

**Energy Scenario
of
Bangladesh**

2010-2011

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1.0 Introduction

Energy is the prime mover for a socio-economic development of a country. Economic Development depends on reliable energy supply. To achieve Millennium Development Goals (MDGs) and to alleviate poverty in line with Vision 2021, Bangladesh has to meet increasing energy demand. In order to ensure energy security as well as to meet the increasing energy demand, the primary energy source of the country especially gas, coal and other energy resources have been taken into consideration.

To meet energy demand at desired level, initiative has been taken to increase gas production and its optimum utilization. Steps have been taken to import LNG to meet up the increasing energy demand. Realistic policies for development of coal fields in northern part of the country are under process for national interest. Initiative has also been taken to build up regional energy security based on mutual co-operation with the neighboring countries under SAARC umbrella.

2.0 Current Position of Energy Sector

Known commercial energy resources in Bangladesh include indigenous natural gas, coal, imported oil and hydro-electricity. Biomass accounts for about 38% of the primary energy and the rest 62% is being met by commercial energy. Natural gas accounts for about 75% of the commercial energy. About 2000 million cubic feet of gas is being produced per day. Imported oil accounts for the lion's share of the rest. Every year Bangladesh imports about 3.8 million metric ton of crude and refined Petroleum Products. About 96,000 metric ton of LPG is being marketed by public and private entrepreneurs.

Total in-situ reserve of the five discovered coal fields in the north-western part of the country is about 3300 million ton. The only producing coal mine, Barapukuria coal mine, is producing about 0.8 million metric ton coal per year and major part of it is used in the Barapukuria Thermal Power Plant (2x 125 MW).

Moreover, power is also being generated by using Solar Home System (SHS) in off grid areas. In addition there are some poultry and dairy farms in which bio-gas plants are being set up and this bio-gas is used for cooking and power generation. The amount of power generation from such plants is currently about 1 MW. Steps have been taken to generate electricity by Bio-Mass Gasification Method in the country.

Estimated final consumption of total energy is around 36 MTOE. Average increase of energy consumption is about 7% per annum. Per capita consumption of energy in Bangladesh is on

an average 160 kgoe (Kilogram Oil Equivalent) and per capita generation of electricity is 250 kWh, which is lower than those of South Asian neighboring countries

Bangladesh also has a bright potential to produce electricity from wind and mini-hydro. Recently, solar power based irrigation pump has been used in a number of areas of the country. Its wide use will lessen the pressure on diesel and electricity.

3.0 Natural Gas

In Bangladesh, natural gas is the most important indigenous source of energy that accounts for about 75% of the total commercial energy demand of the country. The existing gas source is mainly used in electricity, fertilizer, industry, transport and household.

Followings are the data related to gas production:

- Total recoverable reserve (proven and probable) : 20.34 Trillion Cubic Feet (TCF)
- Total gas consumption up to June 2010 : 9.22 TCF.
- Total remaining reserve (proven and probable) : 11.12 TCF
- Daily gas production : 2000 Million Cubic Feet (MMCF).
- Daily demand of gas : 2500+ MMCF
- Daily shortage of gas supply : 500+ MMCF

To meet up the increasing gas demand, EMRD has undertaken following gas production augmentation programs to balance the demand-supply gap:

- Short Term (by June 2011) : 100 MMcfd
 - Import of LNG (by June 2012) : 500 MMcfd
 - Mid Term (by June 2013) : 585 MMcfd
 - Long Term (by December 2015) : 880 MMcfd
 - Offshore (by December 2015) : 200 MMcfd
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- Total : 2265 MMcfd

3.1 Gas Demand-Supply situation

At present 730 BCF (Billion Cubic Feet) gas is being supplied against the average annual demand of 912 BCF. As a result, there exists a shortage of 182 BCF of gas annually. According to the projections mentioned in the table, in 2014-15, total annual demand for gas will stand at 1335.0 BCF. If the present supply of 2.0 BCF per day remains unchanged then daily shortage may stand at 1.66 BCF on the basis of the projected demand. Hence, it is not possible to meet this shortage with the existing reserves. If the reserve capacity does not

enhance according to the estimation of the Gas Sector Master Plan, then after 2011 there would be huge difference between demand and supply and the present reserve may decrease to a greater extent by 2015.

3.2 Action Plan for the Gas Sector Development

Power and energy sector has been identified as the top priority sector with the aim of ensuring long term energy security of the country. In this regard, government is determined to overcome the critical situation prevailing in the gas sector to ensure the availability of energy.

As part of exploration activities, national company BAPEX has traced a gas structure assuming 2 TCF reserve in the border of Sunamganj and Netrokona district by conducting 259 line KM 2D seismic survey. The structure has been named as 'Sunetra' and steps have been taken to drill exploratory wells. Salient features of the planned policy strategy of government in over-coming the energy shortage are as follows:

3.4 Policy Strategy

- Adoption of time based action plan for discovering new gas fields
- Make BAPEX more effective in exploring oil and gas
- Speedy processing of tenders and signing agreements for offshore blocks
- Approval for importing liquefied natural gas by private sector as an alternative to natural gas and building necessary infrastructure
- Reduce the supply of natural gas to those sectors where alternative energy can be used and encourage them for using alternative energy
- Finalizing National Energy Policy and Coal policy to create opportunity for using energy from multiple sources
- Increasing financial capacity of BAPEX by forming Gas Development Fund

3.4 Action plan for exploration and increased production of Natural Gas

Energy and Mineral Resources Division (EMRD) has already undertaken an array of Short term (up to Dec 2010), mid-term (up to June 2013) and long term (up to Dec 2015) plans to increase gas production to overcome prevailing gas shortage. After implementing these plans, additional 2353 mmcf of gas per day will be added to the gas supply grid by 2015. The proven recoverable reserve is 15.03 TCF. As of June 2010, a total of 9.22 TCF of gas has already been produced leaving only 11.12 TCF under 2P (proven+ probable) category and 7.01 TCF under possible category (P₃).

Exploration activities have been strengthened to explore the new gas discovery. BAPEX, other national & International companies are carrying out the exploration activities in the onshore & offshore (shallow water) area to find out new discoveries. To explore in the deep sea, Bangladesh Offshore Bidding Round-2008 has already been carried out to explore oil

and gas in offshore area under PSC and few blocks are at a final stage for awarding to 2 (two) international oil companies.

4.0 Coal

Besides natural gas, Bangladesh has significant coal reserve. About 3300 million metric tons of Coal comprising 5 deposits at depths of 118-1158 meters has been discovered so far in the north-western part of Bangladesh. The name of these deposits are-Barapukuria, Phulbari and Dighipara coal field in Dinajpur district, Khalashpir in Rangpur district and Jamalganj in Joypurhat district. These coals can conveniently serve the energy needs of Bangladesh for 50 years. Out of which coal from 4 deposits (118-509 meters) are extractable at present. Production from Jamalganj may not be viable with present day's technology due to the depth of the deposits. Coal resources can be alternative source of fuel to natural gas.

The description of these coal deposits are narrated bellow:

It is notable that the coal of Bangladesh is considered to be high quality in terms of its high level of hit generation capacity as well as low sulphur content. Following are the chemical composition of coal from five coal fields:

5.0 Peat

The peat deposits of Bangladesh are located in the low lying areas of the alluvial plain which are generally submerged under water for a large period each year. Peat occurs in Baghia-Chanda beel under Madaripur and Gopalganj district, Kola Mouza of Khulna district, Chatal beel area of Moulavibazar district, Pagla, Dirai and Shalla area of Sunamganj district, Chorkai area of Sylhet district, Brahmanbaria Sadar upazila of Brahmanbaria district and Mukundapur area of Habiganj district. It has a carbon content of 50-60% and has a calorific value between 5500 Btu/lb and 7000 Btu/lb. The peat occurs at the surface or at shallow depths below the surface. The total peat reserve (dry peat) discovered in Bangladesh is 146.36 million ton. There is no commercial utilization of peat in Bangladesh at present. Peat can be conveniently used in the form of briquette, ovoid and compressed tablets as an alternative fuel to household work, in brick and lime industries and in small capacity thermal power plant (10 MW) in rural areas.

6.0 Liquefied Natural Gas (LNG)

To meet up the increasing gas demand as well as to reduce the dependency on imported oil, import of LNG is under process. Under mid-term plan, 500 mmcf/d of LNG will be imported by 2012. The site for building necessary infrastructure for LNG Receiving Station has been located in Kutubdia Island. Steps have been taken to set up necessary infrastructure such as LNG Receiving Station, LNG Storage Tank, and Re-gasification process. A 90 km long pipeline from Kutubdia to Anwara will also be laid to evacuate LNG to supply in the main grid.

7.0 Compressed Natural Gas (CNG)

To reduce the dependency on imported fuel significantly, to reduce environment pollution and to save foreign currency, the use of CNG vehicles was introduced in 1997. As of September 2010 -

- No. of Filling Station - 582 (Dhaka – 140)
- No. of Conversion Workshop -173 (Dhaka – 75)
- Total number of Vehicles Locally Converted into CNG -1,55,290 (Dhaka- 1,15,388)
- Total number of CNG Vehicles -1,98,146 (in Bangladesh)
- Daily Gas Used by CNG Vehicles -115.13 mmcfd

8.0 Liquefied Petroleum Gas (LPG)

It is difficult to supply gas through pipeline all over the country. Moreover, the gas resource is also limited. To reduce deforestation and save the environment from pollution, government has undertaken various steps to popularize the use of LPG. To popularize the use of LPG, government has reduced tax rate on some spare parts of LPG Bottle such as Pressure Regulator/Valve, Safety/ Relief Valve and Submerged Welding Flux.

Currently supply of LPG in the country is 95,500 Metric Ton of which local production in Public Sector is 22,500 Metric Ton and import by Private Sector is 73,000 Metric Ton. Demand of LPG is increasing day by day. The projected present demand of LPG in the country is about 2 (two) lac Metric Ton.

9.0 Petroleum Product

To meet the total demand of commercial energy, Bangladesh imports about 3.8 million metric Tons of Petroleum Product per annum of which 1.2 million metric Tons is crude oil and 2.6 million metric tons (approx) is refined petroleum products. The lone refinery, Eastern Refinery Limited (ERL), a company of Bangladesh Petroleum Corporation (BPC), is capable of processing 1.2 million metric tons of crude oil per year. Local liquid fuels in terms of condensate are also extracted from different gas fields. About 0.35 million metric ton of condensate is being recovered from gas fields per annum. Sector wise use of petroleum products are-Power 9%, Industry 4%, Transportation 36%, Domestic 16% and agriculture 20%.To keep pace with the fuel demand, feasibility study has been undertaken to increase the refining capacity of Eastern Refinery Limited up to 4 million ton through BMRE .Besides these, project for setting up of deep sea offloading facilities has also been undertaken.

10.0 Renewable Energy Sources in Bangladesh

Renewable Energy Sources may be helpful in tackling the challenges of energy security of the country and global climate change. Areas which are outside gas coverage and electric grid

connection, usage of biomass for cooking and solar power and wind for drying of different grains as well as clothes are known to all. Biomass is currently the largest renewable energy source due to its extensive noncommercial use (mainly for cooking and heating) comprising some 38 percent of total primary energy use in Bangladesh. It has huge potentiality of generating solar power. Moreover, the use of renewable energy has become popular worldwide in view of depleting reserve of non-renewable fossil fuel. Renewable energy is environment-friendly. At present, the different categories of renewable energy that are being used in limited ways in our country are as follows:

- Biomass
- Hydro-electricity
- Solar power generation using solar rays
- Wind-mill power generation using wind power

10.1 Biomass

Biomass refers to the organic materials produced from plants and animals and includes fuel woods, leaves, agricultural residues, animal dung, etc. Converting biomass into more energy efficient fuel is a means of upgrading the rural energy consumption pattern. Biogas is very suitable for cooking and lightening (Mantel/Hazak) and for running small generator to produce electricity. Presently there are about 50,000 of households and village-level biogas plants in place throughout the country. There is a real potential to harnessing basic biogas technology in rural electrification, through village-level biogas production and internal combustion (or even micro turbine) power generation.

10.2 Hydro-electricity

Only one Hydro-electric Power plant, Karnafuli Hydro-electric plant, built on Karnafuli River, is located in Kaptai. The power plant is now in operation having a capacity of 230 MW. Geography and socio-economic condition of the country may not allow bigger expansion of Hydro-electricity in Bangladesh. Possibility of installing mini and micro level hydro-electric power plant in the hilly areas of Bangladesh would be explored.

10.3 Solar Energy

Potential of solar energy is good in Bangladesh. Bangladesh is geographically located in a favourable position (within 20^o34' to 26^o38' north latitude) for harnessing sunlight, available abundantly for most of the year except for the three months June-August when it rains excessively. The amount of Solar Energy available in Bangladesh is high about 5 KWh/day per square meter, enough to meet the demand of the country. Grameen Shakti started selling Solar Home System (SHS) from 1997 on credit. The Rural Electrification Board (REB), a

government agency has been engaged in commercializing solar power electrification of domestic, commercial, irrigation in rural area. IDCOL, a government-owned entity has disseminated some SHS through its partners NGOs. Due to higher cost of its production it has to go a long way to become commercially competitive. However, in remote areas of Bangladesh it is gradually becoming popular and government has undertaken a lot of scheme to subsidize on it. Presently there are about 2,64,000 solar panels installed throughout the country. Government has planned to setup solar panel with capacity of 5~10 MW.

10.4 Wind Energy

Bangladesh is exploring the potentiality of wind power. Windmills are with capacity of 2 MW in operation in the coastal area of Bangladesh. The country has to wait for a breakthrough in the technology of wind power to be competitive against other conventional commercial energy. Government has planned to setup wind meal along the seashore with capacity of 20 MW as pilot project and after the performance of this pilot project another 200 MW power would get from wind power.

10.5 Nuclear Energy

Since 1960s, a plan has been taken to establish a nuclear power plant in the country. But no effective action had taken in the last 50 years except land selection and acquisition for the nuclear power plant. Present government, with the technical assistance of Russia, has made effective arrangement to establish a nuclear power plant with a capacity of 1,000 MW in the pre-determined location at Ruppur. In this respect, Bangladesh government has signed a framework agreement with the Russian National Nuclear Institute. It is expected that the count will be able to enter into nuclear age through the establishment of nuclear power plant by 2016. Though the country will have to face the following challenges in installing Nuclear Power Plant:

- Ensure safety of the population and environment.
- Build up the trained and efficient manpower in order to administer and maintain the nuclear plant.
- Build up awareness among general people regarding the risk and prevention of nuclear power centre.

11. On-the-job training:

On-the-job training as well as academic courses is essential for the personnel of technology-oriented in the various fields of energy sector. It would be very effective if personnel of various fields in this sector could be provided with on-the-job training as well as the academic courses on graduate/under-graduate/diploma in Earth Sciences, Petroleum Engineering,

Mining Engineering, Environmental Engineering, Management etc. in the Universities/ institutions of the UAE under technical and financial assistance program.

12.0 Conclusion

Gas production augmentation activities are under implementation. Exploration activities have been strengthened to find new Gas Fields. Some new exploration wells in various blocks in offshore area will be drilled under PSC. Discovered Coal Fields will be developed. Exploration activities have been strengthened to find new Coal fields and other Mineral Resources. Successful implementation of all these activities as well as import of LNG and petroleum products will meet up the energy demand of the country. On the other hand, successful implementation of electricity generation plant and diversification of fuel in generating electricity will meet up the increasing electricity demand of the country that will help to achieve Millennium Development Goals (MDGs) in line with Vision 2021.

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