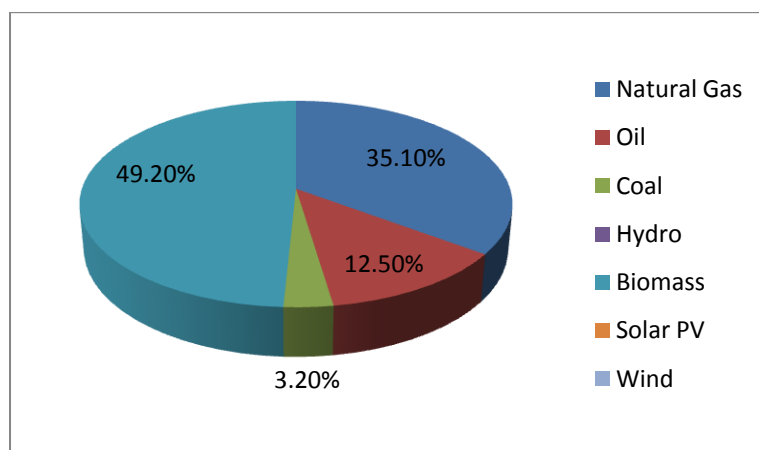


Introducing Socio-Environmental Management Policy Guidelines for the financing of Electric Power Projects in Bangladesh.

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1. Introduction:

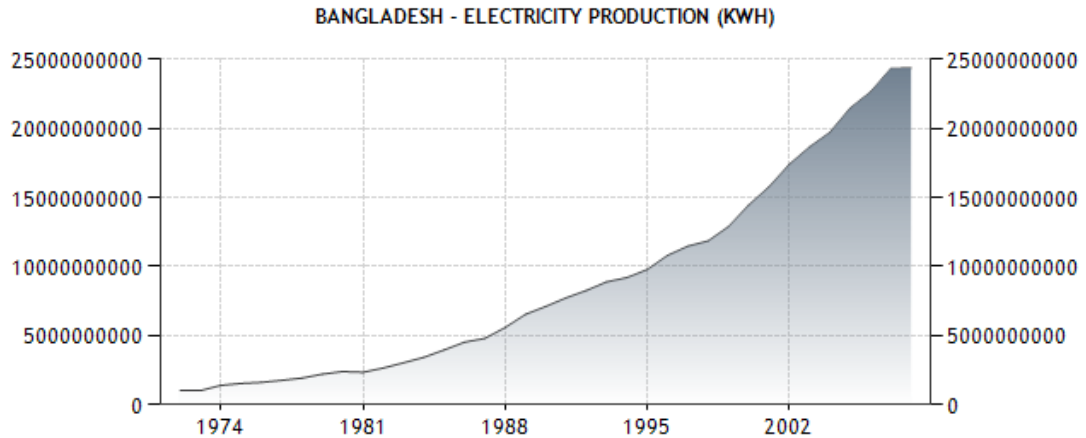
The energy related infrastructures in Bangladesh is quite small and insufficient, which is also not well managed by anybody concerned. Even up to last decade the energy was not the prime priority sector for the government. The per capita energy consumption in Bangladesh is 163kg which is one of the lowest amounts in the world (*World Bank, 2010*). Still today half of the country's total energy consumption is dependent on wood, animal waste, crop residue, leaves and some other noncommercial energy sources. As of following chart biomass is the dominant as primary energy consumption source followed by natural gas, oil, coal etc. (*Tamim et.al. 2005*).



Historically ancient Dhaka, the capital city of Bangladesh started using of electricity from 1901 introduced by the then Nawab of Dhaka. Later from 1933 commercially the residents of Dhaka city started using electricity (*DPDC 2011*). After the liberation of Bangladesh electricity became popular as energy source for living and industrial purposes which created huge demand of electricity.

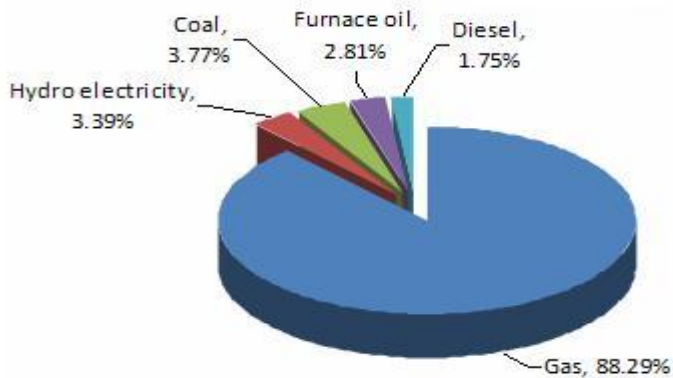
1.1 Background of the Study:

Electricity is the major source of power for country's most of the economic activities. Bangladesh's electric generation capacity was around 5.5 GW in February 2011;. Only 47% of the population has access to electricity (*BPDB 2011*). Following figure will show the electricity production trends after the liberation of Bangladesh in 1971



Source: TradingEconomics.com

Bangladesh is not much rich in natural resources. It has very small stock of oil and coal so far but has wide reserve of natural gas. Therefore, most of the electric power plants are established using the natural gas as raw material which is more than 88%. From following figure we can see the raw materials that are using to generate at this moment in Bangladesh (MoF 2010).



Due to the increasing huge demands Government has planned to add 5000MW electricity in the national grid within 2013. Basically as gas reserve is depleting authority is now switching to furnace oil and coal fired plants rather than gas fired. It is obvious that this will require huge budget and government is unable to accommodate this, so they invited private to come forward to resolve the crisis. Most of the private farms would go as public private partnership (PPP) basis.

1.2 Objectives of the Study:

Thanks to government initiatives of facing the challenge of power a significant numbers of small and medium power plants are established in last couple of years by the private sector including on PPP basis. As these power plants are very crucial for the emerging economy of the country but not free from significant social and environmental impacts which were not seriously addressed leaving necessary to establish a mechanism to determine and assess future potential environmental and social impacts of electric power projects. It is very difficult for the lone Government's environmental agency to monitor and evaluate the socio-

environmental impacts of these electric power projects due to the lack of proper laws and guidelines, expertise, man power, corruption etc. Again, most of these projects will be financed by the banks or other financial institutions (FIs), so it would be meaningful to do these socio-environmental impact assessments by these FIs under the regulations, guidance and supervision of Central Bank of Bangladesh.

The research is opted to focus on the following issues:

1. To frame out a Social and Environmental Management policy guidelines for FIs to finance electric power projects consistent with Bangladesh Environmental and Social Assessment laws.
2. Apart from possible environmental impacts, the social impacts including land acquisition and involuntary resettlement issues are also considered.

2. Methodology:

This descriptive study is carrying out by reviewing the existing social and environmental laws of Bangladesh. The related literatures those are already published in country and worldwide. Consultation with the stakeholders and by analysis of the gathered information.

3. Discussion:

Bangladesh is one of the least Carbon-Di-Oxide (CO₂) emitting countries. The per capita carbon emission is only 300kg in 2006-07(*World Bank 2010*). However, Bangladesh is trying to better environmental management by keeping the uptrend of economic activities. The World Bank has estimated that Bangladesh loses around \$1 billion per year due to power outages and unreliable energy supplies.

3.1 Environmental Impact Assessment (EIA): EIA will be done by the project entity before starting of the project which has to be cleared by the Governmental Environmental Agency. This EIA should be prepared by the third party recognized environmental consultant.

3.2 Environmental Management Plan (EMP): An Environmental Management Plan, a part of Environment Management Guidelines basically is an implementation plan for mitigation, protection and/or enhancement measures, which were already recommended in the EIA submitted by the project entity. It details:

- (a) The measures to be taken during the implementation and operation of a project to eliminate or offset adverse environmental impacts, or to reduce them to an acceptable level.
- (b) The actions needed to implement these measures.

3.3 Major Social and Environmental Concerns: The major environmental and social impacts could be triggered due to implementation of electric power projects would be as follows:

- Change of land use pattern;
- Involuntary resettlement issues;
- Surface and ground water;
- Ambient and indoor air pollution;

- Land degradation;
- Forest management issues; and
- Fisheries management issues etc.

Apart from the wider social and environmental effects by fossil fuel burnt electric power generation, The biggest effect of fossil fuel plants have overall is the emission of air pollutants, particularly SO_x, NO_x , CO, CO₂ , and hydrocarbons. Carbon monoxide, CO, carbon dioxide, CO₂, and the hydrocarbons are the "greenhouse gases," believed to be responsible for global warming. SO_x and NO_x produce acid when released into the atmosphere, leading to the production of acid rain. Following table list approximate amounts of airborne pollutants produced. Generally, air emissions are controlled by the use of scrubbers and precipitators located at the plant. (*Energy Foundation, 2007*).

Power Plant Emissions (g/kWh)

Plant Type	CO	NO_x	SO₂	CO₂
Coal	0.11	3.54	9.26	1090
Oil	0.19	2.02	5.08	781
Gas	0.20	2.32	0.004	490

Apart from these emissions, the noise and vibrations of the plants are also to be considered. Other than these the heat that will released from the plant also need to be cooled down. These emissions can be controlled by taking different measures.

3.4 Mitigation measures: Adequate mitigation measures have to taken in different stages of project life cycle like design stage, construction stage and operation stage. The pollution level would be different in every stage. Some major impacts and mitigation measures are as follows:

Air Quality

Bangladesh is predominantly dry country which starts huge dust during construction phase, so it would be better to start construction in rainy season, of course it will depend upon the soil properties. In operation stage the burning of fossil fuel will triggered the ambient air pollution by generation of GHG gases and particulate matters which has to be controlled and kept in acceptable level.

Water Quality

Surrounding surface water and ground water could be polluted both in construction stage and operational stages. So adequate measures need to be taken to keep the water quality in acceptable level. The water should not be released to open stream or river without being treated as it also may hamper the fisheries and crop production.

Ecology and Biodiversity:

The construction and operation of electric power plant may have significant impact on surrounding ecology and biodiversity even in generation of green energy like hydro and solar energy.

Waste Water Treatment and Solid waste:

The waste water and solid waste that would generate from the establishment of electric power plant should be treated. The waste water could be treated for reuse within the plant and it has to be maintaining the standard of the country before releasing to the natural ways. Solid waste materials should be separated at a designated point within the plant prior to disposal in approved local authority waste disposal sites.

Domestic CDM

The electric power plant that will burnt fossil fuel must emit carbon-di-oxide which will increase the global warming potentials of the country though Bangladesh is one of the least CO₂ emitting countries in the world. So, if domestic CDM can be introduced, the power plant's emitted CO₂ could be purchased by the emission permitting agency

3.5 Institutional and Legal Framework: Environmental management in Bangladesh is regulated by following laws, rules and regulation and 'Department of Environment'(DoE) is the Governmental agency to look after these issues:

- National Environmental Policy, 1992
- National Environmental Management Action Plan, 1995
- Environmental Conservation Act and Rules, 1995
- National Conservation Strategy, 1992
- National Water Policy, 2000
- National Water Management Plan, 2001

4. Conclusion:

Bangladesh is a small and densely populated country, however very promising in recent economic growth. The energy source and use always play an important role in potential economic activities. In this sense, Bangladesh is very low energy consuming country and facing a huge shortage of energy. If they can improve their energy production and use will be very helpful for better economic development. So Government is going for establishment of huge electric power projects, which are not free from adverse social and environmental impacts that have to be seriously addressed. This became very difficult for the Governmental agency alone, so in this study we proposed for separate socio-environmental policies for financial institutions that will finance for establishment of electric power projects in private sector. However, this different approach must be consistent with the all laws and regulation of Bangladesh Government and will be flexible for further better modifications. We hope this initiative will help address the adverse social and environmental impacts during the whole life cycle of a project. From the view point of Central Bank these guidelines might increase the potentiality of the FIs to finance this type of projects.

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