of reserve capacity
Government	9,717	48	FY16	12,365	9,036	26.9
IPPs	8,884	43	FY17	13,555	9,479	30.1
PPP	622	3	FY18	15,953	10,958	31.3
Import	1,160	6	FY19	18,961	12,893	32.0
<b>Total</b>	<b>20,383</b>	<b>100</b>	<b>FY20</b>	<b>20,383</b>	<b>12,738</b>	<b>37.5</b>

Source: Bangladesh Power Development Board (BPDB), 2020a.

This excess capacity had led to a large financial challenge for BPDB. According to the agreements with the Independent Power Producers (IPP), BPDB requires to pay a ‘capacity payment’ for not using a ‘minimum amount of generated capacity’ of a power plant. Since IPPs comprise 43 per cent of total installed capacity (Table 4) for power generation and a substantial part of the capacity remains unutilised due to poor demand, BPDB is obligated to pay the ‘capacity payment’ of a substantial amount to the IPPs every year.

### 2.4 Targets and achievements in T&D lines

The 7FYP had specific targets relating to T&D of generated electricity. These include expansion of distribution lines for 21,618 km, construction of 246 sub-stations, setting up 7.280 million pre-paid meters and system loss reduction to less than 10 per cent, etc. As part of improving efficiency, BPDB and other power development agencies had set their targets to reduce the T&D loss in single digit: BPDB to 9.8 per cent, Dhaka Power Distribution Company Ltd. (DPDC) to 9.0 per cent and Dhaka Electric Supply Company (DESC) to 8.0 per cent respectively (Table 5).

**Table 5: Power distribution targets for urban centres for the 7FYP**

Distribution activity	BPDB	DPDC	DESC	WZPDC	Total
Expansion/Construction of electricity distribution line (km)	14,200	1,750	1,050	4,618	21,618
Construction/ Modernise of sub-stations (No.)	115	60	37	34	246
New Consumer Connection (No.)	1,400,000	426,000	426,000	600,000	2,852,000
Pre-paid Meter (No.)	3,900,000	1,200,000	1,050,000	1,131,000	7,281,000
System Loss (%)	9.8	9	8	9.5	36.3 per cent
Customer Service (Call Centre) (No.)	57	1	1	446	505

Source: Power Division, Ministry of Power, Energy and Mineral Resources; GED (2015).

Although the data on actual achievement of all the above mentioned indicators relating to T&D are not available, the majority of targets mostly remained unrealized. According to the available data, both transmission and distribution loss has gradually declined (Annex 1); while distribution loss has declined to 8.73 per cent in FY2019–20, the overall loss of transmission and distribution has marginally declined and it is well above the single digit level, 11.23 per cent (Table 6). Overall target for reduction of system loss was not however achieved (Annex 4). Lack of development in transmission and distribution lines along with the power generation plants across the country has caused higher level of transmission and distribution losses. Unplanned increase in the power generation capacity resulted in many plants remaining idle—either for lower demand than the plant’s capacity or absence of T&D line (Annex 4).

**Table 6: T&D and distributional system loss**

Fiscal year	Distribution loss in per centage	Transmission and distribution loss (total loss in per centage)
2015-16	10.96	13.1
2016-17	9.98	12.19
2017-18	9.6	11.87
2018-19	9.35	11.96
2019-20	8.73	11.23

Source: Power Division (2020).

## 2.5 Positive changes in consumers access to electricity

During the 6FYP and 7FYP periods, priority was attached for upgradation of power generation capacity to meet the electricity demand. Consequently, considerable investment had been made for power generation both by the private sector and public sector: in FY2019–20, total installed capacity reaching 23,548 MW which was higher than the target. Electricity coverage has increased from 72 per cent in the baseline year FY2015–16 to 97 per cent in 2019–20, end of the 7FYP; per capita electricity generation has increased to 512 kWh (including captive power) from 371 kWh in FY2015–16. During this period, distribution line was further expanded to 5.67 lakh km which served about 37,000,000 consumers to get connected to the national grid. The overall system loss of electricity had decreased substantially to 11.23 per cent in FY2019–20 (Table 6) from 15.73 per cent in FY2009–10- the last FY of the 5FYP. However, the share of RE including hydro to the total electricity generation declined from 3.6 per cent in FY2015–16 to 3.05 per cent in FY2019–20. Overall, access of the consumers



to electricity at the national level has substantially increased during the 7FYP period based on the expansion of fossil-fuel based power generation, transmission and distribution.

## 2.6 Public investment in the power sector

Public investment in the power sector made significant contribution in increasing power generation and extending T&D system, and thereby, reducing system loss in the overall perspective. According to Table 7, a total of Tk. 1461 billion of public investment had been projected in the plan document to be required for implementing power sector projects. Majority of the fund had been allocated for power generation: Tk. 848/ billion (58 per cent of total budget), followed by Tk. 404/ billion, (27.6 per cent) for transmission, Tk. 209/ billion for distribution (14.3 per cent) and Tk. 147/ billion for primary energy (10.1 per cent) (Table 7).

**Table 7: Public investment required for the power sector (in billion taka/FY2015–16 price)**

Fiscal year	Generation	Transmission	Distribution	Primary energy	Total public investment requirement (other than primary energy)	Per cent of GDP
FY16	108	81	42	23	254	1.6
FY17	259	81	42	28	382	2.4
FY18	103	81	42	30	226	1.4
FY19	195	81	42	32	318	1.7
FY20	183	81	42	34	306	1.6
<b>Total</b>	<b>848</b>	<b>404</b>	<b>209</b>	<b>147</b>	<b>1,608</b>	<b>8.7</b>

**Note:** During the plan period a total of 807 MW worth of electricity will be required.

**Source:** Compiled from GED (2015).

**Table 8: The 7FYP ADP allocations for the power and energy sector**

(in billion taka)

Ministry	FY16	FY2017	FY18	FY19	FY20	Total
Energy and mineral resources Division	19.9	32.6	36.7	40.8	45.7	175.7
Power division	164.9	159.9	153.2	170.2	190.4	837.7
<b>Total</b>	<b>184.8</b>	<b>191.5</b>	<b>189.9</b>	<b>211.1</b>	<b>236.1</b>	<b>1,013.4</b>

**Source:** Compiled from GED (2015).

Against the overall financing requirement, 53 per cent of total finance had been planned to be allocated under ADP allocation in the 7FYP. The actual allocation was rather high beyond the targeted ADP amount—about 107.6 per cent (Table 9) of the targeted ADP fund. Higher ADP allocation has helped to cover 84 per cent of the targeted financing requirement of the sector during the plan period. Within the MoPEMR, the Power Division had received a significantly higher amount of budget most of the years compared to the targeted levels. Despite the small share (8.5 per cent of total budget), the Energy and Mineral Resources Division received less budget compared to their allocated budget in most of the years.

**Table 9: Financing power sector through ADP during the 7FYP period**

Fiscal year	Energy and Mineral Resources Division			Power Division			Total		
	Target	Actual	% of total allocation spent	Target	Actual	% of total allocation spent	Target	Actual	% of total allocation spent
FY16	19.9	11.0	55.3	164.9	152.7	92.6	184.8	163.8	88.6
FY17	34.5	11.5	33.3	168.5	134.7	79.9	203.0	146.2	72.0
FY18	41.1	10.1	24.6	171.5	275.5	160.6	212.6	285.6	134.3
FY19	48.2	47.4	98.3	201.0	324.5	161.4	249.2	371.9	149.2
FY20	56.6	24.8	43.8	235.9	236.7	100.3	292.5	261.5	89.4
<b>Total</b>	<b>200.3</b>	<b>104.8</b>	<b>52.3</b>	<b>941.8</b>	<b>1,124.2</b>	<b>119.36</b>	<b>1,142.1</b>	<b>1,229</b>	<b>107.6</b>

Source: Authors' estimation.

Private investment is increasingly becoming a major source for financing the power sector, particularly in electricity generation. As a result, the share of IPP in total installed generation capacity has increased from 5.012 MW to 8.884 MW in 2020; however, the share of IPPs in total installed capacity remained the same (43.5 per cent) (Table 4). The share of private sector in power generation will be higher (47.3 per cent) if we include electricity generation undertaken through joint venture. Besides, cross-border trade of electricity with India is a notable progress during the plan period—about 1,160 MW electricity had been imported during the 7FYP period. Discussion of further import of electricity has been ongoing with India, Bhutan and Nepal (Table 10). However, the import of hydropower from Nepal and Bhutan will require a tri-lateral agreement with India in order to use the Indian transmission system to trade those electricity to Bangladesh (Annex 3). Hydropower generated by India would be another potential source of electricity for Bangladesh. In the future, Bangladesh needs to balance sourcing electricity from different options available within and outside the country.

**Table 10: Installed capacity by ownership excluding captive power (MW) and off-grid RE (FY2010–FY2020)**

Fiscal year	Public	Private	Import	JV	Total (MW)
FY10	3,719	2,104	-	-	5,823
FY15	6,022	5,012	500	-	11,534
FY19	9,507	8,294	1,160	-	18,961
FY20	9,568	8,884	1,160	771	20,383

Source: Compiled from BPDB (2020a).

### 3. EMERGING CHALLENGES OF THE POWER SECTOR TOWARDS SETTING TARGETS IN THE 8FYP (JULY 2020–JUNE 2025)

At the end of the 7FYP, a number of challenges have been revealed in the power sector which needs to be addressed during the 8FYP period. These challenges include: (i) over generation capacity, (ii) under utilisation of power plants, (iii) poor efficiency, (iv) rising public expenditure on the part of BPDB, and (v) fiscal-financial pressure on importing fossil-fuel in the country. Following sub-sections discuss in detail about these challenges and their implication in preparing 8FYP.

### 3.1 Challenges of over generation capacity

Over-Generation Capacity, technically called ‘reserve capacity’, has become a major burden for the power sector, and it has significantly increased during the COVID-19 period (Annex 1). At the end of 7FYP period ending on 30 June, 2020, the reserve capacity level reached 44.2 per cent or 9,016 MW (Table 11). Such a high reserve capacity level is against the benchmark set forth at the PSMP 2016 (25 per cent). Even Bangladesh’s reserve capacity is much higher compared to that of other developing countries (10 per cent) (IEEFA, 2020). It is faultily argued that electricity demand would increase within a short period after completion of the ongoing large-scale infrastructure development projects like metro rail, special economic zones, etc (Annex 2). Such over capacity is partly responsible for BPDB’s financial burden which needs to be adjusted through budgetary and non-budgetary measures. The 8FYP needs to design a financial sustainability plan for the BPDB under which it could operate successfully without taking cash loans from the government.

**Table 11: Over-capacity in terms of demand and generation**

Year	Reserve capacity (as per max. generation)	% of Share of over-capacity of installed capacity
FY16	3,329 MW	26.9
FY19	6,068 MW	32.0
FY20 (30 June, 2020)	9,016 MW	44.2

**Source:** Authors’ analysis based on BPDB data.

### 3.2 Under-Utilisation of Power Plants

Unbalanced growth in generation capacity and lack of corresponding rise in demand forced many power plants to remain idle. At the end of the 7FYP period, 30 June, 2020, as many as 51 unutilised and non-producing power plants were located, 37 per cent of the total 137 power plants. Such under-utilisation of power plants had forced the BPDB to pay a minimum capacity payment to individual power producers. This capacity payment has been increasing over the years—from Tk. 5,003 crore in FY2015–16 to Tk. 8,929 crore in FY2019–20. This eventually forced the government to allocate resources to finance the deficit. The capacity payment is almost equal to the amount of subsidy taken from the government in FY2019-20. Therefore, the 8FYP needs to consider strategies for improvement of the plant utilization capacities in the power sector.

### 3.3 Low level efficiency

BPDB’s financial burden has been escalating due to poor efficiency of the power plants. Although plant efficiency has improved over time, a large number of power plants are still operating at a low level efficiency. About 18 per cent power plants have operated at an efficiency level below 30 per cent in 2020, whereas comparable stats was 30.5 per cent in 2015. On the other hand, about 45 per cent of plants operate at an efficiency level between 40–50 per cent during 2020 which was 23.2 per cent in 2015. None of the available plants operated over 60 per cent and above level. The huge variation in plant factors among the power plants is another reason for the unstable and/or meagre efficiency level. The 8FYP needs to consider the improvement of efficiency of power plants.

**Table 12: Power generation through different public and private sectors 2015 and 2020 comparison by per cent***(in per cent)*

Efficiency level (%) net	Percentage of total number of plants, 2015	Percentage of total number of plants, 2020
0-10	0.0	0.0
10-20	2.1	1.6
20-30	28.4	16.3
30-40	42.1	34.1
40-50	23.2	45.0
50-60	1.1	3.1
>60	0.0	0.0
<b>Total</b>	<b>96.8</b>	<b>100.0</b>

Source: BPDB, 2015.

**Table 13: Power generation through different public and private sectors 2015 and 2020 comparison by the number of plants***(per cent)*

Efficiency level (%) net	Public PP		IPP		Rental	
	2015	2020	2015	2020	2015	2020
0-10	-	-	-	-	-	-
10-20	2	2	-	-	-	-
20-30	22	18	2	-	3	3
30-40	16	23	5	8	19	13
40-50	-	10	9	40	13	8
50-60	1	4	-	-	-	-
>60	--	-	-	-	-	-
<b>Total</b>	<b>41</b>	<b>57</b>	<b>16</b>	<b>47</b>	<b>38</b>	<b>24</b>

Source: BPDB, 2020b.

### 3.4 BPDB's ever-increasing yearly expenditure

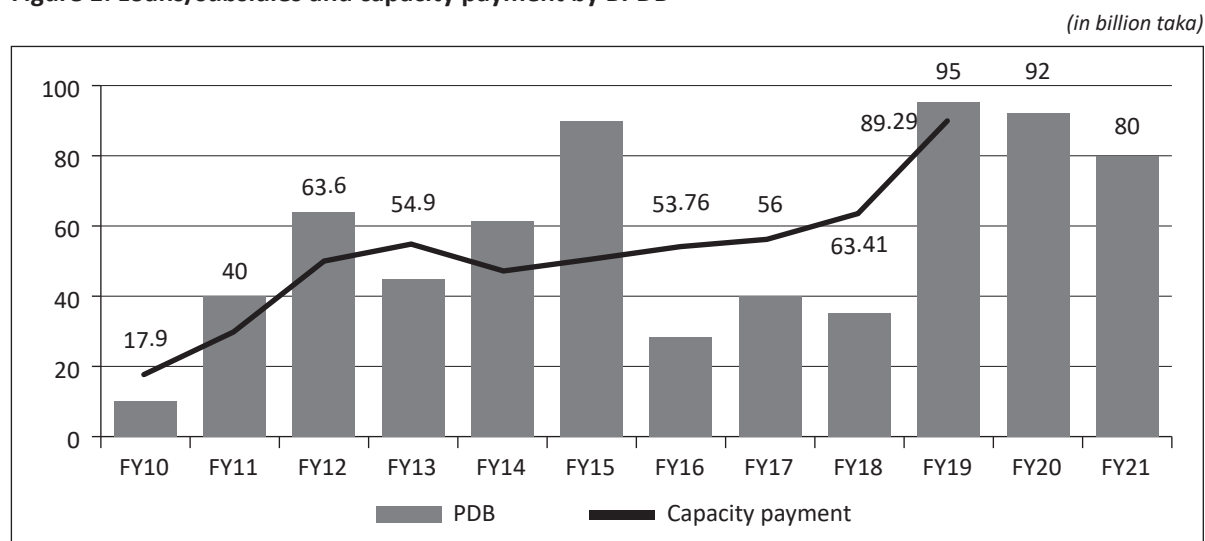
The power generation cost per unit has revealed an upward trend over the years, from Tk. 5.86/kWh in 2015 to Tk.5.91/kWh in 2020. During this period, BPDB's operating revenue and operating expenditure have increased and its loss reduced by 17.5 per cent. Expenditures in selected heads of accounts such as purchasing electricity from IPPs and purchasing coal are found to be exceptionally high (Annex 1). Rising capacity payment to IPPs, high electricity costs for petroleum-based power plants and enhanced import of coal are likely the reasons behind the high expenses of BPDB. Given the structure of power generation, the financial burden of BPDB is likely to rise in the coming years. During COVID-19 pandemic, low demand for petroleum caused dip in crude oil price and petroleum products cost in the world market, which partly reduced the burden of import payment by BPDB.

BPDB's borrowing has significantly increased in recent years in order to meet its expenditure. During the 7FYP period, BPDB took loan in the form of subsidy amounting to Tk. 28,980 crore. Over the years, BPDB has emerged as the major recipient of cash loans from the government. During FY2019–20, its cash loan was accounted for more than one-fifth of total subsidy allocated for different sectors.

**Table 14: Changes in operating income and operating expenditure during the 7FYP period**

Head of accounts	FY15	FY20	Amount increase/ decrease	Percentage of increase/decrease
	(Tk. in Cr)	(Tk. In Cr)		
Operating Revenue	21,187.63	35,535.40	14,347.77	67.72 per cent
Operating Expenses	26,462.41	39,887.15	13,424.74	50.73 per cent
Profit/Loss	-5,274.78	-4,351.75	+923.03	-17.50 per cent

Source: GED (2015), BPDB (2020) and BPDB (2015).

**Figure 1: Loans/subsidies and capacity payment by BPDB**

Source: Authors' illustration based on different newspaper reports.

In this context, 8FYP needs to take into account appropriate measures to reduce the operating expenses of BPDB.

### 3.5 Revision of tariff

Electricity tariff is administered by Bangladesh Energy Regulatory Commission (BERC) which finalises the tariff through discussion and public hearing involving different stakeholders. During the 7FYP,

**Table 15: Revision of power tariff during the 7FYP period**

Range	Rate/Unit			% Increase from 2015 to 2020 (Poisa)
	1 Sep 2015	1 Dec 2017	1 Mar 2020	
0–50	3.36	3.50	3.75	11.61
0–75	3.80	4.00	4.19	10.26
76–200	5.14	5.45	5.72	11.28
201–300	5.36	5.70	6.00	11.94
301–400	5.56	6.02	6.34	14.03
401–600	8.70	9.30	9.94	14.25
600+	new	10.70	11.46	-

Source: Authors' illustration based on different newspaper reports.

the tariff had been revised three times (Table 15) causing changes in the tariff structure between 10.3 per cent and 14 per cent. A major reason for the upward electricity tariff is to accommodate the higher costs of production, which BPDB had to bear in purchasing electricity from the public and private sectors. Given the growing financial burden, BPDB had to undertake additional steps to handle it. In June 2020, concluding year of the 7FYP, the MoPEMR placed a new bill to the National Parliament seeking its permission to adjust power tariff more than once in a year. The bill was passed in November 2020, inaugural year of the 8FYP. This bill aimed at allowing BPDB to raise the retail tariff more than once in a year. An upward adjustment of tariff would help BPDB accommodate its financial burden by way of shifting a part of the burden onto the shoulder of the electricity users. The last revision of the tariff was done in March 2020. The question is whether such an adjustment is rational and justified without addressing over capacity and inefficiency-related excess expenditure. During the 8FYP period, how the electricity tariff will have been set and thereby the burden passed on to electricity users will be an important issue.

### 3.6 Fiscal-monetary implications vis-a-vis IPP projects

The operational cost of IPP projects wields significant fiscal-budgetary implications for the Power Division. Such impact and implications are related to using different energy-mix in power generation by the IPPs, operational inefficiencies caused due to overcapacity and under-utilisation of expensive petroleum-based power plants including those of quick rental power plants. Since power plants are dependent to a great extent on imported energy, being the single import source—the financial burden on the BPDB has been increasing over time. During the 7FYP period, the government spent USD 24.1 billion (Table 16) for importing different amounts of fossil-fuel. Since BPDB is the sole government authority to import petroleum and coal, it has to import the required energy for the IPPs. Besides, the foreign currency used for such import put pressure on the country's overall forex reserve.

**Table 16: Bangladesh's import of energy**

*(in million USD)*

Year	Crude Petroleum*	Petroleum Products*	Liquefied Natural Gas	Coal	Total
FY16	381	2,278	0	112	2,771
FY17	534	2,778	0	210	3,522
FY18	558	4,156	367	247	5,328
FY19	930	5,732	135	382	7,180
FY20	270	5,006	71***	47**	5,395
<b>Total</b>	<b>2,673</b>	<b>19,950</b>	<b>574</b>	<b>998</b>	<b>24,195</b>

**Sources:** ITC calculations based on UN COMTRADE and ITC statistics (ITC, 2020).

**Note:** \*data for fiscal year; \*\* Data for January-October 2020 only; \*\*\*Data for January-July, 2020 only.

### 3.7 Converting scrapped coal-fired power plants into LNG-based power plants

Abandoning coal for power generation is a welcome initiative on the part of GOB Power Sector, but those are planned to be replaced by LNG-based power plants. The MoPEMR has put forward a number of arguments with regard to abandoning coal and replacing those by LNG-based power plants. According to the BPDB latest power sector updates, a total of 22 units of coal-fired power plants with a total capacity of 23,236 MW are at different stages of implementation. Of which, 15 units are being planned to be set up under public sector fetching 18,664 MW electricity and seven units under private sector generating 4,572 MW. Other than the three, rest of the coal-fired power

plants are at different levels of implementation. However, the move for converting coal-fired power plants into LNG-based one have weak logic and justification. As per plan, 10 LNG-based power plants with a capacity of 12,155 MW are currently being implemented.<sup>1</sup> Even under the exiting work plan, the share of LNG and gas as energy-mix in power generation would cross the target of 35 per cent by the year 2037 (25,525 MW/42.5 per cent). Centre for Policy Dialogue (CPD) showed in 2020 that the proposed inclusion of LNG-based power plants would completely change the power sector's energy-mix towards electricity generation: from a moderately diversified energy-mix to overwhelmingly dependent (70 per cent) single-source LNG.

### 3.8 Scope of RE in power generation

Despite all the potentials, RE had never got adequate attention from MoPEMR. Its scope should be adequately explored. As per BPDB (2020b), about 1,482 MW of RE would be generated by 2025, and there is no plan for investment in RE after 2025. Overall, 1,552 MW of RE has been targeted, which will be only 2.8 per cent of the total capacity of 60,000 MW by 2041.<sup>2</sup> If the abandoned coal-based power plants are shifted to solar power plants, they will generate a total of 4,779 MW of electricity. With the existing and other RE projects, a total of 6,331 MW capacity could be generated by 2041. This amount of electricity would increase the share of RE in power generation to 10.6 per cent by 2041. It is to be noted that out of 36 projects implemented by SREDA (Sustainable and RE Development Authority), only four projects are currently in operation while 11 projects are in implementation and 19 projects have been at the planning phase.<sup>3</sup> Among the projects, only eight projects are being implemented by the government while the private sector is implementing the rest 25. Overall, public sector investment in RE is very insignificant. The 8FYP needs to focus on public investment along with private investment in RE projects.

## 4. REFLECTIONS OF THE POWER SECTOR IN THE 8FYP

### 4.1 Power generation and energy-mix issues

The 8FYP (July 2020–June 2025) considerably focuses on power generation just as in the previous FYs (the 6FYP and 7FYP). The total installed generation capacity has been targeted to rise to 28,000 MW at the end of the 8FYP (Table 17). Additionally, the Plan will emphasise on energy efficiency, investment in RE and financial sustainability of the power and energy related public agencies. The 8FYP is also

**Table 17: The 8FYP targets on installed power generation capacity**

Power generation targets	Installed power generation capacity (MW)
Baseline (FY20)	22,787
FY21	24,000
FY22	25,000
FY23	26,000
FY24	27,000
FY25	28,000

Source: GED (2020a).

<sup>1</sup>On 27 June, 2021, the MoPEMR has announced that it will scrap a total of 10 coal-fired power plants. However, there will remain another 12 coal-fired power plants which are at different phases of implementation.

<sup>2</sup>The data on RE use in electricity which is provided by BPDB does not match with that of SREDA (total generation: 2,111 MW).

<sup>3</sup>According to the statistics available in the SREDA website, two projects are rejected (SREDA, 2020).



intended to focus on timely implementation of all the power and energy projects that are highly devoid of prior experience of project implementation. The formulation of power sector strategy is heavily influenced by a number of assumptions, like (i) acceleration of private investment in the post-COVID-19 period with the setting-up of special economic zones, (ii) inauguration of mega-projects like metro-rail operation in Dhaka city, and (iii) rising demand for electricity in energy-intensive industries. In view of the weaknesses and challenges discussed above, such target-setting would further raise excess generation capacity, further concentrate on fossil-fuel based power generation as well as cause more import of energy and accentuate financial burden.

As per the 8FYP, government is planning to move towards least-cost power generation options by gradual phasing out of high-cost petroleum-based and rental power plants through time-bound schedules (GED, 2020a) (Annex 2). This will also be reflected through government's move towards an optimal fuel-mix in electricity generation and power trade with neighbouring countries. Although T&D related activities are emphasised, these will not match with the requirement. Therefore, targeting further reduction of system loss is well justified. However, there is little reflection in the current FYP of taking into account the changing power demand situation which would further create pressure on the sector in terms of efficiency, power generation management and financial sustainability.

In case of renewable energy-based power generation, 8FYP focuses mainly on hydro-power. Other important RE sources include wind power, solar energy, biomass and solid waste. It is important to notice in due course how government strategy works out in attracting public and private investment on a large scale for RE, particularly hydro-power based electricity in the country.

Apart from access to electricity, making it affordable for the electricity users should be an important strategy. In that context, the Plan rather takes the position of regular power tariff adjustments. The objective is to reduce the losses, and thereby, reduce relying on subsidised cash loans from the government. Affordability of the common electricity users within their means might thus be a far cry!

In case of primary energy, the 8FYP has little shift from the earlier policy stance. The Plan strategises gas allocation policy considering depleting domestic gas reserve, investment for exploration and development of undiscovered gas fields, utilisation of coal which is locally available, import of LNG/gas through pipeline, demand-side management (DSM) and energy conservation, rise in the use of improved cooking stove (ICS) and rationalising energy subsidy and pricing. Despite government's position of gradual phasing out from fossil-fuel based power generation, the Plan continues emphasising on fossil-fuel use.

## **4.2 Financing strategy for power and primary energy sector development**

Total public investment in power and primary energy sector has been planned to be Tk. 2,060 billion (Table 18) which will be about 1.4 per cent of GDP per year on average during the 8FYP period. This projected investment will be twice as high as that was planned during the 7FYP period. In order to ensure proper and full utilisation of the budget, a sound financing strategy will be required to revamp the energy sector adequately. According to the Plan, this will be a combination of public sector financing as well as public and private partnership (PPP) financing in case of power generation and for containing the provision of energy subsidies as far as practicable. The 8FYP assumes that the subsidy level will be capped at around 0.2 per cent of GDP throughout the five-year plan period, mainly targeted to the poor and supporting the expansion of RE programmes. Furthermore, the plan maintains that the government will ensure that the average price of electricity must be at least equal



to the average production cost.

**Table 18: The 8FYP sectoral ADP allocation (in billion taka; current prices)**

Ministry	FY21	FY22	FY23	FY24	FY25	Total
Energy and Mineral Resources Division	20.0	24.7	28.4	33.2	39.8	146.1
Power Division	284.6	334.5	372.3	419.0	502.8	1,913.2
Sector Total	304.7	359.2	400.8	452.2	542.6	2,059.5

Source: GED (2020a).

## 5. ADDRESSING THE CHALLENGES OF THE POWER SECTOR DURING THE IMPLEMENTATION OF THE 8FYP

The power sector will pass through a critical phase during the 8FYP period in view of a number of ongoing and emergent challenges. These include post COVID-19 recovery challenges, implementation challenges of Sustainable Development Goals (SDGs) by 2030, and challenges in meeting commitments as stipulated in the Enhanced Nationally Determined Contributions (ENDCs) and the commitment made as to the Chair of the Climate Vulnerable Forum (CVF). It is expected that the MoPEMR will consider these ongoing and emergent challenges while implementing the targets as per the strategy of the 8FYP despite those not properly reflected in the Plan document.

### 5.1 A fresh demand projection for electricity till 2030

A fresh demand projection for electricity for the next 10 years (2020–2030) is required targeting 2030/2031 when Bangladesh aspires to be a “higher middle income country”. Such a projection should be carried out through a ‘bottom-up’ approach where individual sectoral demands and their long-term growth would be considered. A scientific, rational and well-justified analytical base for projecting demand should invariably replace weak methodological foundation for faulty and ambitious projections on industrial growth and consequent demand for electricity in medium to long term range. In this context, micro-level sectoral growth and electricity demand analysis will be required, including different sub-sectors of agriculture, industrial sub-sectors (energy-intensive sectors), residential sector, possible urbanisation and electricity demand in rural households and off-farm activities (Annex 2). It is expected that the projection of demand will take into account COVID-19 impact, period of recovery and post-COVID demand.

Analysis of electricity demand and plan for power generation is likely to create a huge excess capacity in electricity in the post-COVID period. Given the huge amount of over capacity, government does not need to hurry to establish new fossil-fuel based power plants with immediate electricity demand.

### 5.2 Emphasis on RE to justify energy-mix

Although 8FYP has put emphasis on fossil-fuel based power generation, it is expected that government will gradually phase out petroleum-based plants. Moreover, no new petroleum-based plant should be considered for investment. Suitable sites for coal-fired power plants should be considered for developing RE-based power plants. The Ministry should refrain from allowing private and public isector investments in setting up LNG-based power plants in the sites which were identified for coal-fired power plants and has been abandoned (Annex 1). The LNG-based power plants along with those

of gas-based power plants, which are currently at different stages of implementation, would surpass the targeted share of LNG/gas mix in total electricity generation by 2041 (40 per cent vs. 35 per cent as per the PSMP 2016). Moreover, replacing coal by LNG would fully change the energy-mix in power generation and would make Bangladesh's power sector single source-based (LNG-based) as its share would rise to 70 per cent by 2041.

### **5.3 Private investment vis-a-vis renewable energy-based PPs**

During the 8FYP period, it is expected that all quick rental power plants should be gradually phased out. These plants include the petroleum-based power plants. In order to encourage private investment in RE-based large scale power plants, incentive provision needs to be attractive. Fiscal and monetary incentives should well be set in such a way as it would attract investment in 'off-shore wind', 'tidal energy' and 'solid waste to energy' (Annex 7).

### **5.4 Strong coordination between T&D along with generation process**

Given the current context of T&D process, an independent body should be in place to ensure better T&D of electricity across the country. Power distribution and transmission system ought to be well-linked with each of the power generation plants. This demands proper planning during the project development phase. The government must take immediate steps to provide full independence to the National Load Dispatch Centre (NLDC). A unified T&D infrastructure will be required where NLDC will maintain the criteria of the power plant's T&D process in a harmonious way (Annex 4).

### **5.5 Demand-side management**

During the 8FYP period, specific 'demand-side management' measures need to be undertaken. The Green Building Code needs to be finalised and activities to that end need to be geared up. Adherence to the building code should be mandatory gradually (Annex 7). SREDA should immediately finalise the solar energy road map for 2021–2041 and develop an action plan based on the roadmap (Annex 7). Development partners who have expressed interest to invest in coal-based power generation should be motivated to redirect their project aid towards setting up RE projects. Being the leader of the CVF, Bangladesh needs to set precedence by promoting renewable energy-based power generation within the country. The new PSMP is expected to design towards that direction considering long-term targets for clean energy-based power sector development.

### **5.6 Revision and synchronisation of different policies**

It is expected during the 8FYP period that further revision and synchronisation of different policies relating to the power and energy sector will be effected. These policies and plans include SDGs, National Solar Energy Road Map and Solar Energy Master Plan. Under SDG 7 (affordable, reliable, sustainable and modern energy), the government has set the target that, by 2030, 20 per cent of total energy consumption is to be derived from renewable sources. This target does not however match with the available policy documents.

According to the National Solar Energy Road Map 2021–2041, future solar capacity is estimated to be 6 GW in the BAU case. For the mid and high deployment cases, the estimated targets are 20 GW and 30 GW respectively till 2041. These figures are also not compatible with SDG targets. The installed capacity of the solar PV systems will be half (50 per cent) of country's projected generation capacity.

In the increased deployment scenario, the solar PV (photovoltaic) systems' energy generation will be around 47,000 GWh per year. The solar PV systems will provide nearly 20 per cent of the country's total electric energy demand by the year 2041 in a high deployment scenario.<sup>4</sup>

On the other hand, the draft Solar Energy Master Plan 2021-2041 recommends that the government should opt for the high deployment case in order to realise the Bangladesh Delta Plan 2100 aims and objectives. The road map proposes several sensible and attainable actions or specific measures. These include (a) revision of policy documents and setting a new RE target, mainly a solar energy target, (b) formulation of policies and implement smart grid to tackle high shares of Variable Renewable Energy (VRE), (c) introduction of policies for a large-scale storage system (grid) for peak shifting, shaving of load and VRE generation smoothing, (d) upgrading existing grid infrastructure, especially the transmission network to evacuate uninterrupted and high-quality grid power according to the grid code for safe injection of generated power from solar plants, (e) developing capacity in terms of both institutional and human resources, (f) ensuring availability of long-term and concessionary financing through commercial, financial institutes for RE, (g) mandating net metering for new industrial and commercial electric connections, and (h) developing solar power hubs by the government along with

**Table 19: Targets under the perspective plan of bangladesh 2021–2041**

Objectives performance indicators	FY19 (actual)	FY21 (target)	FY31 (target)	FY41 (target)
Make power sector financially viable	Losses amounting to Tk. 75 billion	-	-	-
Total grid-based generation capacity of electricity	18,961 MW	21,369 MW	33,000 MW	56,734 MW
Maximum peak demand-based on PSMP 2016 base case	12,893 MW	14,500 MW	29,300 MW	51,000 MW
Increase efficiency of energy use as well as reducing the system loss (T&D loss)	11.96 per cent T&D loss	-	-	T&D loss target: Single-digit
Diversify fuel use in power generation capacity to balance the use of low-cost fuel with a low carbon content of the fuel mix	57.4 per cent gas; 32.4 per cent liquid fuel; 2.8 per cent coal; 6 per cent power import; 1.2 per cent hydro, 0.2 per cent renewables	45 per cent gas; 27 per cent coal; 17 per cent liquid fuel; 9 per cent power import; 1 per cent hydro	29 per cent gas; 30 per cent coal; 14 per cent nuclear; 9 per cent liquid fuel, 17 per cent power import, 1 per cent hydro	35 per cent gas; 35 per cent coal; 12 per cent nuclear; 16 per cent power import; 1 per cent liquid fuel; 1 per cent hydro
Increase private sector investments in electricity, gas, and other energy supply	50 per cent including imports	50 per cent	55 per cent	60 per cent
Encourage energy trade	1 160 MW	2,000 MW	5,000 MW	9,000 MW
Access to electricity	72 per cent	100 per cent	100 per cent	100 per cent

Source: Compiled from GED (2020b).

<sup>4</sup>To execute the high deployment scenario, the government should undertake several necessary and timely steps. According to the Bangladesh Delta Plan 2100, there will be more than 3,800 square kilometres of newly reclaimed land shortly. Suppose around 5 per cent of this reclaimed new land is used for solar power projects, and the government undertakes the necessary land and transmission infrastructure development; in that case, these projects can be built and operated by either the government utilities or the private sector through competitive bidding of IPP projects or by both. Such measures can be expected to bring down the tariff. Forty per cent-40 per cent of the targeted 30 GW capacity can be implemented on the reclaimed lands along the central riverbanks and Meghna estuary.

facilities of power evacuation infrastructure (transmission lines).

The Perspective Plan of Bangladesh 2021-2041 (GED, 2020b) on the other hand has dropped a number of targets as stipulated in other policies, plans and strategies. It has dropped, for example, the target of developing coal fields at Jamal Ganj and Khalaspir by the year 2041.

Besides, projection on RE needs to be aligned with recently developed solar energy road map. The projection on RE is made only on hydro-power (1 per cent) but no mention about solar energy.

## **6. CONCLUSION**

This Study highlights the imperatives for the power sector during the 8FYP covering the periods from 2020 to 2025. These directives are beyond what has been strategised in the 8FYP document. A detailed analysis of targets and achievements during the 7FYP period reveals a number of challenges which need to be addressed during the next phase. Unless properly addressed, those challenges would likely to aggravate in the future, and hence needs to be properly addressed during the 8FYP period. The proposed doables recommended in this CPD Study have been identified based on those challenges.

The power sector will encounter a critical phase during the 8FYP period. This relates to the post-COVID-19 recovery challenges, implementation challenges of SDGs and challenges in meeting the commitments under CVF and NDC. In other words, the success in ensuring access to electricity all over the country during the last decade is embedded in new success indicators such as efficiency enhancement, cost reduction, cleaner energy-mix, demand-side management, increase of the use of non-conventional RE mix for power generation, etc.

A significant driver of the initiative will entail a rational projection on power demand for the 8FYP period and afterwards (2020–2030/2031). This needs to be carried out considering existing excess reserve capacity, possible sectoral demand in the post-COVID-19 period, likely growth of industries and enterprises during the 8FYP period and beyond. The upcoming PSMP 2021 would provide a better understanding of the demand for electricity in the coming years. An alignment of the demand projection to be made by the forthcoming PSMP with other policy documents will be highly important.

The government should ensure exclusion of the quick rental power plants and outdated and inefficient power plants from power generation cycle to reduce costs and financial burden. Government should ensure that no new power plant will be set up under the capacity payment clause. Priority should be attached to setting up new power plants involving RE.

The 8FYP should focus on SREDA by prioritising the MoPEMR's institutional structure. Strengthening RE projects' capacity should be the focus where both traditional and non-traditional RE projects should get priority in the upcoming policy document.

The incentive aspect of the power sector should focus on renewable energy-based power projects. All policy documents need to be geared to the key targets set forth on the power sector, and this should also be followed in case of the 8FYP (Annex 9). These targets are related to the demand for power, installed capacity and power generation during 2030 and energy-mix. An effective and enticing 'incentive programme' needs to be developed to encourage private investment in renewable energy-related technologies. Awareness-raising initiatives need to be undertaken towards encouraging manufacturers, local communities and local authorities to generate RE from solar energy, wind power, biomass and solid waste.

Renewable energy-related targets should be aligned with, and compatible to, newly prepared solar energy master plan. Government's stance on abandoning coal-fire based power plants (other than the three) should be specifically mentioned in all relevant policy documents including 8FYP. These documents include Perspective Plan 2041, SDG 2016-2030, PSMP 2021, Solar Energy Master Plan and ENDC 2021.

The 8FYP should highlight that the power sector would follow competitive bidding processes in the supply chain including generation, transmission and electricity distribution (Annex 8). Power sector needs to shift its paradigm from the 'emergency management' initiated in the early 2010s to 'market-led management' spanning the years 2021-2030. It needs to (a) improve transparency, accountability, efficiency and (b) reduce irregularities and corruption in the generation, transmission and distribution processes. For the sake of development in the power and energy sector, the 'Speedy Supply of Power and Energy Act' needs to be abandoned immediately.

The power and energy sector should gradually return to lead its operation under the 'public procurement act' and rules as the emergency need period appears to be over. The 8FYP should highlight a gradual shift in energy tariff setting mechanism from administered tariff towards synchronising with the market rate. In case of tariff setting, the equity issue needs to be taken into account in case of small and medium enterprises (SMEs), agriculture, low-income households, etc. As an institution, BERC needs to be independent in taking decisions. Revision of power tariff should be justified by undertaking appropriate measures (to combat) inefficiency, and in view of demand-side management and reduction of capacity payment (Annex 9).

The 8FYP should highlight appropriate mechanism to lessen the fiscal pressure, huge import payment and debt burden owing to different power sector related activities. These include subsidy, import of petroleum, LNG and coal and credit from the international market. The 8FYP should focus on reducing BPDB's operational cost by undertaking efficient cost management strategies (Annex 5). Such a major strategy should undertake measures towards effecting a low level power production cost per unit and reducing the burden of capacity payment; additionally, demand-side management should be highlighted.

Improvement in T&D of electricity should be a major focus of the power sector during the 8FYP period. A balanced development in T&D would ensure a better quality of electricity across the country. Reduction of T&D losses mainly relating to transmission should get priority. The government must take immediate steps to give full independence to the NLDC.

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## ANNEXES

**Annex 1: Experts' comments on overall strategy during the 7FYP and status of implementation and reasons of failure**

Target	Experts' comments on progress
Total power generation during the 7FYP period (FY15-FY20) was to increase by 12,584 MW, excluding captive power.	This was very ambitious due to the high projection of power demand based on economic growth; huge increase in industrial growth was eventually predicted to address the imbroglio, but to no effect. Electricity growth has been there due to the residential sector. If the target had been achieved, it would have been worse for the economy given the current capacity of power generation and financial burden of BPDB.
A major transformation was expected concerning fuel as source of power generation from domestic gas and imported liquid fuel to imported coal and LNG.	Gas shortages were compensated by oil based power plant. Coal import had also been started. LNG had not been used for power generation, It was being used for industrial purposes. A minimal portion was getting mixed for power generation. Why should we transform from fossil-to-fossil fuel based generation when can we implement renewable energy-based generation?
Reliance on gas and liquid fuel continued until FY18.	Reliance on gas and liquid fuel had been continuing. However, now is the time to plan based on RE. The 8FYP and PSMP should be properly considered how this breathing space can be well utilised. Gas is required for the economy which can be explored within the country, but oil should be phased out.
The projected share of coal shot up from only 3 per cent at the end of the Sixth Plan (FY15) to 21 per cent by the end of the Seventh Plan (FY20) and subsequently projected to 50 per cent by FY30.	This was not realised. Government decided to abandon using coal for power generation (barring 3 plants). Least cost generation sources should be targeted. The plan had been pushed back which was commendable and good for us not to achieve this goal as demand for electricity is low.
The share of nuclear power increased significantly from zero in FY15 to 8 per cent by the end of the Seventh Plan and was projected to 10 per cent by 2030.	This was not realised during the 7FYP as the commencement date has been in 2023. Once the 2nd phase was completed, 10 per cent target can be achieved by 2030. It is still in 1st phase.
First LNG-based power plant was expected to be commissioned in FY20.	No LNG based power plant had been established yet as projected.
Further increase was planned for imported power and some small increments were expected from RE (solar and wind power).	Imported electricity will feature as per plan. No success in wind. Very small success in solar. Within next 2–3 months, almost 100 MW will be added in solar when the total capacity will be increased to 150 MW (current capacity 50 MW).
The 7FYP should undertake strong efforts to make progress in areas where the Sixth Plan failed. These included reduction in electricity production cost and continued operational deficits in the power sector.	It has not been fulfilled. Operational deficit has not changed much. In general, major impact of cost reduction has not been feasible HFO and HSD based plants are responsible for cost increase; however in recent times, these fuel based plants are decreasing and so is the generation cost. Cost of HFO based electricity (5,500 MW) is Tk. 14 per unit and HSD based electricity (1,300 MW) is Tk. 176 per unit. Though diesel based plants were idle, but government had to pay the capacity charges to these plants. These were the reason towards cost increase.
	Although there has been improvement in the power sector, there has been no improvement as such in human resources.

(Annex 1 contd.)



(Annex 1 contd.)

Target	Experts' comments on progress
	Incentives in the public plants are insignificant to attract local talent to contribute.
Improving sector efficiency by sharply reducing T&D losses.	T&D loss reduction has been partially achieved.

## Annex 2: Experts' comments on mobilising independent power producers

Targets	Experts' comments on progress
Massive expansion in power generation requiring investment worth USD 24 billion (excluding 600 MW of imported power).	Projection of electricity demand considering massive industrial growth was faulty.
	Industrial growth should be calculated based on growth in demand at micro sector rather than based on economic growth.
	Economic growth due to infrastructure development generally provides the wrong picture of industrial growth and demand for electricity, since the energy requirement varies between different sectors.
	There has been over investment than the demand which is still lower than the capacity to generate.
	Despite the large investment, the large power plants are not completed in accordance with the investment.
Independent Power Producers' programme for the 7FYP was based on large and efficient power supply rather than reliance on a multitude of small-scale rental plants.	IPPs delivered output with reliability compared to that of the small rental power plants.
	Government may withdraw from the rental plants, since large plants are already in line and some of them are already completed. Rentals were resorted only to meet immediate crisis.
No new rental power plant contracts were targeted during the 7FYP and the share of rental plants to deplete progressively.	It has not been followed.
	Contracts have been renewed for the expired rental power plant.

## Annex 3: Experts' comments on power trade

Targets	Experts' comments on progress
Resorting to power trade will continue to be a major element of the electricity generation strategy for the 7FYP.	An initiative towards power trade agreement with Bhutan has been undertaken, under which activities are yet to commence.
The 7FYP will further expand trade with India and also explore hydro-power import opportunities with Nepal and Bhutan.	Import of hydro-power is a tri-lateral issue involving Bangladesh, Bhutan and Nepal, where India provides the corridor.
	Negotiation is ongoing, and activities are pending.
	India is generating hydro-power and offering Bangladesh to purchase directly from them.
The 7FYP power generation programme plans to import at least 600 MW electricity through power trade.	600 MW power trade was executed under 6FYP initiative. It was not planned under 7FYP.
	No new power trade has been initiated under 7FYP.
	However, negotiation for power trade agreement is underway.

#### Annex 4: Experts' comments on coordinating transmission and distribution programmes with power generation

Targets	Experts' comments on progress
Efforts will also continue to further reduce T&D losses from 13.03 per cent in FY15 to 12 per cent by FY20.	Single digit T&D loss is standard for the power sector which has been attained by one or two Agencies under the power division.
	Progress in terms of T&D loss is quite appreciating, but power generation and distribution cycle is questionable since load-shedding and power outage are still common in rural area
	The efficient and effective power distribution should be achieved under a good planning.
Pragmatic and worthy transmission and distribution development programmes are expected to ensure uninterrupted power distribution and achieve the target of power supply for all.	The target has been achieved but the quality of T&D intervention is an issue of concern.
	Uninterrupted power distribution is not going to be materialised unless the loss-reduction on account of T&D has been improved.
	Power is not uninterrupted and reliable yet; industries are largely based on captive power due to lack in uninterrupted supply.
Up to 2020, the last financial year of 7FYP, about 8,000 km of new transmission lines and 120,000 km distribution lines need to be constructed.	Transmission process should be opened for private investment as well since it requires huge funding.
	It has been observed that the T&D process is initiated after completing a power plant which is supposed to be initiated in accordance with the power generation plan so that every plant will be able to start its operational activities at full capacity.
	National Load Dispatch Centre (NLDC) was not made independent which was a major requirement for the power plant T&D process. Automated system in NLDCs' activities were not materialised.

#### Annex 5: Experts' comments on improving operational efficiency of generation plants and procurement process

Targets	Experts' comments on progress
Adoption and implementation of a proper O&M is of highest priority.	Government is not at all up to the mark in effecting operational efficiency of generation plants and improving procurement process.
	It has not progressed much.
	No worthwhile O&M Plan has been adopted.
	Efficiency of government has increased but major drawback remains in developing human resources.
The Government may want to consider turn-key type investments that will reduce procurement problems and ease project implementation	That has not yet been realised

#### Annex 6: Experts' comments on pricing policies and cost recovery

Targets	Experts' comments on progress
The average cost is projected to rise owing to shortage of gas and reliance on more expensive primary fuel.	The cost of primary fuel has not been increased since the growth was lower and the demand for electricity was lower as well.
	Cost is likely to decrease due to withdrawal from liquid fuel based rental plants.

(Annex 6 contd.)

(Annex 6 contd.)

Targets	Experts' comments on progress
The average cost of power generation will invariably grow from an average Tk. 6 per kWh in 2013 to Tk. 8-9 per kWh during 2014-20.	The average cost of power generation had marginally increased during the 7FYP.
	It has not been increased since the price of fossil fuel is lower in the global market as well.
	Distribution cost will increase due to large scale rural electrification. It needs more infrastructure and materials to connect rural households in the grid compared to the town where houses are adjacent to one another.

### Annex 7: Experts' comments on demand-side management

Targets	Experts' comments on progress
SREDA will be empowered to offer financial incentive schemes towards promoting the programmes to conserve power system in the range of 1,000 MW during the Seventh Plan.	This was not implemented.
A range of incentives has been proposed including preferential taxation, subsidy and low-interest financing.	Various fiscal incentives including waiver of tax, VAT, etc., have been provided to private and foreign power producers.
SREDA will implement the government's power conservation strategy.	A draft plan has been prepared to that end but progress on related activities are unknown.
In the long run, the Green Building Code will be adopted during implementation.	Green Building Code has been prepared but its implementation at individual level has been made optional.

### Annex 8: Experts' comments on electricity through renewable energy

Targets	Experts' comments on progress
RE is important to meet the demand in areas where grid supply was not possible during the 7FYP.	Solar home system had negligible growth during this period.
	Currently the progress is at a snail's pace due to prevalence of grid power distribution.
The 7FYP was to focus on two main areas of RE: solar and wind power.	In case of wind, the plan has not been developed or worked at all.
	Small scale solar based initiatives have been implemented.
	Some agreements have been signed in case of wind based power generation but the success rate under 7FYP is nil.
For the 7FYP, the Government has adopted 500 MW Solar power generation Programme apportioned between 340 MW for commercial purpose and 160 MW for social sector.	Through unsolicited bidding process, the procurement was geared to RE sector.
Commercial projects will be implemented by the private sector, while social projects will be implemented by the different ministries and agencies as a part of social responsibility of the government.	The progress in the social sector was very limited, and in commercial sector, industrial rooftop solar panel for own uses indicate some progress.
Commercial Projects refer to: (a) Solar Park (grid connected), (b) Solar Irrigation, (c) Solar Mini-grid/micro-grid and (d) Solar rooftop.	The targets have not been achieved but government is implementing in social sector; gradually investments are flowing into the commercial sector.

(Annex 8 contd.)

(Annex 8 contd.)

<p>Social Projects refer to: (a) Rural health centres, (b) Remote educational institutes, (c) Union e-Centres, (d) Remote religious establishments, (e) Off-grid railway stations and (f) Government and Semi-Government Offices in the off-grid areas.</p>	<p>Wind mapping has been done in a small scale; so is the tender and negotiation process, question of implementation thus remains inapplicable.</p>
<p>Government has a plan to generate electricity from wind power under public and private initiatives.</p>	<p>No comment provided.</p>

### Annex 9: Experts' comments on reform initiatives

Targets	Experts' comments on progress
<p>Upgrade electricity price gradually to match generation cost.</p>	<p>A Bill was placed in National Parliament in June, 2020 on allowing BPDB to revise power tariff more than once in a year.</p>
	<p>The bill was passed in the Parliament in November, 2020.</p>
<p>Strengthen BERC to be able to perform its work-agenda on licensing, energy pricing, quality of utility performance including energy efficiency, and consumer satisfaction/dispute resolution.</p>	<p>BERC has been doing this.</p>
	<p>How efficiently and fairly BERC has been regulating these issues is important issues of concern.</p>
	<p>Not well connected and the reform process is slow.</p>
<p>There is a need to revisit the PSMP to check for relevance of the generation plan in the context of realities in the primary energy sector.</p>	<p>There are differences in various policy documents regarding different targets relating to the power sector.</p>

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