Draft

Abandoning Coal in Power Generation
Government Initiatives & Way Forward

Presentation by

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1. Introduction

1. Introduction

- The Ministry of Power Energy and Mineral Resources (MoPEMR) has recently sought approval of the Prime Minister's Office to abandon use of coal in power generation
  - A total of 22 coal-based power plants (public & private) have been identified with a total generation capacity of 23,236 MW
  - These include plants which are currently under implementation, which have received LoI & NOA & which are currently under planning
  - Centre for Policy Dialogue (CPD) registers deep appreciation to the Ministry for its internal decision on abandoning coal-based power plants
- This internal position of the Ministry was shared by the Hon'ble State Minister of MoPEMR in a CPD webinar organized on 24 June, 2020
  - 'Government is reviewing its earlier stance on coal-based power generation. Coal based plants usually require huge amount of land, its efficiency level is low and it is environmentally polluting. There are alternate sources for power generation which are cleaner than coal and more efficient.' Government is planning to shift from coal-based power generation to clean energy'
  - That is a bold political statement made by the minister in a public discussion
  - A video short video clip of CPD webinar is available here: https://www.youtube.com/watch?v=yT8oB2iLG9I

1. Introduction

- The ministry's recent initiative indicates that the political statement made by the minister is going to be a major policy stance of the government on the power sector
  - CPD in the webinar has recommended that "the government should redirect its focus from fossil fuel towards clean energy and should not only abandoning coal but also should create space for renewable energy"
- However, the ministry's initiative could not be fully appreciated as it is still not targeting the clean energy based power generation by abandoning coal
  - It is important to note that the initiative of replacing coal by LNG in power generation will be just shifting from using one form of fossil-fuel to another form
  - Given the over generation capacity, there is no need to rush to select LNG as an alternate for power generation which is also environmentally polluting

1. Introduction

- It is pertinent to mention here that Bangladesh has become the President of the "Climate Vulnerable Forum (CVF)" for 2020-2022
  - Out of the 11 priority areas committed by Bangladesh, promoting renewable energy is one of the major areas of work
  - "Promoting progress towards the CVF vision on renewable energy production and access"
  - In this context, there is no scope to promote LNG–based fossil fuel power generation which will raise major criticism in Bangladesh's role as CVF President
- Present study explores the possible alternate energy options in the abandoned coal-fired power plant projects by
  - Reviewing ministry's recent position and its possible implications on future power generation, fiscal-financial issues and scopes for possible alternates
  - Examining the limitations on LNG based power generation
  - Providing evidence in favour of renewable energy based power generation in those abandoned sites

2. Recent Initiative of the MoPEMR for Abandoning Coal for Power Generation

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- The ministry has put forward a number of arguments with regard to abandoning coal and replacing those by LNG based power plants
  - Those arguments demand more detailed discussion and analysis
- Following information are used as references:
  - Based on the PSMP (2016) (final), projection of electricity generation and energy-mix for 2041 and related analysis have been prepared
  - *Electricity generation:* **2021:** 24,000 MW; **2030:** 40,000 MW; and **2041:** 60,000 MW
  - *Energy mix for 2041:* **Gas/LNG:** 35%; **Coal:** 35%; **Import/renewable:** 15%; **Nuclear:** 10% & **Oil:** 5%
  - *Coal-based power plants currently in operation:* **525 MW** (3 units of Boropukuria; using local coal); **622 MW** (unit 1 of Paira; imported coal)
  - *Coal-based power plants at different stages of implementation:* **22 units** with a total capacity of **23,236 MW** - 15 units are under public sector (18,664 MW) and 7 units are under private sector (4,572 MW)
- The most important argument made by the ministry is environmental pollution caused by emission of CO2 and other gases
  - The ministry has taken note the global voice including civil society regarding climate change led by environmental pollution
  - Bangladesh's lead role in global platform to address climatic vulnerabilities

2. Recent Initiative of the MoPEMR for Abandoning Coal for Power Generation

- Curiously, the Ministry raised the logic of LNG-based power plants as an alternative to coal-fired power plants in the country
  - *FSRU:* Two FSRU LNG power plants with a capacity of 1000 mmcfd has been established and LNG has been imported accordingly
  - *Land-based LNG plants:* Establishment of land-based power plants has been on-going
  - *Implementing projects:* A total of 10 LNG based power plants with a capacity of 12,155 MW of electricity are currently being implemented
  - *LNG is argued as cleaner:* The LNG based power plants have been considered by the ministry as environment friendly. Low price of LNG in the global market has been argued as a major argument in favour of more LNG-based power plants
- A comparative assessment has been made by the ministry between coal-based and LNG-based power plants to show the relative advantage of LNG-based power plants
  - LNG is preferred over coal in terms of per unit price of electricity, land required for electricity generation, level of efficiency and environmental damage and transportation and handling of energy

2. Recent Initiative of the MoPEMR for Abandoning Coal for Power Generation

- It is admitted that demand for electricity will be lower till 2041 than what was projected in the PSRP 2016
  - Little progress has been made in establishing private sector coal-based power plants as it is difficult to get financing for coal-based power plants
- Given the local and global contexts as well as political and social contexts, the ministry found it appropriate for reconsidering its earlier decision on coal-based power-plants
  - It has proposed for renegotiating with the sponsors/developers about establishment of power plants with alternate energy particularly LNG
- It is to be noted that the arguments made by the Ministry in favour of abandoning coal-based power plants are highly pertinent
  - In contrast, the arguments made in favour of LNG as alternate sources are weak and one-sided
- Surprisingly, no comparative assessment has been made with regard to renewable energy in replacing coal
  - Renewable energy should be the most important priority when govt. argues for clean energy, protecting environment and addressing climatic vulnerabilities
  - Global demand of the civil society is not to replace coal by another form of environmentally polluting energy
  - Globally countries have been directing towards renewable energy considering its economic benefit as well

3. CPD's Recommendations and Recent Initiatives of the MoPEMR

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- The webinar organised by CPD on 24 June, 2020 has made a number of recommendations which are pertinent to government's recent initiative
  - COVID-19 has provided an opportunity to revisit existing approaches, operations, management, cost and return of the ongoing power generation including redirecting the power sector towards clean energy by 2030 and 2041
  - Growing overcapacity and inefficiency in the power sector have been creating fiscal-financial pressure on the Power Division particularly to the BPDB which need reprioritization of investment projects
  - The Power Division needs to follow 'go-slow' policy in power generation related projects both under public and private sector given the huge amount of overcapacity currently exists
  - The power division needs to shifts its focus from generating electricity based on fossil-fuel to more by renewable energy- both under public and private sector
  - Government should negotiate with development partners and private sector about possible deferment/cancellation of the projects including those of coal-fired projects
  - A well-planned renewable energy led electricity generation through solar, wind, roof-top and other means could be a better option for the future

3. CPD's Recommendations and Recent Initiatives of the MoPEMR

- At first, clarification is needed about data and information used for this analysis
  - The data and information is inconsistent with the PSMP 2016 (final) and information shared by the BPDB on 6 September, 2020 in the website
- Data and information used for analysis needs to be matched with other official documents
  - Analysis indicated that a total of 22 coal-fired projects are currently being implemented with a generation capacity of 23,236 MW
  - The aggregate generation capacity data (23,236 MW) is not matched with disaggregated generation data (22,972 MW) (Table)
  - BPDB Data (Sept, 2020) indicated that 18 coal fired power plants (13+5) are at different phases with a generation capacity of 21,241 MW

Table: Plant-wise Disaggregated Data State on Coal-fired Power Plants

	Total no. of plants	Total generation capacity (MW)	Location of the plants	Organisations/Countries involved
Public	5	6300	Matarbari, Moheshkhali (2), Ashugonj, North Bengal	CPGCBL, PDB, APSCL,
Joint venture	10	12100	Khulna, Paira (2), Patuakhali, Matarbari, Moheshkhali (4)	India, China, Malaysia, Singapore, South Korea
Private	7	4572	Chittagong, Barisal, Munshigonj, Meghnaghat (2), Anowara Cht, Mirersarai	SSP, BECL, ODPL, OKPL, IPP

3. CPD's Recommendations and Recent Initiatives of the MoPEMR

- The projected distribution of energy-mix for 2041 does not match with what is mentioned in PSMP2016 (final) (Table)

- It is unclear how much renewable energy is considered under the new analysis till 2041
  - A share of 15% is mentioned for imported, biofuel and renewables by 2041
  - As per the current projection, imported electricity would account for 4.4% of total generation capacity of 2041
  - Does it mean that the rest 10.6% would be generated through renewable energy (i.e. 6360 MW)?
  - As per current plan, only 1520 MW electricity to be generated by renewable energy by 2037
- Even within the current plan, LNG and gas would cross the target (35%) by 2037 (25525MW; 42.5%)
- With the current initiative of abandoning coal to shifting to LNG would completely change the energy-mix in the power sector
  - From a moderately diversified to overwhelmingly dependent on single source, LNG (70%)

Table: Difference Long term Targets in Energy-mix (%)

	2041 (PSMP 2016)	2041*
Natural gas/LNG	38	35
Oil	25	5
Coal	20	35
Nuclear power	9	10
Hydro, solar, wind and others	0	15
Bio-fuels and waste	3	
Imported power	5	
Total	100	100

3. CPD's Recommendations and Recent Initiatives of the MoPEMR

- The comparative assessment of alternate energy mix made by the government has provided important information about relative advantage and disadvantage of Coal and LNG
  - It should compare solar/renewable energy along with other two options
  - Some data is misleading – unit price of LNG is presented as blended with gas; but unit price without blended with local gas would be much higher (Tk.12-21, based on a study)
  - Huge capital expenditure would be required for regasification terminals that could very soon be supplying very expensive electricity compared to renewable alternatives
  - Environmental costs of LNG are not properly reflected
  - LNG has about the same carbon emissions as coal when it takes into account fugitive methane emissions from fracked gas and the energy costs involved in liquidfication and regasification (Table)

Fossil Fuel emissions level of CO2, NOx, SO2, particulates and Hg

(Pounds per Billion Btu of Energy Input)

Pollutant	Natural Gas /LNG	Oil	Coal
Carbon Dioxide	117,000	164,000	208,000
Carbon Monoxide	40	33	208
Nitrogen Oxides	92	448	457
Sulfur Dioxide	1	1,122	2,591
Particulates	7	84	2,744
Mercury	0.000	0.007	0.016

Source: Kranzberg (2012); Originally from naturalgas.org

3. CPD's Recommendations and Recent Initiatives of the MoPEMR

- Solar is the best option in all accounts compared to that of LNG in terms of replacing coal except that of requirement of land
  - Unit price of electricity from solar-based power plants is declining (a recent contract is signed at US7.48 cent/kwh or Tk.6.28 /kwh)
  - The price of solar PV and wind is comparable to or cheaper than LNG in most major markets
  - Solar power plant requires more land compared to that of LNG based power plants (about 2.0 acre/MW vis-à-vis 0.4-0.5 acre/MW)
- Countries which expressed interest to go for joint venture for coal based power plants include India, China, Malaysia, Singapore and South Korea
  - A number of these countries have joint venture projects (either public or private) in solar energy in Bangladesh (e.g. India, China, Singapore)
  - The ministry should go for negotiation requesting those development partners to shift their resources from coal to renewable energy
- The initiatives for renewable energy is also consistent with Bangladesh's leading role in climate vulnerable forum (CVF)
  - Government has made commitment to pursue for renewable energy led initiatives across the countries including Bangladesh
  - It has committed to make 100% electricity by renewable energy
  - This will also align with local and global demand as well as voices raised by the civil society for clean energy

4. Implications of Recent Initiative in Future Power Generation Plan

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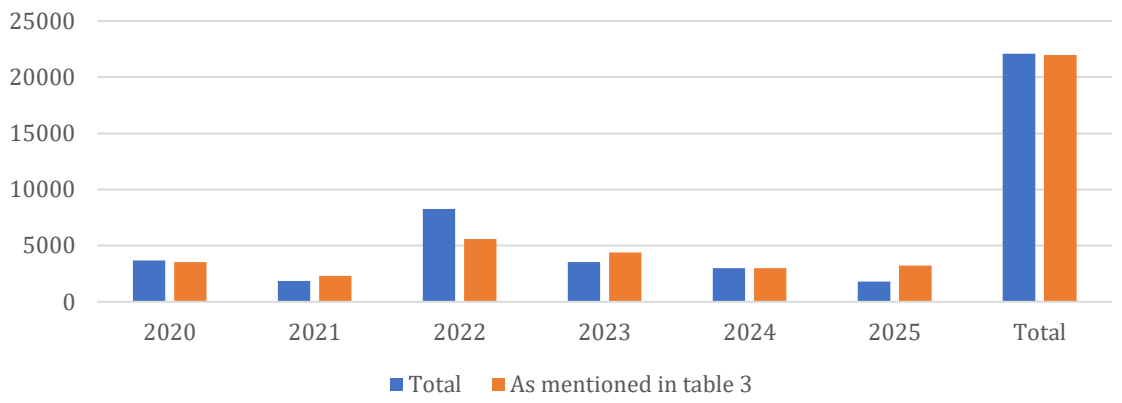
- Future power generation plan as recently published by the BPDB in the state of progress of the power sector (6 September, 2020) has not taken into account the impact of COVID on demand for electricity and generation capacity in the upcoming years
  - Over generation capacity is a major challenge though it is partly eased in recent months (38.1% in August, 2020)
  - Future probable generation portrays a maximum of 36,018 MW of electricity by 2025 when the demand is projected to be 24,952 MW
  - This would mean an over generation capacity of 11,066MW which would be 44.3%
- During 2020, a maximum demand for electricity was projected to be 14,757MW while the maximum actual consumption is reported in July, 2020 (12,536 MW)
  - Even in a normal business year 2019, maximum demand was 12,893 MW (in May, 2019)
  - A gap between electricity demand and generation of about 1,864 MW is reported in 2019. The gap has further increased during the period of COVID (2221 MW in 2020)
  - Thus, a downward revision of electricity demand will be required otherwise over generation capacity will further rise

4. Implications of Recent Initiative in Future Power Generation Plan

- The estimates of plant-wise added capacity in different years does not match with aggregate added capacity mentioned in BPDB data (Figure)
- Aggregate data indicates that a gross total of 21,977 MW would be added between 2020-2025 through new generation
  - It is also reported that a net total of 12,298 MW would be added by 2025
- This difference could only be possible if a significant number of power plants with a generation capacity of 9,798 MW are retired by 2025 (Table in next slide)
  - If QRRs are retired by 2025 it would reduce only 1,958 MW worth of electricity. Hence the rest 7,840 MW worth of electricity to be exited from other power plants
- If this does not explain the difference , then the total generation would be significantly high and the over generation capacity would be much higher as estimated

Figure: Difference between Power Generation Data



4. Implications of Recent Initiative in Future Power Generation Plan

Table: Analysis of BPDB Data: Gross vs Net Generation

	2019	2020	2021	2022	2023	2024	2025	Upto 2025
Probable maximum demand for electricity (MW)	13044	14757	16823	18731	20697	22769	24952	
Probable net generation capacity (MW)	20049	22152	23699	28595	31026	32887	36018	
Net electricity added in a year (Net)		2103	2066	1908	1966	2072	2183	12298
New electricity added by new plants in a year (Gross)		3519	2289	5586	4378	2990	3215	21977
Probable reduction of generation capacity by exiting power plants		1577	-215	6346	1565	918	-393	9798

- If the coal is abandoned, the total generation capacity would be 31,881 MW by 2025
  - As per the current projection, the reserve margin would be 27.7% in 2025 which is the sizable reserve for a country like Bangladesh (other developing countries have a reserve of 15 per cent)
  - This would not give opportunity to exit the power plants (with a capacity of 9798 MW)
  - Negative sign in some of the years' exit data is confusing.

5. Abandoning Coal-based Power Plants – Assessment of Alternate Energy Options

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- At present, a total of 18 coal-fired power plants with a total capacity of 21,241 MW which are at different stages of implementation (Table)
  - *Under implementation:* 8,359 MW
  - *LOI & NOA provided:* 1,240 MW
  - *Under process for tendering:* 0 MW
  - *Under planning:* 9,820 MW
- A total of 10 projects related to coal are currently being implemented under the ADP 21
  - *Total project cost:* Tk.42,602 crore (Table in next slide)
  - *Total spent up to FY2020:* Tk.16,951 crore
  - *Allocation for FY2021:* Tk.5,115 crore
  - *Probable rate of implementation up to June, 2021:* 33.3%-104.1%

Table: Power Generation Plants at Different Stages

	Under implementation (MW)			LOI & NOA provided (MW)			Under process for tendering (MW)			Under planning (MW)		
Energy-mix	Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
Gas	1289	0	1289	0	0	0	400	0	400	0	0	0
HFO/Gas	150	77	227	0	0	0	0	0	0	0	0	0
Gas/diesel	756	220	976	0	0	0	0	0	0	225	0	225
Diesel	162	0	162	0	0	0	0	0	0	0	0	0
HFO	150	812	962	0	0	0	0	0	0	0	0	0
LNG (inlc. HSD, gas)	880	1885	2765	0	1040	1040	0	0	0	8900	0	8900
Coal (imported)	5671	2688	8359	0	1240	1240	0	0	0	9820	0	9820
Solar (incl. wind)	7	547	554	0	505	505	0	250	250	155	0	155
Total	9065	6229	15294	0	2785	2785	400	250	650	19100	0	19100

5. Abandoning Coal-based Power Plants – Assessment of Alternate Energy Options

Table: Coal-Based Power Plants in the ADP 2021 (Lac Taka)

Project Name	Project cost	Expenditure upto June 20	Allocation FY21	Maximum Possible Completion by FY21	Remaining allocation (after FY21)	Remaining allocation (after FY20)
Land acquisition of Maheshkhali Power Hub	132465	131662	1	99.4	802	803
Matarbari 2*600 MW Ultra Super Critical Coal Fired Power Project	3598445	1292344	367000	46.1	1939101	2306101
Land Acquisition and Protection and Feasibility Study of Bangladesh-Singapore 700 MW Ultra Super Critical Coal Based Power Plant (Revised)	80351	55597	14700	87.5	10054	24754
Land Acquisition and Ancillary Activities for Establishment of CPGCBL-Sumitomo 1200 MW Ultra Super Critical Coal Based Power Plant	127008	92000	16000	85.0	19008	35008
Feasibility assessment of establishment CPGCBL- Sumitomo 1200 MW ultra super critical power plant	1851	383	500	47.7	968	1468
Land Acquisition and Land Development for Implementation of Gazaria 350 (+ - 10%) Megawatt Coal Fired Thermal Power Plant		0			0	0
Land Acquisition, Land Development and Resettlement for Implementation of Patuakhali 1320 (2*660) MW Coal Fired Thermal Power Plant	86971	56680	15000	82.4	15291	30291
Construction of road and ancillary infrastructure connecting Payra 1320 MW thermal power plant	25062	4200	8400	50.3	12462	20862
Matarbari Ultra Super Critical Coal Fired Power Project (2) PGCB Part: "Matarbari-Madunaghat 400 KV Transmission Line"	109081	53508	60000	104.1	-4427	55573

5. Abandoning Coal-based Power Plants – Assessment of Alternate Energy Options

- If the government decides to abandon coal-based power plants it would have major budgetary implications
  - *Without any allocation disbursed after June, 2020:* A total of Tk.25,650 crore could be saved of which government revenue will be saved by Tk.7,139 crore and project aid would be unspent by 18,511 crore (Table I next slide)
  - *With allocation disbursed in FY2021:* If the decision is made after the FY2021 (June, 2021), the total amount of savings would be reduced to Tk.20,535 crore of which revenue and project aid would be Tk.5,596 crore and Tk.14,939 crore.
- JICA has provided support to two coal-fired projects at present which could be renegotiated for alternate renewable power plants

5. Abandoning Coal-based Power Plants – Assessment of Alternate Energy Options

Break-down of ADP Allocation in Coal-fired Power Plants (lakh taka)

Project Name	Remaining allocation (after FY20)			Remaining allocation (after FY21)		
	Total	Revenue	Project	Total	Revenue	Project
Land acquisition of Maheshkhali Power Hub	803	803	0	802	802	0
Matarbari 2*600 MW Ultra Super Critical Coal Fired Power Project	2306101	496612	1809489	1939101	438812	1500289
Land Acquisition and Protection and Feasibility Study of Bangladesh-Singapore 700 MW Ultra Super Critical Coal Based Power Plant (Revised)	24754	24754	0	10054	10054	0
Land Acquisition and Ancillary Activities for Establishment of CPGCBL-Sumitomo 1200 MW Ultra Super Critical Coal Based Power Plant	35008	35008	0	19008	19008	0
Performing Feasibility Study for 500-600 MW LSG Based Combined Bicycle Power Plant and Construction of Gas Transmission Line	16337	16337	0	11337	11337	0
Feasibility assessment of establishment CPGCBL- Sumitomo 1200 MW ultra super critical power plant	1468	1468	0	968	968	0
Land Acquisition, Land Development and Conservation for Patuakhali 1320 MW Super Thermal Power Plant	73868	73868	0	48868	48868	0
Land Acquisition and Land Development for Implementation of Gazaria 350 (+ - 10%) Megawatt Coal Fired Thermal Power Plant	0	0	0	0	0	0
Land Acquisition, Land Development and Resettlement for Implementation of Patuakhali 1320 (2*660) MW Coal Fired Thermal Power Plant	30291	30291	0	15291	15291	0
Construction of road and ancillary infrastructure connecting Payra 1320 MW thermal power plant	20862	20862	0	12462	12462	0
Matarbari Ultra Super Critical Coal Fired Power Project (2) PGCB Part: "Matarbari-Madunaghat 400 KV Transmission Line"	55573	13966	41607	-4427	1966	-6393
Total	2565065	713969	1851096	2053464	559568	1493896

5. Abandoning Coal-based Power Plants – Assessment of Alternate Energy Options

- The saved amount could facilitate the government in different ways
  - The allocation for FY21 (Tk.5,115 crore) would help the government to reduce pressure on fiscal constraints in view of COVID-19 pandemic
  - The remaining savings would be used in the following years for alternate investments in the power sector in the post-COVID period
- Abandoning coal would help reduce import payment for coal which has been increasing in recent years (Tables)
  - The total amount of coal import during FY2019 was US$381.3 million. This amount of coal is used mainly for generating 1,320 MW worth of electricity at Payra (one 660 MW unit in operation; another 660 unit will come in operation soon)
  - Without abandoning the coal, increased generation of electricity by coal would increase import payment to as high as US$3.3 billion
- A major part of import payment for coal will be saved after abandoning the coal-based power plants

Table: Import of Coal (whether or not pulverised, non-agglomerated (excluding anthracite and bituminous coal) (HS Code:270119)

	Unit : US Dollar $
Year	Total Coal Import
2016	58188
2017	131299
2018	183948
2019	327385
Jan-Apr 2020	24576

Table: Import of Bituminous coal (whether or not pulverised, non-agglomerated) (HS: 270112) (US$ thousand)

Importers	Bangladesh
2015	7240
2016	53459
2017	78064
2018	63973
2019	53976
Unit : US Dollar thousand	
Sources: ITC calculations based on UN COMTRADE and ITC statistics.	

5. Abandoning Coal-based Power Plants – Assessment of Alternate Energy Options

- The option that have been discussed in the ministry is to convert those coal-based into LNG-based power plants
  - As per current plan, a total of 4,495 MW of LNG-based power plants will be established by 2025
  - The amount will increase to 11,645 MW by 2037 under the current plan
  - Along with gas-based power plants (24,097 MW) the combined generation capacity could reach to 40% of total generation (cross the required share of 35% by 2041)
- Import payment of LNG has been increasing and would sky-rocketed in the coming years if the additional LNG based power plants would be undertaken
  - In 2019, an amount of US$114 million has been spent for importing LNG. This would increase significantly in the coming years
  - Due to demand shortfall LNG price declined from US$3.88/MmBtu to US$1.9 in July, 2020. However, this may not be the case in the coming months as the price would rise in the coming years when demand would rise.
- An imported LNG based power plant would be a costlier option

Import of Natural gas, liquefied (HS Code 271111) ('000 US$)	
Importers	Bangladesh
2015	22
2016	6
2017	-
2018	367177
2019	114676

6. Scopes for Renewable Energy

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- Despite all the potentials, renewable energy has never got adequate attention from the ministry
- As per the latest BPDB document, about 1,482 MW renewable energy would be generated by 2025
  - And there is no plan to add renewable energy after 2025
- Overall, a total of 1,552 MW renewable energy has been targeted which will be only 2.8% of total capacity of 2041
- The data provided by BPDB does not match with that of SREDA (total generation: 2,111 MW)

Table: Renewable Energy Projects (SREDA)

	Total generation (MW)	No. of plants
Total	2111	36
Currently running	38.4	4
Implementation ongoing	615.6	11
Under planning	1257	19
Rejected from planning phase	200	2

- If the abandoned coal-based power plants have been shifted to solar power plants, those plants would generate a total amount of 4,779 MW of electricity
- Together with the existing and other renewable energy projects, a total of 6,331 MW of electricity could be generated by 2041
- This amount of electricity would increase the share of renewable energy in power generation to 10.6% by 2041
- If Bangladesh wants to make 100% RE based power generation by 2050- this amount is far behind the targets (i.e. 60000 MW as per PSMP 2016)

6. Scopes for Renewable Energy

- Renewable energy plants are currently being implemented under the Sustainable and Renewable Energy Development Authority (SREDA)
- Out of 36 projects, only 8 projects are being implemented by the government while the rest 25 projects are being implemented by the private sector (Table 1)
  - Government has less interest in investing renewable energy projects
  - Only 4 projects are currently in operation while the 11 projects are in the process of implementation and 19 projects have been at planning phase (2 projects are rejected)
- It is to be noted that a large number of projects are behind the targeted timeline for commencing their operations (Table 2)
  - *Operation year 2016:* Out of three projects none has gone in operation; two projects are still under planning and one project is rejected
  - *Operation year 2017:* Out of two projects one project is running and another one is still under planning
  - *Operation year 2018:* Out of 8 projects only one project is running,, two under implementation, four under planning and one is rejected
  - *Operation year 2019:* Out of 11 projects, only 2 project is running, six projects are being implemented and three are under planning.
  - *Operation year 2020:* Out of three project, no project is running, two project are being implemented and one project is under planning

6. Scopes for Renewable Energy

- It indicates SREDA's lack of capacity to enforce its authority to ensure timely implementation of renewable energy projects
  - Thus strengthening SREDA should get priority in this regard

Table 1: Status of implementation (Based on ownership of projects)

	2016	2017	2018	2019	2020	2021	2022	2023	Total (up to 2023)
Total	3	2	8	11	3	6	2	1	36
GoB	1	0	3	1	1	0	1	1	8
IPP	2	2	5	8	2	5	1	0	25
Development Partners	0	0	0	2	0	1	0	0	3

Table 2: Status of implementation (Based on level of implementation of projects)

	2016	2017	2018	2019	2020	2021	2022	2023	Total (up to 2023)
Total	3	2	8	11	3	6	2	1	36
Currently running	0	1	1	2	0	0	0		4
Implementation ongoing	0	0	2	6	2	1	0	0	11
Under planning	2	1	4	3	1	5	2	1	19
Rejected from planning phase	1	0	1	0	0	0	0	0	2

7. Demand Projections in the Post-COVID period and Implications for Ministry's Decision

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- It is observed that power demand has not reached to the level as it is projected in normal business situation. The situation got worsened during the period of COVID-19 when demand for power has reduced further
  - There is a gap of 15.1% even in the projected electricity demand during FY2020
  - The challenge would persist in the post-COVID period and the maximum demand as projected would not be attained
  - Without proper demand assessment, if the power generation initiatives continue the over capacity would rise further
  - Even without coal, if a 15% gap persists in maximum demand, then the over generation capacity would be as high as 50.3%
- If the coal is abandoned, the total generation capacity would be 31,881 MW by 2025 (not considering exit of any plant)
  - As per the demand projection, the reserve capacity would be 27.7% in 2025 which is the sizable reserve for a country like Bangladesh (other developing countries have a reserve of 15 per cent)
- If the demand gap in the post-COVID period is considered, the over-generation capacity would be much higher (i.e. 50.3%)

7. Demand Projections in the Post-COVID period and Implications for Ministry's Decision

- Government should not hurry for adding new generation capacity
  - The choice for energy-mix in the abandoned coal project lands should be solar and other renewable energy projects
  - This additional amount of renewable energy based power generation is not adequate to make 100% RE based by 2050
- In this context, renewable energy should get priority over any other alternate option

Total Generation Capacity 2025: With or Without Coal

	Gen. upto 2019	Added capacity (MW)						Total added capacity (upto 2025)	Total generated capacity (upto 2025)	Exit by 2025	Total net generation upto 2025 (excludes the exit plants)
		2020	2021	2022	2023	2024	2025				
New electrcity added by new plants in a year (with coal-fired pp)	20049	3680	1851	8254	3531	2990	1790	22096	42145	9798	32347
New electricity added by new plants in a year (without coal-fired pp)	20049	2398	1851	5403	1040	590	550	11832	31881	9798	22083

8. Conclusion

8. Conclusion

- The recent initiative of the Ministry of Power and Energy to abandon coal in power generation is a right move and CPD appreciates ministry's move
  - However, the alternate of the coal should not be LNG. Shifting from coal to LNG will be a move from one form of fossil-fuel to another form of fossil-fuel use which is also environmentally polluting
- Bangladesh's leadership role in the CVF would be questionable if it promotes LNG instead of renewable energy
  - Out of 11 commitments made by Bangladesh as President of CVF, promoting renewable energy is one of the important commitments
- Data related inconsistency in different official documents creates a confusion regarding demand, generation, reserve capacity and exit of power plants etc.
  - What is the total number of coal-fired power plants that are being considered- 18 or 22 or others?
  - How much generation capacity of coal fired power plants are being considered- 23,236 MW or 21,241 MW?
  - Which coal fired power plants will be retained? Will the one of two units where generation started will be considered for this abandon plan?
  - Will a total of 9,778 MW of power plants will be exit by 2025, as per calculation of BPDB data?
  - If not, then what is the total over generation capacity is likely to be 2025

8. Conclusion

- Energy-mix data presented in the analysis of the government is not matched with PSRP (2016), particularly those of renewable energy
- Strangely it was combined with imported electricity which made it difficult to understand the share for renewable energy by 2041

- LNG –based power generation is not an option rather a concern in the longer term
  - LNG is not cleaner as it is claimed; rather it emits Carbon Dioxide, Carbon Monoxide, Nitrogen Oxides, Sulfur Dioxide, Particulates, Mercury
  - LNG has about the same carbon emissions as coal when it takes into account fugitive methane emissions from fracked gas and the energy costs involved in liquidification and regasification
  - 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 in total electricity generation for 2041 (40% vs. 35%)
  - Replacing coal by LNG would fully change the energy-mix in power generation and would make it Bangladesh's power sector single source-based (LNG based) as its share would rise to 70%
  - The huge import payment for LNG (US$115 million in FY2019) would significantly rise if additional LNG-based power plants are included

8. Conclusion

- The unit price of electricity from LNG-based power plant (not blended with domestic gas) would be much higher and it would not be the cheaper option

- The Ministry should take into account the concerns of LNG-based power plants and should refrain from setting up LNG-based power plants in the sites of abandoned coal fired power plants

- Abandoning coal from power generation would be a number of relief and opportunities for the power sector
  - Environment will be saved from huge emission of Carbon Dioxide, Carbon Monoxide, Nitrogen Oxides, Sulfur Dioxide, Particulates, Mercury
  - As high as US$3 billion of import payment would be saved annually because of not setting up coal-fired power plants
  - Abandoning of 10 ongoing projects (out of 18 projects) would save public investment by a total amount of Tk.25,651 crore
  - This would save public fund by an amount of Tk.7,139 crore and project aid by an amount of Tk.18,511 crore
  - This amount of could be used for alternate power generation projects particularly for renewable energy projects

8. Conclusion

- Government should renegotiate with JICA for setting up renewable energy projects on the sites of coal-fired power plants as JICA has provided loan to two coal-fired projects
  - Similar negotiation should be made with China, Singapore, South Korea and India which had planned to set up coal-fired power projects
  - These countries should be convinced as almost all of these countries have investment (private investment) in renewable power generation in the country
- Despite all the potentials, options for setting up renewable energy based power plants did not get attention from the policy makers
  - The ministry should make a comprehensive assessment by adding renewable energy as an option and should help the PMO in taking right decision
  - Renewable energy is the most clean energy
  - It can save a huge amount of foreign currencies – after establishment of the plant, regular maintenance cost is negligible. Supply of electricity continues up to 20 years. Its efficiency level has been gradually increasing (lab tested 47% which need to be commercialized)
  - Per unit cost would be one of the cheapest (solar plant)

8. Conclusion

- If the abandoned land for coal is used for solar-based power plants, total solar energy-based power generation will reach 6,331 MW which would be 10.6% of total generation by 2041

- The Ministry should revise its proposal for alternate use of sites of coal fired power plant projects by using those for renewable energy-based power generation projects

- SREDA which is the authority in implementing renewable energy projects, could not fully deliver the targeted renewable energy projects
  - Only 4 projects are currently in operation while the 11 projects are in the process of implementation and 19 projects have been at planning phase
  - A large number of projects are behind the schedule in completion
  - Government showed lack of interest in setting up renewable energy projects under public sector

8. Conclusion

- SREDA should strengthen its capacity to deliver projects on time. BPDB will come forward to set up renewable power plants in the sites of abandoned coal-fired power plants
  - Development partners who had expressed interest/invest developing the sites would come forward to redirect their project aid for setting up renewable energy projects
- Analysis of electricity demand and plan for power generation reveals a huge over-capacity in the post-COVID period
  - A 15% gap between projected demand and actual use is observed. If this continues in the post-COVID period, then the projected demand of BPDB needs downward revision
  - Even excluding the coal-fired power plants would create an over capacity of 27.7%-50.3% which would continue in the coming years
  - Given the huge amount of over capacity, government need not require to hurry for power projects with immediate electricity demand
- Bangladesh now has the chance to get ahead of the cost curve, use its remaining domestic gas resources to stabilize the grid while it works on rapidly increasing RE deployment to provide cheap and secure power

8. Conclusion

- A fresh demand for electricity is needed projecting 2030 and 2041 considering the revised projection of long term economic growth
  - The future power generation should focus on renewable energy
  - This should applied not only in abandoned coal-fired power plants but also in other fossil-fuel based power plants which are yet to be started implementation (e.g. projects under LoI, NOA, planning phase)
- Being the leader of the CVF Bangladesh needs to set precedence in renewable energy based power generation
  - It has committed to make 100% RE based power generation by 2050
  - A huge investment is required in RE – by replacing the existing conventional fossil fuel power plants and shifting from fossil-fuel based power plants which are at planning phase
  - The new PSMP is expected to design towards that direction taking into cognizance of long term targets for 100% clean energy

Thank you.