

ENERGY AND POWER



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1. INTRODUCTION

Power and energy are prerequisites for higher economic growth, poverty reduction and social development. Access to energy has become essential to the functioning of modern economies. To alleviate poverty in the face of resource limitations and high population density, Bangladesh requires an economic growth rate of more than 7%. In order to achieve this growth rate electricity growth need to be achieved by 10%. Present government has prioritized this sector right from the election manifesto. Commercial energy in Bangladesh is dominated by natural gas, particularly in power generation. This is supplemented by imported liquid fuel; indigenous coal is yet to make any significant impact in the energy scenario. While sustained energy supply is a prerequisite for economic development, current information indicates that the existing gas reserves will be able to meet the gas demand (at 7% per annum) up to 2016 though with the present production capacity it can not meet the existing demand. As such there exists a demand and supply gap. The demand would reach to 5.6 billion cubic feet by 2025. As the current reserves (12 trillion cubic feet) would be unable to meet the increasing demand, there will a requirement of investments of over \$ 9 billion for exploration, development and transmission network expansion by 2025. The current average daily gas production is about 1970 MMCF against actual demand of 2200 MMCF resulting deficit of around 230 MMCF per day. About 3.3 billion tons of coal reserves comprising 5 deposits at depths of 118-1158 meters have been discovered so far. Out of which 4 deposits (118-509 meters) are extractable at present while one deposit may not be viable for extraction by present day's technology due to greater depth (640-1158 meters). Only one deposit (Barapukuria) has been developed and coal is being extracted mainly for one thermal power plant.

The Government of Bangladesh is putting its best efforts to develop the indigenous energy resources, which play a vital role in the socio-economic development of the country. As per election manifesto of the present government, electricity generation in the country would be 7000 MW by the year 2013, 8000 MW by 2015 and 20,000 MW by the year 2021. Meanwhile, the government has declared its vision for power sector to make the country free from load shedding beyond 2010 and to make electricity available for all by the year 2020. In order to fulfill the vision, additional 9000 MW electricity will be required to be produced within next 5 years under short, medium and long term out of which 5400 MW would be produced under private sector. Adequate transmission and distribution facilities would also be developed to get access to this electricity. Estimated total investment of 9.5 billion US \$ would be required all together for generation, transmission and distribution of power.

2. SECTOR OVERVIEW:

Table 1.A: Present Energy Scenario

SI No	Items	Status (2009)
1	Current average daily gas production	1970 MMCF
2	Current daily actual gas demand	2200 MMCF
3	Estimated coal reserve	3.3 billion tons
4	Present annual extraction	858,000 tons

Table 1.B: Present Power Scenario

SI No	Items	Status (2009)
1	Electricity Growth	5.8 % in 2009 (7.0 % Av. since 1990)
2	Total Consumer	11.5 Million
3	Transmission Line	8300 km
4	Distribution Line	2,60,000 km
5	Distribution Loss	14.6%
6	Per Capita Generation	220 kWh / annum
7	Access to Electricity	47 %
8	Present Generation Capacity (Derated) (MW)	5250
9	Present Demand (MW)	4200 ~ 5500
10	Present Available Generation (MW)	3800 ~ 4300
11	Recent Maximum Generation (MW)	4296 (Sep 18, 09)
12	Maximum Load Shedding in FY-09 (MW)	1270 (April 23, 09)

3. SECTOR REFORMS

To set out the overall framework for the improved performance of this sector, the National Energy Policy was prepared and adopted by the government in 1996. The policy, among others, provides the broad guidelines for sector reform and restructuring, corporatization, private sector participation and enabling framework for establishment of Energy Regulatory Commission. BERC has been strengthened and is now capable of discharging the activities set out in the act. The sector power and energy sector entities have been reformed with a view to unbundle

monolithic structures thereby segregating generation, transmission and distribution businesses. This unbundling has led to a clear demarcation of roles and responsibilities of the owner, operate and regulator.

3.1 Energy:

A new energy policy is being adopted to tap all indigenous sources of energy to ensure accelerated economic development and industrialization

The government has adopted various reform measures to attain energy security by 2021 such as enhanced exploration and appraisal of oil and natural gas, maximize value addition of natural gas, tariff rationalization, effective programs for energy efficiency and conservation of commercial energy, diversifying sources of energy including greater use of coal, LPG and LNG, strengthen institutional and technological capability of public sector exploration and production companies, encouraging foreign private finance, joint venture, structured loan etc.

3.2 Power:

In order to create appropriate and enabling conditions for improved public sector performance, attracting private and multilateral capital flows on a sustained basis and giving value for money to the customers, Government has undertaken a series of reform measures in power sector. To introduce competition, attract foreign direct investment and, more importantly, to increase power supply to alleviate the acute shortage, in line with the National Energy Policy the government has adopted the following policy measures:

- Private Sector Power Generation Policy of Bangladesh adopted in 1996.
- Policy Guidelines for Small Power Plants (SPP) in Private Sector in 1998
- Guidelines for Remote Area Power Supply Systems (RAPSS) in July 2007.
- Policy Guidelines for Enhancement of Private Participation in the Power Sector in 2008.
- Renewable Energy Policy of Bangladesh adopted in January 2009.

Formulation of the above policy framework implies that GoB is very keen to maximizing private sector participation and the sector has been quite successful in attracting significant private investment.

- About 40% (26,500 Mkw) of annual power generation is produced by private sector. Besides, the government has also created the environment for Public Private Partnerships projects, especially for large projects such as coal. The government wholeheartedly welcomes the international private sector to come and invest in power sector under PPP model.
- GoB is also aware of the need to restore and enhance the financial viability of the power sector. The government has given all out efforts to improve the quality of service, loss reduction and efficiency improvement. However continuous rationalization of electricity tariff is a necessity.
- Bangladesh Energy Regulatory Commission (BERC) is working on rationalizing the tariff to make it cost reflective in a gradual manner.
- Financial restructuring of the sector is under implementation. This involves necessary reconciliation of all financial balances for all entities in the sector, and will culminate in the elimination of inter-company arrears, write-downs and write-offs of certain debts, restructuring of remaining debt liabilities, revaluation of assets, and other measures.
- Efforts have been accelerated to corporatize the operating units of BPDB and ensure accountability and transparency in corporate governance and management.
- The Rural Electrification Board (REB) must also evolve and a key strategy study on REB have been launched so that REB and its member cooperatives can keep pace with the increasingly commercial and competitive sector.

4. TARGET AND ACHIEVEMENT

4.1 Energy:

Since the assumption of office by the present government, gas production has been enhanced from 1764 MMCF per day in January 2009 to 1945 MMCF per day in December 2009; this has been achieved by enhancing production from existing assets. as part of government's plan to expand gas supply network, a new distribution outlet, titled, Sundarban Gas Company Limited has been formed for the south-western region of the country. System loss in gas distribution, a major problem for the sector, has been tackled with notable success through management and monitoring. Uninterrupted liquid fuel supply for the vital Boro irrigation season was ensured. An increasing number of CNG operated vehicles has reduced dependency on imported fuel oil significantly and contributed to environmental improvement by reducing pollution. Production of

coal in the Coal Mine increased to 858,000 ton in 2008-09 from 677,000 ton compared to previous year. Coal produced from Barapukuria coal mine is largely supplied to Barapukuria thermal power plant.

Taking into consideration the past experience, the objectives and targets set out for energy sector for Sixth Five Year Plan (SFYP) 2011-2015, in line with Vision 2021, are as follows:

- i) Accelerated exploration, appraisal and development of existing and new gas fields, upgrade possible gas resources into proven reserves and balanced expansion of transmission and distribution network.
- ii) Integrated reservoir management in both public and private gas companies, and where possible, provide standby wells for supply security and reservoir data collection.
- iii) Institute administrative, financial and legal reform in Petrobangla and companies.
- iv) Reduce system loss and improve use efficiency;
- v) Improve supply security of petroleum products;
- vi) Encourage public-private partnership for LNG import and marketing.
- vii) Encourage public-private partnership in exploration and distribution of indigenous oil and gas.
- viii) Expand LPG use for domestic consumption to discourage piped gas.

Overcoming the long stalemate situation energy sector has made some improvement as shown in table-2A below:

Table 2A: Achievement in Energy Sector

Indicator	January 2009	December 2009
Gas production (MMCF)	1764	1945
Coal Production (ton)	677,000	858,000

4.2 Power:

Most of the PRS key targets (set for FY 2005- 2007) for the power sector were almost achieved. For example, target for maintaining government, autonomous and private customers' arrears no

more than 3 months receivables has been achieved. Achievement of other PRS targets are shown in Table -2B below:

Table 2B: PRS Target and Achievement in Power Sector

Indicator	Target	Achievement
Distribution loss of BPDB (%)	21	16.58
No. of consumers of REB increased (million)	1.8	1.7
Access to electricity (%)	47	45
Installed Capacity (MW)	7000	5269

5. ONGOING ACTIVITIES AND EXPANSION PLAN

5.1 Energy:

The government, acknowledging the severity of the gas crisis, has taken up an array of medium and long term plans to overcome the prevailing gas shortage. These target oriented projects (drilling of 7 appraisal/development wells, work over of 8 existing gas wells and drilling of 4 exploration wells) are expected to add about 300 mmcf/d gas to the network by 2012. A fast track program will cover part of these drilling and a major seismic survey (3100 line km). The long term plan involves drilling of 9 appraisal/development wells and a number of exploration wells in PSC blocks including new blocks under award following Offshore Bidding Round 2008. This segment of activity is expected to add 300-500 mmcf/d. There are plans to build permanent LNG terminal to import gas by 2013. Decision has also been taken to install three compressors at different points to improve supply situation of natural gas. The government is also actively seeking to strengthen cooperation in the sub-region involving India, Myanmar and Bangladesh.

5.2 Fuel diversity:

Power sector envisages an additional generation capacity of about 9,000 MW by 2015. Such level of generation will require up to 4000 mmcf gases per day. Under the current scenario, indigenous gas supply will not be able to meet these demands. This implies that diversification of energy source and modes should be an intrinsic agenda. While increased gas production and regular updating of gas resources must be carried out. Efforts to ensure regional energy security through mutual cooperation and importation should also be strengthened. At the same time, accelerated adoption of an environment friendly policy to harness coal resources is to be made a priority.

Due to gas shortage about 500-900 MW of existing capacity is lying idle. Considering the prevailing gas constraint Government has taken a number of steps to diversify the primary fuel to mitigate this problem.

- **LNG:** Preparatory works are going on to establish a Liquefied Natural Gas (LNG) terminal to import LNG, which can take advantage of the country's reasonably developed pipeline infrastructure. Options for immediate import of LNG are also being explored.
- **Coal:** Coal based large supercritical pressure steam power plant has become least-cost option for base load demand. Considering that, government has initiated to install four imported coal based mega projects within next five years.
- **Liquid Fuel:** To mitigate the demand/supply within short period, Government has considered liquid fuel based rental power plants.
- **Nuclear Power Plants:** Steps have already been taken to install Nuclear plant for future base load.

5.3 Power Generation:

Unless the new electricity generation expansion program is implemented the Demand Supply Gap would continue in the range of 1400 to 1800 MW. However, as per government's aggressive program about 9000 MW of generation capacity would be added in the next 5 years. Of this about 3500 MW is under various stages of construction and procurement process (of which 752 MW is expected to be commissioned within June ,2010) and 2250 MW power generation program is under procurement process. Under the new initiative to mitigate the demand supply gap, procurement process have started for 530 MW Rental and 820 MW public sector peaking power plant. Feasibility and procurement plan is underway for installation of remaining 5400 MW. In the new initiative Government has identified about 4000 MW to be installed on BOO basis within FY 2015

5.4 Cross-border Cooperation:

An important strategic element that GoB is initiating to address the power deficits is to exchange electricity with the neighboring countries. Recently India and Bangladesh have reached understandings on power trade. It is expected that power trade with India in the range of 250-500 MW will be possible in the next 24-months.

5.5 Renewable Energy :

Another strategic element is the use of alternative energy sources. At present it is estimated that renewable sources of power generation is about 20 MW. Besides the conventional energy, in order to promote the renewable energy the activities of Sustainable Energy Development Authority (SEDA) have been accelerated. As per approved renewable energy policy 5% of the total generation (450 MW) would be added by 2015 and 10% of the total generation (1600 MW) would be added by 2020 from renewable sources. IDCOL has supported NGOs in installation of SHSs in more than 380,000 households. Under the new initiative , BPDB is in process of installation of 100 MW Wind Power and 9-14 MW Grid connected Solar Power through PPP.

5.6 Power Transmission

Present capacity of high voltage sub-station (230 KV & 132 KV) is 16154 MVA and transmission line is 8300 ckt. km. For power evacuation from the power generation projects and reliable power transmission to the load centers, new transmission facilities would be developed such as 400 KV lines; installation of shunt compensation project, National Load Dispatch Center (NLDC) etc. are under implementation.

5.7 Power Distribution

Presently 2,60,000 km distribution line with 11.5 million consumers of 52300 villages are connected. Yet about 75 million people, mostly rural, are out of electricity. To provide reliable power to the rural area REB through PBSs has taken measures to expand distribution network. To cope up with the new generation and to attain government vision, a substantial amount of distribution lines would be constructed.

5.8. Demand Side Management (DSM)

Gas demand side management has been initiated. In addition to installing new fuel-efficient generation plants, the Government has taken various measures for DSM.

- Shop closure time has been fixed at 8 pm evening.

- Industrial holidays have been staggered over the week.
- Day Light Saving Time (DST) has been introduced to minimize peak load.
- Energy conservation program have been taken up to reduce demand in public offices such as dress code, temperature limit in A/C etc.
- “Efficient Lighting Initiatives” (ELIB) program initiated for distributing 30 million CFL bulbs
- Program has been launched to motivate people through electronic and print media for energy conservation.
- Inclusion of Solar panel has been made mandatory in the public buildings to be constructed.

6. CHALLENGES

- **Gas Exploration:** Strengthening of gas exploration program to reduce the demand supply imbalance is major challenge. High dependency on local gas needs to be reduced by gradual replacement with coal and possibly later by imported LNG. Transmission and distribution infrastructure need further expansion.
- **Coal Extraction:** Due to a complex tangle of environmental, socio-economic condition and debate on the best mining method extraction of a proven deposit of coal equivalent to more than 70 tcf gas is at halt.
- **Storage of Petroleum Products:** Petroleum refining capacity in the country has remained static for a long time due to limited storage capacity especially for diesel and jet oil.
- **Availability of Primary Fuel:** Availability of primary fuel for power generation in future is a major challenge. To reduce pressure on high gas dependency diversification of fuel is necessary. It is necessary to finalize Coal Policy immediately for domestic coal development.
- **Fuel Price:** Increasing fuel oil price is a major concern in trying to keep electricity tariff affordable to the customers. Tariff needs to be addressed for cost recovery and further investment.
- **Efficiency Improvement:** Efficiency improvement of the sector entities is essential. Generating surplus cash flow by reducing system loss and improving efficiency could be reinvested in building new facilities.

- **Financing Arrangement:** The challenges are to arrange financing for future investment. GOB is trying hard to attract private capital for installing new generation capacity on PPP/BOO basis. About 9.5 billion US\$ would be required for new generation plants including commensurate development of transmission & distribution while only generation projects will require about 7.1 billion US\$. Establishment of a LNG terminal would require another US \$ 320 million. For gas sector development an investment to the tune of approximately US \$ 7.7 billion would be required to add 20-26 tcf gas by 2025. About US \$1.5 billion would be required for transmission addition.

7. WAY FORWARD

The government is committed to realize its vision and fulfill its election pledges. Accordingly the government has taken short, medium and long term plans. Steps have been taken to enhance energy supply through introducing fuel mix and source diversity. Various steps are being taken to implement these plans which will need substantial investment in the sectors. The government on its own initiative has taken various measures to mobilize additional resources for the power and energy sector including attracting private sector investment both domestic and foreign. An energy fund is being created to finance the energy and power projects. In order to attract foreign direct investment, Road Shows were recently arranged in UK, Singapore and USA. Capacity building programs of the entities are being taken up. The entities are being run on commercial basis. Sector governance has been improved. Parliamentary Standing Committees are overseeing the activities of the sector.

Energy mix in the country may have to include energy import. Therefore sufficient incentives and safeguards would be in place before LNG business (LNG terminal and re-gas facility) and cross border pipeline to be planned under public private partnership become operational. BAPEX would be strengthened to accelerate exploration and production. Cross border pipeline and cross border trading of electricity would be implemented.

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trading of electricity would be implemented. Gas Act is at final stage and expected to be approved by the parliament very soon.

Energy and power tariff are being regularly reviewed and updated by BERC. The balance sheet of the operating companies are being restructured in accordance with the Internationally Accepted Accounting System.

The new generation plan is progressing under a supervision of a Task Group having members from BPDB, Power Cell and members from respective agencies. Implementation of Diesel based Power Plant (Rental), Furnace Oil based Power Plant (Rental), Peaking Power Plant, Coal based Power Plants, and Renewable would be constructed by forming comprehensive coordination committee. SEDA would be made functional to facilitate investment in renewable energy. Day to day progress would be monitored by a committee headed by Joint Secretary (A), Power Division and members having technical, financial, and legal experience from respective agencies. Power Cell and Hydrocarbon Unit would be strengthened and Power Sector Financial Restructuring and Recovery Plan would be implemented.

8. EXPECTATION FROM DPs

The Government is committed to realize its Vision and fulfill its election pledge to the people. Bangladesh is a proven case of secured investment in power sector. Concerted efforts and sincere cooperation from all quarters can ensure affordable and quality power supply to the people of Bangladesh. Exchange of information and experience, technical cooperation and human resource development could be spearheaded by the development partners. The anticipated role of the development partners should spread over both financial and non financial folds. Their role could encompass facilitation of private sector participation; provide assurance to the intending investors, assistance in capital mobilization and provide risk coverage guarantee as may be necessary. The development partners with their long association with the country, government and people will be in a vanguard position to advise, encourage and coax the investors who otherwise may be wary of a investment place relatively unknown to them.