

Electricity Scenario in Bangladesh

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Author

K. M. Mustafizur Rahman

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For orders and request please contact:

Unnayan Onneshan-The Innovators

House: 16/2, Indira Road, Farmgate

Dhaka-1205, Bangladesh.

Tell: + (880-2) 8158274, 9106 36

Fax: + (880-2) 8159135

E-mail: info@unnayan.org

Web: www.unnayan.org

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EXECUTIVE SUMMARY

Electricity, the most usable form of energy, is one of the most important issues for the economic development of a country. The projection of demand for electricity is an integral part of the planning process as it enables the decisions-makers on the regarding matter. This study investigates the possible pattern of electricity scenario in the near future.

Installed Capacity and Maximum Generation

The total installed capacity was 4005 MW in FY 2000-01 which has increased to 6685 MW in FY 2010-11 (13 June, 2011) with an annual increasing rate of 6.62 percent. However, the maximum generation was 3033 MW in FY 2000-01 which has increased to 4699 MW in FY 2010-11 (13 June, 2011) with an annual increasing rate of 5.49 percent. The annual increasing rate of maximum generation (5.49 percent) is lower than that of the installed capacity (6.62 percent) between the FY 2000-01 and 2010-2011. The installed capacity as well as the maximum generation has increased with a decreasing rate as compared to the FY 2002-03 (Table 1). The growth rate of installed capacity was higher in the FY 2010-11 (11.38 percent) whereas, the growth rate of maximum generation was higher in FY 2007-08 (11.08 percent).

Current Situation and Future Projection of Electricity Demand, Generation and Load Shedding

The average maximum demand for electricity was 3970 MW in 2007 which has increased to 4833 MW in 2011 (May, 2011) with an average increasing rate of 216 MW per annum. Under the business as usual scenario, the average demand might stand at 5696 MW by 2015. On the other hand, the average generation was 3378 MW in 2007 which has increased to 4103 MW in 2011 (May, 2011) with an annual average increasing rate of 181 MW. Continuation of this rate indicates that the average generation would be 4828 MW by 2015 which is far away from the vision of 11500 MW generations by 2015. Additionally, the average load shedding has been increased to 656 MW in 2011 (May, 2011) with an average increasing rate of 35 MW per year from 2007. If this increasing rate remains the same, the average load shedding might be stood at 795 MW by 2015. The lower increasing rate of generation (5.37 percent) than that of the demand (5.43 percent) has accelerated the rate of load shedding which has increased at a rate of 6.72 percent per annum during the same period.

Maximum Demand for Electricity by Different Zones

The scale of demand for electricity is going up. It varies according to different zones of the country. The east zone is more developed and industrial than the west zone. This causes the difference in the demand between the two zones. The demand for electricity in east zone is much higher (more than double) than that of the west zone. In east zone, the demand for electricity has increased with a rate of 18.3 percent per year between 2000-01 and 2008-09. However, in the west zone, this increasing rate was 9.1 percent during the same time period.

Consumption of Electricity by Category

Except 2005-2006, almost all the times after 2001-02, the consumption pattern of electricity at the domestic level increased with a decreasing rate. The same result is also found in the case of the commercial services. However, in the industrial services and in other services, the consumption pattern has also increased with a decreasing rate from 2003-04 except in the year 2005-06. The consumption rate of electricity of all the service categories was highest in the year 2005-06. The annual rate of increase between 2000-01 and 2007-08 was highest at commercial services which was 15.6 percent, followed by domestic services (13.8 percent), industrial services (13.3 percent) and other services (6.4 percent).

Relationship between GDP and Generation of Electricity

A decreasing rate of electricity generation has resulted in the lower GDP growth (Figure 4). The current GDP growth of 6.66 percent might be the result of comparatively higher growth rate of electricity generation (6.19 percent). The average GDP between 2007 and 2011 was 6.22 percent whereas the average generation of electricity was 3748 MW. Under the business as usual scenario, if an arbitrary calculation is made, it is observed that 603 MW generation of electricity might be required for the growth of one percent GDP.

Causes of Electricity Crisis

Although the government has taken several initiatives for reducing the crisis of electricity, yet the crisis persists. This is mainly due to the problems associated with high gas dependency, improper privatization policy, lack of satisfactory and timely implementation of allocated money, political reasons and over population.

High Gas Dependency

The most important reason at the moment is that the government is unable to ensure the supply of natural gas, the main primary fuel that is used to produce electricity. Shortage of available gas supply creates a struggling situation of electricity generation. Many power plants are idle due to the shortage of gas supply. This has resulted in the lower generation of electricity. On the other hand, unprecedented delay in finalizing a coal policy makes it difficult to generate expected level of electricity. Government remains silent about the exploration and exploitation of coal, which is cheaper and safer in generating electricity.

Improper Privatization Policy

In April 2010, 40 percent electricity was generated by private sector which has increased to 44 percent by April 2011. Rental, quick rental and peaking plants were under taken on a first-track basis to address the nagging power crisis. But mostly, second hand equipments and machineries are used in such plants, which will be less efficient and the tariff will ultimately rise. Additionally, many of them are not in a position to generate electricity till to date. Furthermore,

there is a lack of transparency. Tendering persists in that process. Thus, the establishment and timely commencing production of the major segments of the power plant, contracted to be established on 'quick rental' basis in the country, are failing gradually. Thus, it is not only causing huge amount of financial loss to the national exchequer but also increasing the suffering of the citizen of the country. Here, the government has to face two types of challenges. One is the higher subsidy due to the costly quick rental power plants and the other is the lower production that is expected.

Lack of timely Implementation of Allocated Money

The government has given highest priority to the development in power sector which has been reflected in the allocation of annual development programme (ADP). The total allocation in the power sector was Tk. 7145.28 for the fiscal year 2011-12. Over the last few years, there was a significant gap between the allocation and the implementation of ADP in the power sector. Considering the last fiscal year, only 29 percent of the allocated ADP had been implemented during the first eight months of that fiscal year. When a huge amount of allocated money is required to be implemented within a short period of time, there creates corruptions. That is why, the lack of timely implementation has reduced the proper development in the sector of electricity, especially, in the generation of the electricity.

Political Reason

In Bangladesh, the governments come and go and the issue of electricity remains a struggling one. In order to win the mind of voters, the politicians are very much interested in covering a lot of areas without thinking the existing generation. This may bear information about the huge coverage of the electricity but in reality, it creates crisis. This type of politics makes the crisis more acute.

Over Population

There has been an increase in the demand for electricity in the recent years as a result of industrial development and population growth. One of the common matters in the country is over population which creates a lot of problem in various development sectors. More population means more consumption of electricity. Population is increasing but the generation of electricity is not increasing as required. After all, there is an improvement in the life style of the citizen in the country. With the improvement of the people's life standard, the demand for electricity has also increased. As the generation has increased with a slower rate than that of the demand for electricity, the crisis of electricity is on the rise.

1. INTRODUCTION

Electricity is a vital ingredient to upgrade the socio-economic condition and to alleviate poverty. The supply of electricity has a great impact on the national economy. Proper and enough reliable electricity supply have a great positive impact on our GDP and GDP is one of the key measures to understand the economy of a country. Therefore, uses of this electrical energy are rapidly increasing day by day. Human civilization has tremendously been advanced by the versatile uses of electricity and demand for electricity is integrated with all aspects of development.

Electricity is a typical form of energy. It is recognized that the pace of power development (especially electricity) has to be accelerated in order to achieve overall economic development of the country because a country's socio-economic development largely depends on it. But currently, consumers cannot be provided with uninterrupted and quality supply of electricity due to the inadequate generation compared to the national demand. It is unfortunate that as a nation we have not been able to resolve this problem even after forty years of our independence. Governments come and go and this issue remains a struggling issue. Bangladesh is a densely populated country with 142.3 million people (BBS, 2011). Population is increasing but the generation of electricity is not increasing as expected. Only 49 percent of the country's population has access to electricity, which is very low compared to other developing countries in the world. The per capita generation is 236 KWH (Ministry of Power, Energy and mineral resources; Access on 23-11-2011).

It is quite evident that the extensive dependence on electricity has put us under a strong challenge. For years, the matter of balancing the supply against the demand for electricity has remained largely an unresolved matter. The country faces a significant challenge in revamping its network responsible for the supply of electricity. Therefore, such policy formulations are to be done based on the results of realistic and practical researches regarding power sector. A credible and realistic demand forecast is necessary for any country regarding its electrical energy resources for the sake of better administration. Efficient policies should be taken to ensure a stable and healthy economy. This report intends to make an assessment of the present and future scenarios of electricity in Bangladesh.

2. METHODOLOGY

The study was conducted mainly based on the data collected from the different secondary sources like Bangladesh power development board, power division, and power cell etc. under the Ministry of Power, Energy and Mineral Resources (MPEMR). Using these data, some projections were made for the future scenarios of electricity by using simple mathematical equation:

$$P_t = P_0 (1 + rt)$$

Where,

P_t = Value of the present year

P_0 = Value of the previous year

t = Time interval between previous and present year

r = Growth rate

Different statistical reports, relevant research papers, books and many national and journals have also been reviewed for this study.

3. INSTALLED CAPACITY AND MAXIMUM GENERATION

In FY 2000-01, the total installed capacity was 4005 MW and the maximum generation was 3033 MW. Both the installed capacity and maximum generation have slightly increased over the time. The installed capacity as well as the maximum generation has increased with a decreasing rate as compared to the FY 2002-03 (Table 1). The growth rate of the installed capacity was higher in the FY 2010-11 (11.38 percent) whereas, the growth rate of maximum generation was higher in the FY 2007-08 (11.08 percent).

Table 1: Installed Capacity and Maximum Generation

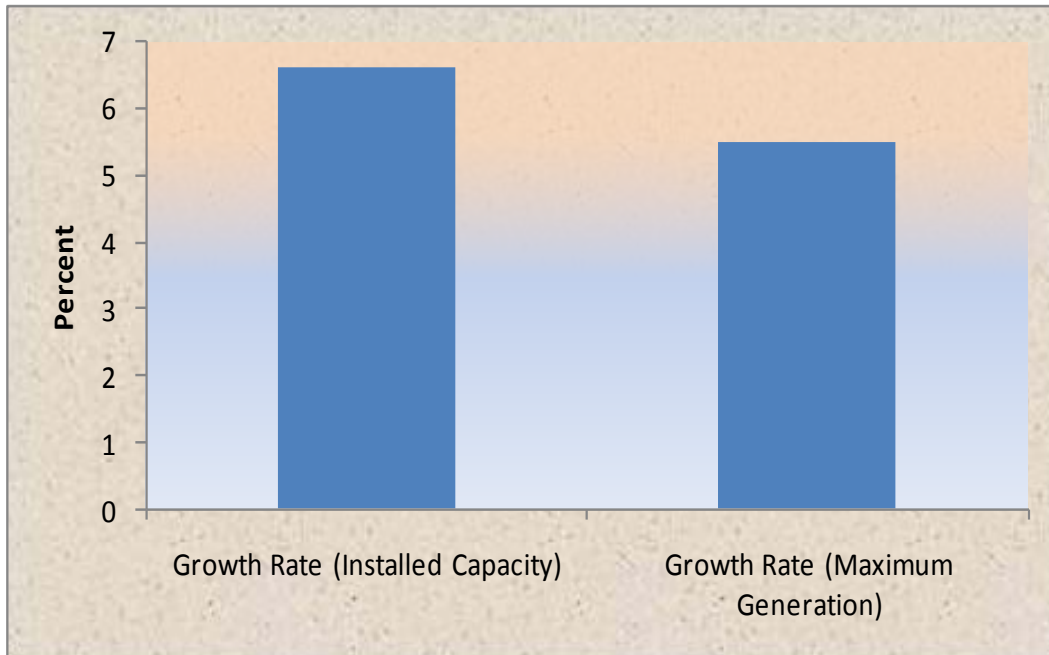
Fiscal Year	Installed Capacity (MW)	Growth Rate (%)	Maximum Generation (MW)	Growth Rate (%)
2000-01	4005	-	3033	-
2001-02	4230	5.62	3218	6.10
2002-03	4710	11.35	3458	7.46
2003-04	4710	0	3622	4.74
2004-05	5025	6.69	3751	3.56
2005-06	5275	4.98	3812	1.63
2006-07	5262	-0.25	3718	-2.47
2007-08	5262	0	4130	11.08
2008-09	5803	10.28	4162	.77
2009-10	5978	3.02	4606	10.67
2010-11 (13 June, 2011)	6658	11.38	4699	2.02

Author's calculation, based on Bangladesh Economic Review 2011

The total installed capacity was 4005 MW in the FY 2000-01 which has increased to 6685 MW in the FY 2010-11 (13 June, 2011) with an annual increasing rate of 6.62 percent. However, the

maximum generation was 3033 MW in FY 2000-01 which has increased to 4699 MW in the FY 2010-11 (13 June, 2011) with an annual increasing rate of 5.49 percent (Figure 1). The annual increasing rate of maximum generation (5.49 percent) is lower than that of the installed capacity (6.62 percent) between the FY 2000-01 and 2010-2011. This is resulted from the poorer productivities of older power plants. Beside this, due to the shortage of gas supply, some power plants are unable to utilize their generation capacity.

Figure 1: Growth rate of Installed Capacity and Maximum Generation between 2000-01 and 2010-2011



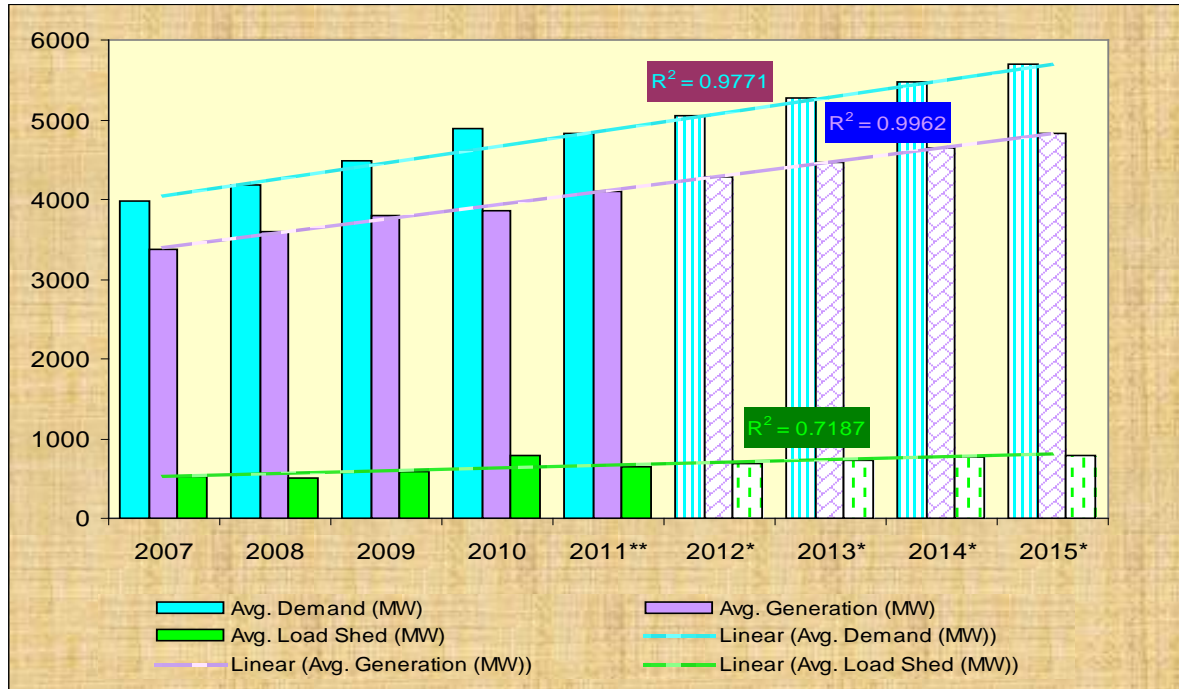
Author's calculation, based on the data collected from Power Division, 2011

4. CURRENT SITUATION AND FUTURE PROJECTION OF ELECTRICITY DEMAND, GENERATION AND LOAD SHEDDING

The real demand for electricity could not be met due to the shortage of available generation capacity. A good number of generation units have become very old and have been operating at a much-reduced capacity. As a result, their reliability and productivity are also poor. Beside this, due to the shortage of gas supply, some power plants are unable to utilize their usual generation capacity. Therefore, there is an increase in the load-shedding over the years. The average maximum demand for electricity was 3970 MW in 2007 which has increased to 4833 MW in 2011 (May, 2011) with an average increasing rate of 216 MW per annum. Under the business as usual scenario, the average demand might stand at 5696 MW by 2015. On the other hand, the average generation was 3378 MW in 2007 which has increased to 4103 MW in 2011 (May, 2011) with an annual average increasing rate of 181 MW. Continuation of this rate indicates that

the average generation would be 4828 MW by 2015, which is far away from the vision of 11500 MW generations by 2015. This increased demand over generation has resulted in increased load shedding (Figure 2). Additionally, the average load shedding has increased to 656 MW in 2011 (May, 2011) with an average increasing rate of 35 MW per year starting from 2007. If this increasing rate remains the same, the average load shedding might be stood at 795 MW by 2015 (Figure 2).

Figure 2: Current Situation and Future Projection of Electricity Demand, Generation and Load Shedding



Author's calculation, based on the data collected from Power Division, 2011

It is also observed that the demand for electricity has been increased with a rate of 5.43 percent per year whereas, the generation of electricity has been increased with a rate of 5.37 percent per year between 2007 and 2011. The lower increasing rate of generation (5.37 percent) than that of the demand (5.43 percent) has accelerated the rate of load shedding which has been increased at a rate of 6.72 percent per annum during the same period (Figure 3).

Figure 3: Growth rate of Demand, Generation and Load Shedding

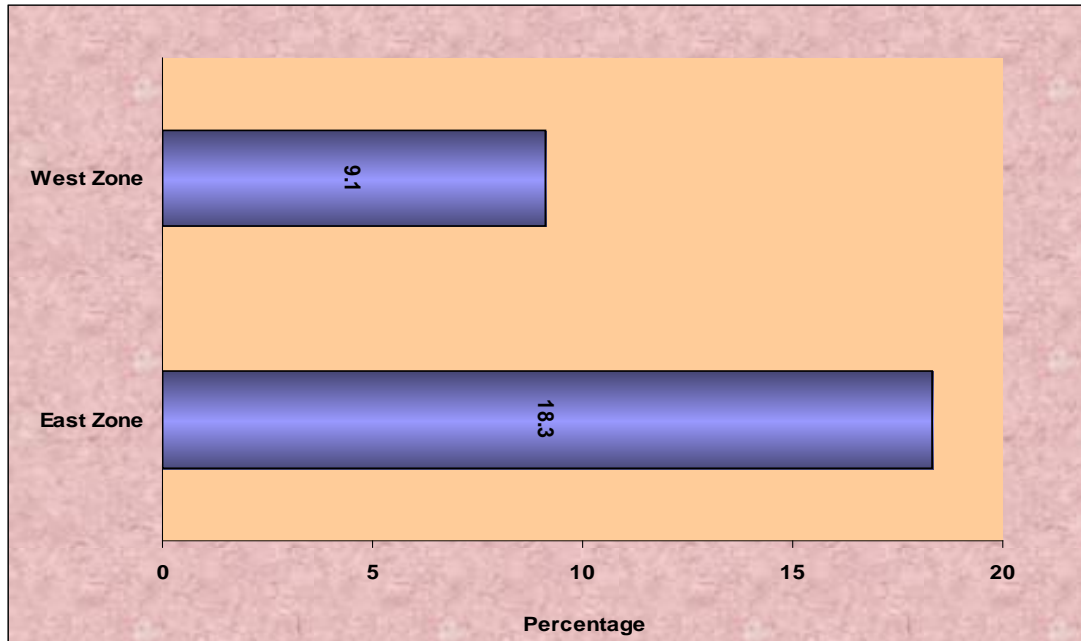


Author's calculation, based on the data collected from Power Division, 2011

5. MAXIMUM DEMAND FOR ELECTRICITY BY DIFFERENT ZONES

Planned and appropriate use of electricity is fundamental to the economic progress of Bangladesh. The scale of demand for electricity is going up. It varies according to the different zones of the country. The east zone is more developed and industrial than the west zone. This has resulted in the different demand of electricity between these two zones where, the demand for electricity in east zone is much higher (more than double) than that of the west zone. In the east zone, the demand for electricity increased with a rate of 18.3 percent per year between 2000-01 and 2008-09. However, in the west zone, this increasing rate was 9.1 percent during the same time period (Figure 4).

Figure 4: Growth Rate of the Demand for Electricity in Different Zones between 2000-01 and 2008-09.

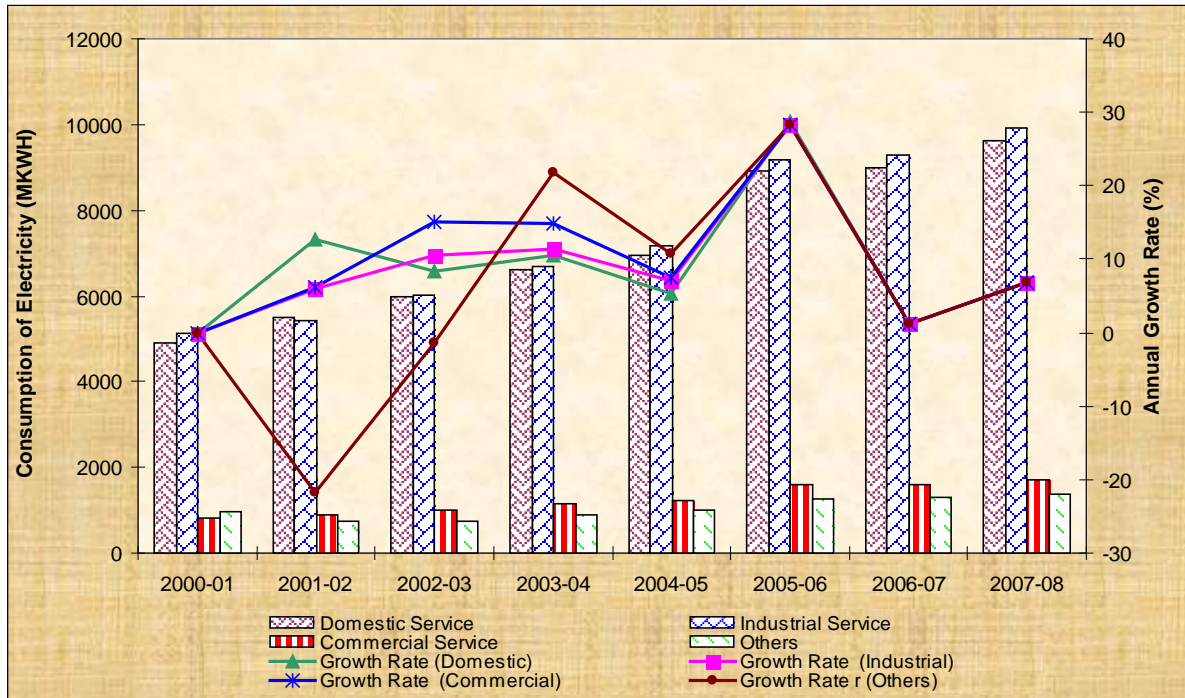


Author's calculation, based on BBS, 2011 data

6. CONSUMPTION OF ELECTRICITY BY CATEGORY

The consumption pattern of electricity varies according to different categories. The consumption of electricity at all categories has increased every year (Figure 5). Except in the year 2005-06, almost all the times after 2001-02, the consumption pattern of electricity at the domestic level increased with a decreasing rate. The same result is also found in the case of commercial services. However, except in the year 2005-06, in industrial services and other services, the consumption pattern has also been increasing with a decreasing rate from the year 2003-04. The consumption rate of electricity of all the service categories was highest in the year 2005-06 (Figure 5). The main reason for which the consumption pattern increased with a decreasing rate is the lower generation of electricity over the demand. Although, the consumption pattern of different sectors has increased over the years but it was lower than that the expected (Figure 5). The annual rate of increase between 2000-01 and 2007-08 was the highest at the commercial services which was 15.6 percent, followed by domestic services (13.8 percent), industrial services (13.3 percent) and other services (6.4 percent).

Figure 5: Consumption of Electricity by Category (MKWH) and their Corresponding Growth Rate from 2000-01 to 2007-08



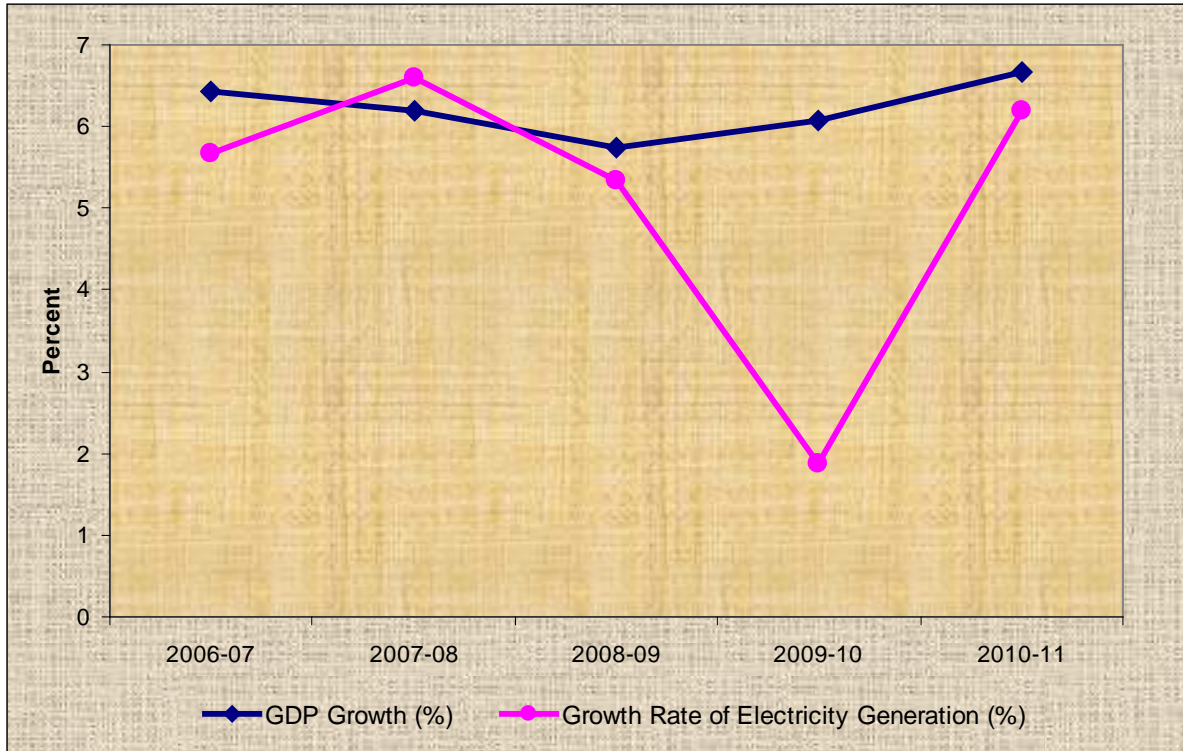
Note: MKWH = Million Kilowatt Hours

Source: Author's calculation, based on BBS 2011 data

7. RELATIONSHIP BETWEEN GDP AND GENERATION OF ELECTRICITY

The supply of electricity has a great positive impact on GDP and GDP is one of the key indicators to measure the economy of a country. Power crisis is slowing the pace of GDP growth rate. Therefore, it is to increase the GDP growth rate, available supply of electricity should be ensured. The economy of Bangladesh is mainly depending upon agriculture, industrial, commercial and other economic development. On the other hand, these developments directly and indirectly depend upon the fluent supply of electricity. A decreasing rate of electricity generation has resulted in the lower GDP growth (Figure 6). The current GDP growth of 6.66 percent might be the result of comparatively higher growth rate of electricity generation (6.19 percent). The average GDP between 2007 and 2011 was 6.22 percent whereas the average generation of electricity was 3748 MW. Under the business as usual scenario, if an arbitrary calculation is made, it is observed that 603 MW generation of electricity might be required for the growth of one percent GDP. Therefore, it is difficult to achieve the target of seven percent GDP growth with the current generation of electricity within this fiscal year (2011-12).

Figure 6: Relation between GDP growth and generation of electricity growth



Source: Author's calculation, based on BBS 2011 data

8. CAUSES OF ELECTRICITY CRISIS

Although the government has taken several initiatives for reducing the crisis of electricity, yet the crisis persists. This is mainly due to the problems associated with high gas dependency, improper privatization policy, lack of satisfactory and timely implementation of allocated money, political reasons and over population.

High Gas Dependency

The most important reason at the moment is that the government is unable to ensure the supply of natural gas, the main primary fuel which is used to produce electricity. The Shortage of available gas supply creates a struggling situation of electricity generation. Still, 83 percent of the total electricity used to be generated by natural gas. Many power plants are idle due to the shortage of gas supply. This has resulted in the lower generation of electricity. On the other hand, unprecedented delay in finalizing a coal policy makes it difficult to generate the expected level of electricity. Government remains silent about the exploration and exploitation of coal, which is cheaper and safer in generating electricity.

Improper Privatization Policy

A good number of generation units in the public sector have become very old and have been operating at a much reduced capacity. This is why the government largely depends on rental, quick rental as well as independent power producers (IPP). In April 2010, 40 percent electricity was generated by private sector which has been increased to 44 percent by April 2011. Rental, quick rental and peaking plants were under taken on a first-track basis to address the nagging power crisis. But, second hand equipments and machineries are mostly used in such plants, which will be less efficient and the tariff will ultimately rise. Additionally, many of them are not in a position to generate electricity till to date. Furthermore, there is a lack of transparency. Tendering persists in that process. Thus, the establishment and the timely commencing production of the major segments of the power plant, contracted to be established on the 'quick rental' basis in the country are failing gradually. Thus it is not only causing huge amount of financial loss to the national exchequer but also increasing the sufferings of the citizen of the country. Moreover, all these quick rental power plants are on short term basis. Here, the government has to face two types of challenges. One is the higher subsidy due to the costly quick rental power plants and the other is the lower production that is expected. The government would be better off spending money on upgrading the existing power stations.

Lack of timely Implementation of Allocated Money

The government has given highest priority to the development in the power sector which has been reflected in the allocation of the annual development programme (ADP). The total allocation in the power sector was Tk. 7145.28 crore for the fiscal year 2011-12. Over the last few years there was a significant gap between the allocation and the implementation of ADP in the power sector. Considering the last fiscal year, it has been observed that only 29 percent of the allocated ADP had been implemented during the first eight months of that fiscal year. It means that another 71 percent have to be implemented within the next four months of that fiscal year. When a huge amount of allocated money is required to implement, there exist corruptions. That is why the lack of timely implementation has reduced the proper development in the sector of electricity, in fact, in the generation of electricity.

Political Reason

In Bangladesh, the governments come and go and the issue of electricity remains a struggling one. The politicians are very much interested in covering a lot of areas without thinking the existing generation in order to win the mind of the voters. This may bear information about the huge coverage of the electricity but in reality, it creates crisis. This type of politics makes the crisis more acute.

Over Population

There has been an increase in the demand for electricity in the recent years as a result of industrial development and population growth. One of the common matters in the country is over population, which creates a lot of problem in the various development sectors. More population means more consumption of electricity. Population is increasing but the generation of electricity is not increasing as required. After all, there is an improvement in the life style of the citizen in the country. With the improvement of the people's life standard, the demand for electricity has also increased. As the generation has increased with a slower rate than that of the demand for electricity, the crisis of electricity is on the rise.

9. CONCLUSIONS AND RECOMMENDATIONS

Providing access to affordable and reliable electricity to all citizens by 2021 is a befitting national goal of the government of Bangladesh. Despite considerable trust on reducing the gap between the demand and supply of electricity, a significant number of people still do not have access to electricity. However, 49 percent of its population have access to electricity. Therefore, it might be quite ambitious to provide affordable electricity to all by 2021. Nonetheless, achieving such target within the time limit is a fundamental challenge of the country without which, international experience suggests, the human development, economic and employment goals of the government may be hindered, where the gap between the demand and generation of electricity is going on. Moreover, it might be quite difficult to achieve the target if the government does not give top priority on the regarding issue.

Over the years, the installed capacity has been increased with a decreasing rate as compared to the year 2002-03. The similar result is also found in case of the generation of electricity. It is also found that the increasing rate of generation capacity is lower than that of the installed capacity. Therefore, this higher increasing rate of demand for electricity over generation has resulted in the higher rate of load shedding that has been increase with an annual rate of 6.72 percent at the same time period (2007-2011). The demand for electricity is not equally distributed according to different zones. In the east zone, the demand for electricity has increased more than double (18.3 percent) compared to west zone (9.1 percent) between 2000-01 and 2008-09. The consumption patterns of electricity by different categories also differ. The relationship between the supply of electricity and GDP growth is positive and significant. A decreasing rate in the electricity generation has resulted in the lower GDP growth.

To achieve the target of electricity supply to all by 2021, the government should have a look to ensure the proper implementation of the allocated money in the regarding sector. Ensuring good governance is also required. Separate allocation for the maintenance and modernization of age old power plants is urgently needed. Due to the shortage of gas, the other primary fuel for generating electricity that is coal, offers a safer and cheaper prospects. However, the debate

about the method of mining coal makes the problem thorny. In addition, the time that would be inevitably needed to exploit and to use the plentiful coal deposit will create an unacceptable time-gap in solving the power crisis with desirable speed.

It is pertinent to mention that theoretically, many of the strategic documents and policy papers are sound and seems implementable, but in reality, fails to do so because of poor implementation rate of allocated money, corruption, lack of funds, poor monitoring and evaluation and so on. The government needs to be creative in renewing and revising strategic approaches to reduce the power crisis. Therefore, provisions must be formulated for programme evaluation and also for understanding the impacts of programmes. Findings are needed to be scientifically utilized in developing suitable programmes addressing the case reducing the crisis of electricity in Bangladesh. Otherwise, the target of ensuring electricity to all by 2021 may remain an elusive and a distant dream.

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Unnayan Onneshan - The Innovators

16/2, Indira Road, Farmgate

Dhaka-1215, Bangladesh

Tell: + (880-2) 8158274, 9110636

Fax: + (880-2) 8159135

E-mail: info@unnayan.org

Web: www.unnayan.org