



## Status and Reform towards Development Energy Sector of Bangladesh

**Amam Hossain Bagdadee**

Department of Energy, Asian Institute of Technology, Pathumthani, Thailand  
[amambagdadee@gmail.com](mailto:amambagdadee@gmail.com)

### ABSTRACT

Bangladesh has seen annual growth rates of around 6% for the last decade the recent international downturn has not had significant negative effects. On the contrary, an increased focus on Bangladesh as the most cost efficient production hub in Asia has been seen. Further economic growth is, however, seriously threatened by unfulfilled and growing energy needs 3.800 MW of electricity is produced. Demand is estimated at 5.500 MW and growing at ~500 MW a year 1.800 MMCFD of gas is produced. Demand is 2.300 MMCFD Government is set to undertake emergency plans to add more generation capacity each year until 2014. Focus will be on setting up new power plants, promote sustainable energy activities and increase energy efficiency large number of tenders will be floated in the coming months leaving ample business opportunities for Danish investors and technology providers within the energy sector.

**Key words:** Energy efficiency, energy market, sustainable energy electricity produce

### INTRODUCTION

Bangladesh power in the electricity sector, the Ministry of Energy and Mineral Resources, it is a business unit of power which has the overall authority of the electricity sector, is responsible for running the MPEMR arm configured. Energy cells to control the development of the electricity sector, including the implementation of energy cells limit liability reform, including renewable energy, - it is to adjust the implementation of RE by NGOs and actress, supporting personal. People's Republic of Bangladesh is, 20 ° 34 'and 26 ° 38' N and longitude 88 ° 01 'and 92 ° 41' E. country, east, and contact with the West India and the border, which is located in Southeast Asia between latitudes should you with the Bay of Bengal in the north and south. There is also a small strip of Myanmar and the border. Land is a delta plain of many rivers and canals network. The total area of the country is 147 570 square kilometres of which approximately 17% was forest. I have been in the northeast of the small number of hills and south-eastern states. 6 seasons 3, namely winter, summer and rainy seasons, more significantly, but this year, Bangladesh, has a subtropical monsoon climate generally. Winter starts in November and ends in February. In winter, too much variation in the temperature range of at least 7 ° -13 ° C to the best of 24 ° C ~ 31 ° C, no. In some places, who was appointed to from time to time 41 ° C (105 ° F or more), the maximum temperature recorded during the summer is 37 ° C. The rainy season begins in July, which lasted until October. This period, which accounted for 80% of total rainfall? Annual rainfall average varies 1429-4338 mm.

### ENERGY INFORMATION OF BANGLADESH

Energy consumption per capita of Bangladesh is very low. The value of the energy consumption of 2008 was approximately 250 kg OE compared to the world average in 1680 kg OE. Total primary energy consumption of 2008 has been estimated as the mix of energy consumption and was one million tons 33.50 oil equivalent: in indigenous biomass 62%, natural gas 25% of the original, 12% of oil imports, imported coal and hydropower I combine to 1%. In rural areas, two thirds of the country's population level from traditional biomass fuel (domestic commercial, industrial) meets most of their energy demand. A variety of marketing company under the nationwide kerosene and diesel distribution Bangladesh Petroleum Corporation (BPC) in a uniform tariff rate the government has set. Frequent power outages, voltage fluctuations and supply reliability is low, unstable: while only 22% of the very poor quality of service of power supply in rural areas in rural areas, about 32%, access to electricity the I have. Biomass, currently, the only non-renewable native total primary energy consumption of Bangladesh of energy source, has been a major contribution to about 60% of the gas .Natural, which is produced continuously, since 1970 was consumed in significant amount of gas, the main source commercial energy plays an important role

in Bangladesh's economic growth. The main consumer of gas, respectively accounted for 46.65 percent and 21.71 percent, (using the gas as a raw material) power and fertilizer in the department.

#### FOSSIL FUEL

**Natural Gas:** Bangladesh gas sector started its journey in the 1960s, but its rapid expansion and integration and integration started to accelerate in the early 1970s spurred by the rising oil prices. Until now, 24 gas fields have been discovered. Natural gas fills about 75% of the total fuel consumption of the country. The oil and natural gas market is primarily operated by the Bangladesh Oil, Gas and Mineral Corporation which holds the shares of all state-owned companies involved in oil and gas production and exploration, and the Bangladesh Petroleum Corporation, responsible for the refining, distribution and import of crude oil and petroleum products. Because of the increasing demand of gas, the exploration of new gas field and the development of the discovered gas fields are very important. During the financial year 2011-12, a total of 29 projects are being implemented by Petro Bangla and its companies in the oil, gas and mineral sector.

**Coal:** According to the present development data, the coal fields in Bangladesh are divided into five coal fields, all of which occur in the northwestern area that is sandwiched between the Jamuna River and the Padoma River in northwestern Bangladesh. At present, foreign companies, including Indian and South Korean companies, are aggressively engaged in coal development in the country. In particular, since Godwin coal is a kind coke of good quality with limited global availability, it has drawn much attention from concerned parties in many parts of the world.

**Electricity:** The Bangladesh Power Development Board (BPDB, [www.bpdb.gov.bd](http://www.bpdb.gov.bd)) was created in 1972, a public sector organization. The Rural Electrification Board (REB) was established in 1977, as the semi-autonomous government agency. As Dhaka grew in population and became a metropolitan city, the need for its own electricity grid, led to the creation of the Dhaka Electric Supply Authority (DESA) in 1991. It was implemented to operate and develop the distribution system and bring improvements in customer service, revenue collection and lessen the administrative burden of BPDB. The Dhaka Power Distribution Company Ltd. (DPDCL, [www.dpdc.org.bd](http://www.dpdc.org.bd)) took over DESA activities in 2008 as part of an overall power sector reform, to unite the energy system, and produce a more competitive, reliable and efficient system. The Power Grid Company of Bangladesh (PGCB, [www.pgcb.org.bd](http://www.pgcb.org.bd)) was created in 1996 to own, operate and expand the national power grid. In 2003, PGCB completed the takeover and began the operation all the transmission assets of BPDB and DESA. The PGCB is a public limited company, and is 76.25 % owned by BPDB, the remaining 23.75% is owned by the general public. The creation of the Dhaka Electric Supply Company (DESCO, [www.desco.org.bd](http://www.desco.org.bd)) was also part of the reforms. It is a public sector company, and a subsidiary of DESA. However, in the future, its shares will be offered to other power sector entities and the general public. The REB has 70 operating rural electric cooperatives called Palli Bidyuit Samity (PBS). These cover more than 90% of the area for rural electrification. These cooperatives bring service to approximately 7,200,000 new connections, and are constructing more than 14,000 km of new transmission and distribution lines each year.

#### RENEWABLE

Low income developing countries like Bangladesh are very much susceptible to the setbacks arising from the on-going energy crisis. Natural gas lies at the heart of the country's energy usage, accounting for around 72% of the total commercial energy consumption and 81.72% of the total electricity generated. Such an overwhelming dependence on bio fuel has brought into focus the substantial amount of renewable energy resources available in the country. The potential non-exhaustive sources of energies, available in the form solar, biomass, biogas, hydropower and wind, can be harnessed to provide an environmentally sustainable energy security, as well as affordable power supply to the off-grid rural areas of the country. To this end, effective utilization of renewable energy resources has been adopted as a policy of the Government of Bangladesh (GOB). Different government, semi - government and non-government organizations (NGOs) have been working separately or jointly to disseminate renewable energy technologies (RET) throughout the country over a significant period. At present, the different categories of renewable energy that are being used in limited ways in Bangladesh are solar, wind, hydro, waste bio-gas, and biomass gasification.

**Hydroelectricity:** The Karnafuly Hydro Power Station is the only hydropower plant in the country with a capacity of 230 MW. It is operated by BPDB (Bangladesh Power Development Board). BPDB is considering increasing production up to 330MW.

**Biomass:** Bangladesh is an agricultural country so biomass is available in huge amount. Cattle dung, agricultural residue, poultry dropping, water hyacinth, rice husk etc. used for biomass power generation are available in Bangladesh.

**Biogas:** Biogas production plays an important role in Bangladesh since the necessary resources are plentiful. The Government along with several NGOs is working together for development of power production from Biogas. Grameen Shakti is one of the most uttered NGO in field of biogas and has completed several works.

**Solar Energy:** Infrastructure Development Company limited (IDCOL) has supported NGOs in installing solar home systems (SHSs), a total of 1,320,965 SHSs having capacity of approximately 36.5 MW have been installed up to February 2012.

**Wind:** Bangladesh is in the midst of a severe energy and power supply crisis, one of the worst in South Asia. However, the government is now looking to explore the potential of wind energy, particularly along the country's 724 km long coastline. Wind energy can potentially generate more than 2000 megawatts of electricity in the coastal regions. The growth of wind energy in the underdeveloped, coastal areas of the country holds hope for poor, isolated communities that are not connected to the national electricity grid and who are also unlikely to receive grid connection in the near future due to the high cost of establishing infrastructure, and growing scarcity of traditional energy inputs. The Bangladesh Power Development Board has estimated that wind energy can contribute to 10% of the energy needs of the country. The Board has also calculated the cost to generate one kWh from wind energy to be about half the cost of generating an equivalent unit of power from solar energy. The expansion of the potential of wind energy will be crucial in order for Bangladesh to achieve its national vision of providing electricity to all of its population by 2020.

### ENERGY FRAMEWORK OF BANGLADESH

Development of the energy sector has been prioritized via the Five-Year Development Plans of Bangladesh. Development of the energy sector appears to be a major constraint for continued development of the nation. The objectives and targets set out for the energy sector for the Sixth Five Year Plan (SFYP) 2011-2015, in line with the Vision 2021 a national development plan, are as follows:

1. Accelerated exploration, appraisal and development of existing and new gas fields, the upgrade of possible gas resources into proven reserves, and balanced expansion of the transmission and distribution network,
2. Integrated reservoir management in both public and private gas companies, and where possible, the provision of standby wells for supply security and reservoir data collection,
3. Institute administrative, financial and legal reform in Petro-bangla and companies,
4. Reduce system losses and improve energy use efficiency,
5. Improve the supply security of petroleum products,
6. Encourage public-private partnerships for LNG import and marketing,
7. Encourage public-private partnerships in the exploration and distribution of indigenous oil and gas,
8. Expand LPG use for domestic consumption to discourage piped gas

### National Energy Policy (NEP)

To set out the overall framework for the improved performance of this sector, the National Energy Policy (NEP) was prepared and adopted by the government in 1996. To introduce competition, attract foreign direct investment and, more importantly, to increase power supply to alleviate the acute shortage, in line with the NEP, the government has adopted the following policy measures:

- The Private Sector Power Generation Policy of Bangladesh, adopted in 1996,
- Policy Guidelines for Small Power Plants (SPP) in the 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,

The Renewable Energy Policy of Bangladesh, adopted in January 2009. This policy has the following objectives:

1. To harness the potential of renewable energy resources and the dissemination of RETs in rural and urban areas,
2. To enable, encourage and facilitate public and private sector investment in RE projects,
3. To develop sustainable energy supplies to substitute indigenous non-renewable energy supplies,
4. To scale up the contribution of RE to electricity production,
5. To facilitate the use of renewable energy at every level of energy usage,
6. To promote development of local technology in the field of RE,
7. To promote clean energy for the clean development mechanism (CDM).

The Ministry of Environment and Forests Government of the People's Republic of Bangladesh in 2008 released the Bangladesh Climate Change Strategy and Action Plan, which will be the main basis of the Bangladesh government's efforts to combat climate change over the next ten years. Government of Bangladesh unveiled a Power and Energy mega-plan in the recent budget of FY2011–2012 to generate additional 11,698MW of electricity by 2015. In this plan, a 5-year power generation and investment roadmap is designed to stimulate both public and private investments for power generation to accelerate the GDP growth in the country.

### GAS & ELECTRICITY CONSTAINS ARE MAJOR CHALANES FOR FUTURE GROWTH

Close to 50% of population do not have access to gas and electricity Per capita power generation is ~183 Kwh and it is among the lowest in the world. Energy intensity (kgoe/US\$) is only 0,29 – e.g. less than half of India Despite high

growth rates only 80 MW has been added to the power grid over the last 7 years. Today 3.800 MW is produced, while demand is soaring around 5.500 MW and growing at ~500 MW a year. 1.800 MMCFD of gas is produced. Demand is 2.300 MMCFD

### **Government Plans Billion USD Energy Investment to Mitigate Challenges**

Government of Bangladesh has announced the following projects to be undertaken in the next few years

- Combined cycle power plants of aggregated capacity of 1.125 MW
- Peak power plants of capacity of 100 MW each
- Coal based steam plant with total capacity of 2.000-2.600 MW
- Renewable energy based power plants of capacity of 110 MW (including one 100 MW wind park)
- One LNG terminal with 3.5 millions tones capacity
- Further off shore gas exploration and extraction

A prequalification notice for a 300-450 MW dual fuel combined cycle powered power plant was released end of January 2010. At least another two prequalification notices are expected to be initiated first half of 2010 together with prequalification on the LNG terminal and the wind park.

### **Regulatory Barrier**

A well-functioning institutional context for the implementation of RETs would entail the removal of the following barriers. Firstly, there is a lack of financial incentives to encourage private sector investments in RE, market-oriented implementation, and use. Most of the programs in Bangladesh are government and/or donor-funded, and focus on research and development, rather than product commercialization. Secondly, there is a lack of standardized power purchase agreements for power generation from RETs (due to unfavorable utility regulations for RE development). Thirdly, RE is dealt with by various ministries, agencies, and institutions. Establishing a good coordination between them is a necessity. Fourthly, the process for project approval is lengthy and difficult. Finally, many RET implementation activities are dependent on national budgets, which creates uncertainties and time delays. Related to this, the government budgets for renewable energy projects are limited, whereas demand for financing various national priorities (health, education, disaster management, etc.) is high.

## **DEVELOPMENT ENERGY SECTOT**

### **Also Significant Market Potential Exist in Renewable**

Focus on renewable energy is gaining momentum. Not at least due to many donors interested in supporting this form of energy production Government has taken a number of initiatives to promote sustainable energy by awarding foreign investors and technology suppliers tax holiday and incentives like prioritized access to loans and soft loans, land and other resources Government vision is to have 5% of the country's power supply generated by sun, wind, biomass and biogas by 2015 and 10% by 2020.

### **Solar Energy has Momentum and Attract lots of Publicity**

Solar energy is the most explored option amongst the renewable energy options More than 450.000 solar home systems have been installed in the country. System #1 million is expected to be installed by 2012. A number of pilot projects on solar grid power are running successfully. The first private sector initiatives to run irrigation system and telecom base stations by solar power have been implemented - and market potential is large - more than 1,2 million irrigation pumps exists of which 85% are diesel driven consuming 800.000 tons of diesel annually. Government has in principal decided to install solar power units in all public and semi public offices. Installation has taken place at the Prime Minister's office and at Bangladesh Bank. All new buildings will also be asked to prepare for solar power installation Plans for tendering four solar power projects with generation capacity of 10 MW are under development Solar power equipment can be made locally. Only the panels are imported. Government has hopes that solar panel manufacturing/ assembling will soon take place in Bangladesh - and government seems ready to support with climate funds, land areas etc.

### **Wind Production has Potential and a 100MW Tender is Coming up, but Wind Data is Unreliable**

Wind is one of the least explored energy forms Country wide wind studies in heights up to 6 meters have been carried out and indicate that onshore wind speed is too slow (3.5-4.5 m/s) to posse's significant commercial potential for wind energy. The wind season is further more reduced to 3-4 months a year Off shore wind parks could, however, be feasible, but no high altitude wind studies have been undertaken at this point of time Nonetheless has government identified an offshore wind park area and will float a tender in first half of 2010 to start development of a 100 MW wind park two pilot projects have been running over the last few years. Both are based on Chinese technology. A number of technical issues and management problems have led to disappointing results with the small scale parks either not running or running at much reduced capacity.

### **Biogas and Biomass is well known Technologies – But not in an Industrial Scale**

Biogas is believed to hold significant potential in Bangladesh. NGOs have strongly promoted small scale systems, and installation of more than 10,000 domestic biogas plants has already taken place. Very limited experience with large scale biogas systems exists. Only two minor pilot projects supported by IDCOL have been initiated – both generating 200- 300 KW electricity using poultry litter. However, studies indicated that up to 800 MW of electricity could be produced in Bangladesh using organic city waste and poultry litter and 12 gasification-based biogas plants equivalent to 5 MW capacity are now being considered/planned by donor financed IDCOL. More than 15,000 tons of waste is produced in Bangladesh each day. 70-80% is organic and only a fraction is being recycled. In 2025 it is expected that 47,000 tons of waste will be produced in Bangladesh each day. Another significant raw material for biomass production is rice husk from the thousands of rice mills. Studies show that up to 400 MW of electricity could be produced from using rice husk alone.

### **Bangladesh is also rich on coal – but Extraction in Limbo**

Coal fields are identified in Bangladesh. Known reserves and resources are around 2,700 million tons. The country still awaits the adoption of a national coal policy before any coal extraction will take place. Major political debate takes place over extraction methods etc. One coal-fired power plant exists, but it is only running at half of its installed capacity (250MW). Bangladesh Coal Power Company is under formation. The company has mandate to facilitate setting up four coal-fired power plants to generate 2,000 MW of electricity. Plants will be setup under PPP where government will only hold a fraction of shares for offering land and infrastructure. The four plants are expected to cost US\$3b and will be running on imported coal until coal extractions starts in Bangladesh.

### **Energy Efficiency and Major Concerns-with Room for Improvement**

99% power plants exist in Bangladesh. Their average age is around 20 years and very little updating has taken place. A study has shown that 7,090 MMCFD was used to generate 480 Gwh at two local plants. A modern plant would produce almost twice as much output (around 880 Gwh) using the same input! System loss is estimated at 7%, while distribution losses are estimated at 14.5% (excl. bulk). On top of this comes theft and bypassing of meter. Limited focus and resources have been given to energy efficiency solutions – mostly because technologies are not in place. Industries – like the textile industry which only gets 60% of the needed power – are increasingly turning their attention to energy saving initiatives to be able to sustain their business.

## **CONCLUSION**

In the globalized world, local actions are always influenced by Global Essence. To harness the benefit of Reform in the energy sector, Reform should consider ground reality. Comparative advantages of regional resources should be utilized in a win-win manner where regional cooperation can flourish. Effective and modern energy market will promote energy security & economic stability to the benefit of all Developing countries. Teeming millions in South Asia are looking for their better future through regional cooperation. This paper also discussed some of the barriers or problems facing in energy sector. However, several barriers, which may vary across countries, impede the penetration of renewable energy techniques into developing countries. These barriers need to be identified and overcome before this potential can be realized. As discussed in this paper, appropriate integration of energy technologies is important not only for sustainable development of the country but it is also the responsibility of Bangladesh to contribute to the global common task of protecting the environment from pollution.

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