

## An Ethical Analysis of Quick Rental Power Plants in Bangladesh

SAKIB B. AMIN\*  
M. ASHIQUR RAHMAN KHAN\*\*  
ANIKA TASNIM\*\*\*

**Abstract.** *Energy is a strategic determinant of economic growth. Therefore, energy crisis can negatively affect the development process of any small economy like Bangladesh. Hundred percent excess to electricity to all the citizens is one of the main agendas of Bangladesh government. Therefore, to reduce the energy crisis and provide the electricity to all, Bangladesh government invited Quick Rental companies in 2010 as a short-term solution. The duration of these Quick Rental companies were 3-5 years but their activities are still going on. Since these companies burn imported oil to generate electricity, there is a growing ethical consensus about the impact of these Quick Rental companies in the energy sector of Bangladesh. To the best of our knowledge, there is no paper so far assessing the impact of Quick Rental companies considering ethical aspects. Therefore, the main objective of this paper is to discuss the role of Quick Rental companies in Bangladesh economy through an analytical and ethical discussion.*

### 1. Introduction

Bangladesh has been maintaining a very significant GDP growth rate over the past few years which cause high electricity demand among the consumers. In 2009, when the current government came into power there were high pressure on them

\* Assistant Professor, School of Business and Economics, North South University, Dhaka, Bangladesh, E-mail: sakib.amin@northsouth.edu

\*\* Department of Economics, University of Dhaka, Dhaka, Bangladesh  
E-mail: ashiquurkhan69@gmail.com

\*\*\* School of Business and Economics, North South University, Dhaka, Bangladesh  
E-mail: anika.tsn28@gmail.com

to provide adequate amount of electricity to the different sectors. Especially the manufacturing sector which is considered as the “Thrust Sector” of our economy was hampered due to inadequate supply of electricity causing disruption in their production process. So, there was a clear problem for the government as the demand exceeded the generation by 2000MW. The problem was not very easy to mitigate given the state of the plants producing electricity during that time. Also, to add to this problem were no proper planning on how to improve this sector causing very little improvement in this sector. As a result of this problem the government had to take some emergency initiatives to mitigate the problem. So, the government planned to produce 5000MW by 2011 and 7000MW by 2013. But the problems of lack of financial resources and primary energy source, the plan became very difficult and challenging to achieve.

The primary source of producing electricity in Bangladesh has been natural gas as more than 80% were generated using gas fired power plants. But in 2008-09 there were shortages in gas supply and predictions by Government agencies showed that supply of natural gas would run out by 2031 at current extraction rate. So, there was pressure to switch to different sources. There was abundance of coal but lack of extraction and pressures from the environmental groups made it less convenient for the government to start extensive use of coal for generation of electricity. As a result, the government went for “Quick Rental Power Plants” (QRPP) and encouraged private firms to participate through tendering. Some 33 power plants were given permission to produce electricity using furnace oil and diesel. Agreements were signed with the private sector electricity generating companies to purchase electricity from the rental power plants which would be then added to the National Grid for transmission and distribution.

This sums up why and how quick rental power plants were initiated in Bangladesh during 2009. At present, there are around 34 oil-fired power plants and the numbers may increase this year as there have been recommendations to increase the generation capacity using the private plants. According to the Bangladesh Power Development Board, “If we rely on the existing power plants there will be chaos in the hot season. We have no alternative but to allow more rental power plants as mega and medium capacity power plants will come into operation after 2019.” So, this idea of quick rental power plant is actually helping Bangladesh throughout this process and has reduced the number of blackouts/ load shading compared to the earlier times.

As the government will have to wait until 2018 to implement any coal-based power plant, the government has decided to extend the tenures of the quick rental

power plants. So the QR power plants has given the government sufficient time to plan for the future ahead and fix the energy problem (electricity) crisis with ease. But the continuation of these policies will affect the long-run sustainable electricity generation capacity of Bangladesh. Moreover, seven of these QRPP companies in on the verge of receiving extension in their contract ranging from 5-15 years. This can prove to be dangerous for the economy and the long-term energy security of our country as short-term fixes have a lot of opportunity cost. The government is selling the electricity at a subsidized price due to the high cost production of the rental power plant electricity. This is putting a lot of pressure on the budget as the deficit is increasing. The other sectors such as education, health care and infrastructure are losing out because of the wastage of funds in filling out the deficit.

Despite fulfilling the energy demand, Quick rental companies are liquid fuel based which causes environmental degradation. We know that these oil production industries contain significant risks like toxic chemicals, water contamination, irreversible environmental degradation and destruction of ecosystems. There are many advantages to using renewable energy sources instead of non-renewable energy sources. Unlike coal, oil, or gas, the renewable energies of the sun, wind, water, and geothermal are clean, accessible, abundant and sustainable. Using renewable energies lowers carbon (CO<sub>2</sub>) emissions. Most are available everywhere in the world. Together, the supply is everlasting. They can support ecosystems and ensure future availability. The benefits of renewable energy are clear.

Yet, approximately 80% of the energy human beings use around the world still comes from non-renewable sources that are environmentally destructive. There are many reasons why this is the case, including: Economic and political systems of the developed world which are deeply rooted in fossil fuel use Lifestyle habits of people in the developed world that are shaped by these economic and political systems and expend large amounts of non-renewable energy Although the government has decided to extend the contract of QR companies to generate electricity, still there is a question regarding the fact that whether the QR companies affects negative impacts in the long run. It should be ensured the benefits of QR companies will outweigh the negative consequences cost by fiscal burdens. So, decisions should be taken from ethical considerations.

To the best of our knowledge, there is no paper so far assessing the impact of Quick Rental companies considering ethical aspects. Therefore, the main objective of this paper is to discuss the roll of Quick Rental companies towards Bangladesh economy through an analytical and ethical discussion.

The rest of the paper is organized as follows. Chapter 2 focuses on Importance of Energy Sector towards Economy. Chapter 3 gives a brief Overview. Chapter 4 critically describes the linkage of Ethics and Energy Economics. Chapter 5 highlights The Benefit of Quick Rental Companies in the energy sector of Bangladesh. Chapter 6 ethically examines the effectiveness of Quick Rental companies as a solution to mitigate energy sector. Finally, the Conclusion is at Chapter 7.

## **2. Importance of Energy Sector towards Economy**

Energy is considered as the lifeblood of the economy. It is an essential input for almost every good and service. Energy plays a important role in the development process of a country. It not only enhances the productivity of factors of production, but also promotes higher living standards. The term “energy” mainly covers a wide range of products such as electricity, oil, natural gas, coal, biomass and other renewable sources. According to World Bank (2000) no country has managed to develop beyond a subsistence economy without ensuring at least minimum access to electricity services for a broad selection of its population. Moreover, in a study of over 100 countries, Ferguson et al. (2000) find a strong correlation between electricity usage and the level of economic development and growth.

The general conclusions of this research are that wealthy countries have a stronger correlation between electricity use and wealth creation than do poor countries and that, for the global economy as a whole, there is a stronger correlation between electricity use and wealth creation than there is between total energy use and wealth. The study also shows that, in wealthy countries, the increase in wealth over time correlates with an increase in the electricity ratio.

Electricity is known as one of the most widely used forms of energy and therefore the electricity industry is an important sector for any economy. Electricity, being an energy carrier, provides energy input to different development processes that vary depending on consumer group such as industrial, service, residential and government. Oil is another vital source of energy in the economy and always been considered as an indicator of economic stability due to the world’s high dependence on oil products.

Energy price is a crucial driver of the world economy and changes in the price of energy can have significant effect on macroeconomic condition and welfare in both developed and developing countries around the world. The transmission mechanisms through which energy prices have an impact on real economic

activity include both supply and demand channels. There is the classic supply side effect according to which rising energy prices are indicative of the reduced availability of a basic input to production; leading to a reduction of potential output (Brown and Yücel, 1999). An energy price increase may also have a negative effect on consumption through its positive relation with disposable income.

From demand side perspective, when energy prices rise, consumers are unable or unwilling to reduce energy consumption and may reduce expenditures on other goods and services, potentially upsetting the macroeconomic condition (Lescaroux et al., 2008). Naturally, the bigger the energy price increase and the longer higher prices are sustained, the bigger the macroeconomic impact. The strength of the link between energy and macro economy is affected by different factors. The long run level of economic activity is determined principally by labor productivity, which is determined part by the net supply of energy. In the short run, economic theory argues that an increase in energy prices leads to an increase in the domestic price level and a decrease in output due to higher cost. There is growing recognition that energy supply can transform people's lives and does serve as an engine for economic and social opportunity (World Bank, 2013).

Recent empirical literature till to date observes over a hundred studies on causality between GDP and energy (both at aggregate and disaggregate level) consumption using various methodologies across the countries. The existing empirical literature finds support for four possible hypotheses between energy consumption and economic growth; they are growth, conservation, neutrality and feedback hypotheses. The growth hypothesis suggests that an economy is energy dependent where energy consumption leads to economic growth and a shortage of energy may negatively affect economic performance, leading to a fall in income and employment. The hypothesis suggests that energy is a vital and necessary input along with other factors of production such as labor and capital.

On the other hand, the conservation hypothesis suggests that an economy is not energy dependent where energy conservation policies may be implemented with no adverse effect on growth and employment. The feedback hypothesis suggests that energy consumption and real GDP are interrelated and complementing each other. Finally, the neutrality hypothesis suggests that there is no causality in either direction and changes in energy consumption are not associated with changes in GDP, so that energy conservation policies may be pursued without adversely affecting the economy. They have argued that since the cost of energy is a very small proportion of GDP, it is unlikely to have a significant impact; hence there is a "neutral impact of energy on growth."

### 3. Overview of Electricity Sector in Bangladesh

Energy plays a vital role in the socioeconomic development of a country. Thus, the government of Bangladesh has been putting its best efforts to develop the indigenous energy resources. In fact, to upgrade the socio-economic condition and to alleviate poverty, electricity sector has been prioritized by the government. Bangladesh has one National Grid with an installed capacity of 15,379 MW as on February 2017. Electricity is one of the major reasons of slow GDP growth so government has decided to build more power projects through private sector and public private partnership.

As 2015, 92% urban population and 67% rural population have the access to the electricity for their source of light. Average 77.9% population have the access to the electricity in Bangladesh. Bangladesh's total installed electricity generation capacity (including captive power) was 15,761 MW as of 30 August 2017. Energy use in Bangladesh is quite low when compared to other developing countries in South Asia. According to US Energy Information Administration, USEIA, 2015, total energy use in Bangladesh in 2012 is only 0.20% of world consumption. Per capita consumption of electricity is still low in Bangladesh.

However, the annual growth rate of energy use was about 5% during 2000-2010, which is a lot faster than the other neighboring countries in South Asia.

Problems in the Bangladesh's electric power sector include, high system losses, delays in completion of new plants, low plant efficiency, erratic power supply, electricity theft, blackouts, and shortages of funds for power plant maintenance. Overall, the country's generation plants have been unable to meet system demand over the past decade. Bangladesh has small reserves of oil and coal, but very large natural gas resources. Commercial energy consumption is mostly natural gas (around 66%), followed by oil, hydropower and coal.

Electricity generation in Bangladesh was almost entirely dependent on natural gas because of its local availability and there was a sharp increase in oil prices in the early 1970's and Bangladesh switched fuel sector from oil to natural gas. But. Bangladesh's natural gas reserves are expected to last till 2031 at current extraction rate which would endanger the energy security of Bangladesh (Ministry of Power, Energy and Mineral Resources, 2015). The growth in gas demand will exceed supply in future. According to PETROBANGLA (2015), recent reserve estimation, current gas production and consumption rates and future demand projections suggest that known recoverable reserves of gas will not be able to cater the growing energy needs of the country and Bangladesh is now on the threshold of a critical stage.

During 1992, the country's total installed capacity of electricity generation was 2,350 million watts (MW), while the derated capacity was 1,719 MW. The installed capacity increased to 4,680 MW in 2002 and further to 10416 MW in 2014, with the corresponding derated capacities of 3,428 MW and 9821 MW respectively. That means, the addition in installed capacity is not reflected in terms of proportional increase in electricity generation. There are many factors that contribute to the difference between the installed capacity and the maximum available generation (derated capacity). For example, some plants may remain out of operation for maintenance, rehabilitation and overhauling, and the capacity of some plants may be derated due to aging. However, the shortage of natural gas, which is the major fuel used for electricity generation, is the most important factor for low-capacity utilization in Bangladesh.

To mitigate this supply-demand mismatch, government entered into contractual agreements for high-cost temporary solution, such as quick rental power plants and small independent power producers (IPPs, mostly diesel or liquid-fuel based) on an emergency.

“In 2009-10, the generation was about 3,500 MW while the peak demand was about 5,500 MW indicating a deficit of 2,000 MW. Moreover, the deficit was continuously rising as new demand for electricity was generated in the growing economy.” (Mustafa. K.M, 2013).

The change in the fuel mix of electricity generation has significant implications for the cost structure and total subsidy cost. The use of liquid fuel high speed diesel and furnace oil has increased significantly in the last few years, which has, in turn, increased the per-unit generation cost of electricity at present.

With furnace oil and diesel now accounting for around 21% of fuel mix for electricity generation, the average cost for bulk supply stands at BDT 5.88/KWH in 2014. This was BDT 5.36/KWH in 2012. The increase in generation cost is due to the increase in share of liquid fuel based power plants and also the increase in prices of liquid fuel.

Power generation sector is rising but power transmission and distribution are still lacking behind. One of the reasons might be the Single Buyer System prevailing in the power sector. Most of the electricity generated is either produced or purchased by BPDB making it the sole customer of power generation companies. To get the complete benefits of the power supply these three sectors (generation, transmission and distribution) should work separately.

#### **4. Ethics and Energy Economics**

Energy is not an ethical issue. Indeed, it is a very young subfield of applied ethics. Energy is part of our everyday lives and is often taken for granted. This is not surprising, as energy appears to be artificially cheap and seemingly plentiful. This “illusion of plenty” has likely contributed to the problem by diluting ethical issues related to our energy systems. Greenhouse gas emission and climate change have also put attention to several ethical issues with our energy systems.

Fereidoon P. Sioshansi, President of Menlo Energy Economics, emphasizes “The key question is not how are we going to get more energy, but rather why are we using so much of it and what for?”

The ethical issues with energy can be divided into three categories: producers, consumers and policy. Although these categories are not solid and some of the issues will overlap between two or all categories energy producers face ethical issues in the way energy is extracted and produced. All energy sources will involve the transformation of nature. Several energy industries (oil and gas production, mountaintop removal coalmining, uranium mining) contain significant risks such as: toxic chemicals, water contamination, irreversible environmental degradation, destruction of ecosystems, and relocation of communities. These raise important ethical issues that environmental philosophy deals with.

Another major concern is the issue of externalities in energy. The current energy market does not pass on the full cost for the energy that is produced, but some of the major costs of energy production have been externalized. This cost is never actually ‘paid’ by consumers or producers, the cost becomes externalized as a social cost. In addition, the “illusion of plenty” which is created by the “extensive supply and distribution network that connects consumers to virtually endless supplies of energy” followed by the lack of price signals at the point of consumption, disconnects consumers from the costs and the environmental impacts of energy production.

The ethical issues that face energy consumers are questions about responsibility and complicity. Are individuals morally responsible for purchasing energy from energy sources that promote climate change? Are individuals morally required to change their energy-intensive lives? The most important issue related to consumers is linked to lifestyle choices, the way they use energy. Surprisingly, the way we use energy in our daily lives has not received nearly as much attention as it deserves. It is much easier to make changes on an individual level than governmental (policy) or collective levels (producers).



An important ethical issue facing energy policy is the issue of trade-offs. Every single energy technology has its negative impacts and energy policy must make difficult decisions between the different choices available. Even if the most environmentally friendly technologies are chosen or available, still there will be always technological negative impacts.

So, consideration of energy issues has many implications on human society. The use of fossil fuels has been identified as a major contributor to global climate change, with serious ethical implications. Replacement of fossil fuels by hydroelectricity involves dam construction and flooding, displaces rural populations, destroys forest and wildlife habitats, interferes with fish populations, and changes sediment transport and deposition patterns. The construction of concrete dams releases large amount of greenhouse gases to the atmosphere, and in many areas dams have a limited life span. Decommissioning dams raises significant environmental questions, is very costly, and will require further substantial releases of greenhouse gases. Development of nuclear power, once seen as the answer to the energy dilemma, has proven to be difficult, a possible health risk, and less reliable and more expensive than initially predicted. Solar energy, geothermal energy and wind have significant potential for generating electricity in some areas, but may involve aesthetic alterations to human environments that are deemed unacceptable. Tidal and wave action as a source of energy have been little developed, and while they could have local significance, energy storage and distribution issues remain to be solved, and there may be environmental and aesthetic constraints.

Energy is not just a technological issue but involves difficult ethical choices. Science and engineering are crucial in finding more ethical and environmentally friendly technologies for our energy systems, but technology can never estimate our choices. We are faced with serious ethical decisions and choices, and ethics must be involved to ensure that important aspects of our energy systems are not overlooked. Ethics play an important role in issues of development for the future by clarifying values at stake in policy decisions and giving moral reasons for alternative courses of action. Environmental and development questions are loaded with moral implications that need to be understood and carefully weighed before intelligent choices are made. With the help of ethics, a new social paradigm should evolve that would promote sustainable development with the maintenance of cultural diversity, social justice and equity.

### **5. Benefits of quick rental companies in Bangladesh Energy sector**

The name quick rental power plants itself suggests that the rental power plants are easy to set up and therefore, can supply electricity to the national grid within a very short period of time. In times of crisis this is very helpful for quick generation of electricity. These power plants are typically installed within 4-6 months and hence are ideal for meeting short-term electricity needs; they utilize scarce resources efficiently and create local employment. The quick rental power plants provide an easy and short-term solution. It needs to be remembered that the fast-track development of the rental plants is a widely used option across the world to resolve the power crisis on an urgent basis, and there does not seem to exist any better solutions to the crisis at present.

Most of the rental power plants are private and therefore it means government does not have to invest on building the plants. Since quick rental plants do not involve capital investment on the part of the government in these power projects This saves a lot of funds for the government which can be used for the long-term electricity generation projects. The cost of purchase and setting up of power plants are borne by the sponsors and the government in no way guarantees any repayments to the lenders of the rental plants. The quick rental plants can create efficiency and competence to the country's other power plants particularly of the public sector.

One additional benefit of these rental projects is that technically only the amount of electricity supplied would be liable for payment. Quick rental plants in Bangladesh have the same configuration of 15-20 years IPPs and hence these can be used, if necessary, as IPPs with a lower, structured payment.

In 2011-12 year, the contribution to the GDP of additional electricity generated by the QRPPs (5,067.8 M kWh) has been between Tk. 23,312 crore and Tk. 54,226 crore at constant 1995/96 prices. Obviously, if electricity from the QRPPs was not produced, along with lower GDP growth and reduced sectoral output, would have reduced the export growth rate and created adverse impact on other macroeconomic and sectoral indicators including employment generation and poverty reduction.

The additional power supplied to the national grid through the QRPPs has made significant positive impact in many areas of the economy. The supply of additional power has no doubt contributed to the expansion of economic activities in various sectors including manufacturing industries, RMGs, commercial and business activities, agriculture through providing irrigation and better marketing and processing services, and in trade, communication, and other services. This has

significantly helped to keep the GDP growth rate over 6 percent along with a healthy export growth despite global recession and other constraints.

Quick rental power plants provide electricity in the short-run while the policy makers can develop and implement strategies for the long-run. So, the government is buying itself some precious time while the quick rental power plants are working it can solve the energy crisis issue and ensure sustainable long-term growth of the country.

Moreover, if government did not go for the quick rental option during the power crisis time, the power situation could have been much worse. For a country like Bangladesh, increasing the gross generation capacity by 3,100 MW within a period of around three years is no doubt a big achievement even though the demand over the period also shot up by 7,500 MW which did not have much impact on the consequent load shedding.

## **6. Can Quick Rental Companies be considered as a solution to mitigate energy crisis: An ethical discussion**

Over the last few years, severe power crisis compelled the government to enter into contractual agreements for high-cost temporary solution, such as rental power and small independent power producers (IPPs, mostly diesel or liquid-fuel based) on an emergency basis. A significant portion of the additional electricity generation has come from liquid fuel based power plants which has raised the total contribution of liquid fuels in power generation to 17 percent in 2012 from 13 percent in 2011 and 5 percent in 2010. Even though quick rental power plants have increased electricity generation, the use of liquid-fuel or diesel in energy sector raises many ethical dilemma in our energy system.

Petroleum is extracted beneath the Earth's surface. Then it is refined into various type of fuel. These fuels are then used to produce energy as a form of electricity. As the demand of electricity increases, also the usage of fuel rises in the energy sector. But these fuels cause massive environment degradation across the world because it is toxic to almost all forms of life and it causes climate change. Large amount of petroleum is burnt to produce fuel which creates large amount of CO<sub>2</sub> (carbon dioxide) gas that traps heat in the Earth's atmosphere. This CO<sub>2</sub> is the main greenhouse gas which causes global warming. The other produced compounds are often toxic to life. Examples are carbon monoxide and methanol which pollutes the air severely. High temperatures created by the combustion of petroleum cause acid rain. It causes many problems such as dead trees and acidified lakes with dead fish.

Acid rain leads to increased corrosion of machinery and structures and to the slow destruction of archaeological structures. Petroleum hydrocarbons such as gasoline, diesel, or jet fuel intruding into indoor spaces from underground storage tanks or brown fields threaten safety and causes adverse health effects from inhalation. Also, sea oil spills cause the mammals, reducing its insulating ability, and making them more vulnerable to temperature fluctuations. Lastly, the waste oil is produced due to the combustion of petroleum which has become unsuitable for its original purpose due to the presence of impurities or loss of original properties. This oil contains toxic like Benzenes which poisons both soil and drinking water. Runoff from storms carries waste oil into rivers and oceans, poisoning them as well. Thus, it implies that excessive use of fuel is a threat to the ecosystem and all forms of life around the world.

Every single energy technology has its negative impacts and energy policy must make difficult decisions between the different choices available. So, Government must choose energy policy which is the most environmental friendly and the price of the energy is cheaper with the highest efficiency. Currently the government has taken a lot of plans to increase the electricity generation capacity of our country. This a positive sign as the economy will benefit from it.

However, the amount of policies being undertaken lacks a clear and precise vision. Also, it seems that the policies in the plans are not followed instead they remain in the books only and other policies are being undertaken. According to the "Power System Master Plan 2016" the government would focus more on long term project using coal and other renewable sources. Notwithstanding, this policy is not being maintained as the Government recently granted rental power plants extension ranging five to fifteen years. So, this show there is a clear discrepancy between what the policy and the actions being taken.

Many people suggest that these steps are taken because in the current tenure of the government long-term projects cannot be finished so they are going for short term fixes. Also, some influential people are making money out of these power plants by extending their contracts and getting permission for new ones. Renewable energy is one of the long term options for Bangladesh. For example, renewable energy helps in reducing poverty and environmental degradation. It makes it easier for everyone in the economy to be able to attain electricity and get benefits from it. This energy comes from sunlight, wind, rain. River current, geo-thermal heat, etc. all of these is renewable. This policy will also benefit the excess demand scenario in Bangladesh.

It is true that to mitigate short-term energy crisis, quick rental power plants are very effective, but for the long-term sustainable economic growth and development it is not an ideal solution. It is harmful for the environment as well as expensive compared to its efficiency whereas; successful long-term projects will ensure energy security and reduce the energy cost.

## **7. Fuel Diversification as an alternative Solution**

The use of imported High Speed Diesel (HSD) and Furnace Oil (FO) has risen alarmingly which, although added electricity to the national grid, actually meant that the government's public expenditure budget was inefficiently allocated to pay the corresponding import bills. This had probably crowded out the nation's potential investment in other productive sectors creating adverse economic impacts. The country's growth prospects are being hampered. Moreover, the nation's vast dependence on imported fuel has also attributed to an unnecessary fiscal burden, exerting multidimensional pressures on its economic development drives. Thus, it is crucial for Bangladesh to prepare itself for the near future and plan its fuel diversification strategies keeping in line with the trends in the global energy markets. It is also important to utilize the domestic energy sources other than relying on imported resources.

In the past, there was a global trend of being heavily dependent on the use of fossil fuels and non-renewable energy resources which not only minimized their reserves but also caused environmental degradation. Bangladesh can look forward to replacing fossil fuel and non-renewable energy with renewable energy in order to match its local energy demand.

Biomass is one of the main non-commercial resources of Bangladesh. Biomass as a versatile source of energy is primarily used in rural areas to meet the energy needs for cooking. The traditional biomass sources include agricultural residue (rice husks, rice and jute stalks, sugarcane bagasse, etc.), animal waste (mainly dried form, but some biogas plants, too) and fire wood. These renewable biomass resources are considered to have significant potential to meet the energy demand, especially in the rural areas.

In addition to these, biomass can be extremely helpful for farmers who no longer have to rely on expensive diesel and kerosene to run irrigation pumps and lighten houses, using biogas as a substitute to these fuels. The abundant supply of solid biomass can even be converted into compressed natural gas that can be employed to run vehicles whereby the import bills, arising from petroleum imports, could be

reduced. Furthermore, second generation bio-fuels from *Jatropha*, etc. can also supplement the national energy supply.

Bangladesh can also tap its superior quality coal deposits for clean coal-based electricity generation purposes, provided skills development in the energy sector is ensured. Large scale coal-based power plants can be set up which, although is subject to time, can resolve the nation's electricity deficit to a great extent, provided measures to protect the environment are ensured. Although substantial amounts of coal reserves in seven fields have been discovered in the north-western part of the country, still the coal sector of Bangladesh is quite underdeveloped. The Government was in the process of reviewing the country's coal policy, which would set the regulations for the development of the coal industry and help establish a reliable source of energy for the country through the use of coal as the primary fuel for power generation. The Rampal Power Station is a proposed project which is a coal-based power plant with a 1320 MW production capacity.

Bangladesh is expected to have enormous potentiality in renewable energy development. Renewable energy is energy, which comes from natural resources such as sunlight, wind, rain, tides and geo thermal heat which are renewable. Renewable energy helps in reducing poverty, aid in energy shortage and environmental degradation such as desertification, biodiversity depletion and climate change (Power Division, 2015). Regarding the institutional development, government power utilities like Bangladesh Power Development Board (BPDB), Rural Electrification Board (REB), Local Government Agency like Local Government Engineering Directorate (LGED) and a significant number of private sector agencies including NGOs are already involved in renewable energy development.

A nodal agency, i.e. Sustainable and Renewable Energy Development Authority (SREDA) as envisioned in the Renewable Energy Policy is established and in the process of manning this organization so that it can work according to the desire of the people. This organization will provide policy support to the government as well as work to promote, expand and develop the renewable energy and to enhance energy efficiency both in public and private sector. Moreover, this organization facilitate private sector to get involve in renewable energy and energy efficiency business. Electrification of villages in remote areas generally requires huge investment and leads to power losses associated with transmission and distribution networks.

Additionally, at the current annual rate of growth of consumption of 10% the natural proven reserve of natural gas may not last more than 15-20 years. One of the great promises offered by the renewable energy technologies is their potential to provide electricity in areas not served by national power grids. There is no doubt about the fact that renewable energy will take a crucial role not only for off grid electrification in the country but also for future electricity generation as a whole. Among the renewable energy sources, hydropower currently represents less than 5% of total installed electricity generation capacity. Among the renewable energy sources, hydropower currently represents less than 5% of total installed electricity generation capacity. Since the country is a flat one, opportunities for installing further hydropower plants is negligible, although micro hydro and mini hydro have limited potential in Chittagong Hill Tracts.

However, the country is blessed by considerable solar radiation. Bangladesh receives an average daily solar radiation of 4-6.5 kWh/m<sup>2</sup>. Solar photovoltaic (PV) are gaining acceptance for providing electricity to households and small businesses in rural areas where electricity is not available from national grid. However, potential of other renewable resources is still at the exploration stage. Potential of wind energy is mainly in coastal areas and offshore islands and to determine extent of potential wind resource mapping project is in process. Some of the development partners and companies come forward for wind mapping in different parts of the country.

Finally, Bangladesh is advised to participate in cross-border electricity trading across the South Asian region, importing hydropower, the cheapest form of electricity, from Bhutan since Bangladesh do not have geographical advantages. However, regional trade among South Asian economies is not as much as strong between other countries, especially amongst the developed ones. At present, Bangladesh mainly imports electricity from India. However, it can also look to diversify its import partners and look towards countries like Bhutan and Nepal that have comparative advantages in producing hydropower.

## **8. Conclusion**

The benefits from “Quick rental power plant” policy implemented during 2009 cannot be scrutinized as they came onto the economy’s rescue when we needed energy the most. The excess demand of electricity was around 2000MW during 2009 so QRPP helped a lot in reducing this gap. Different sectors benefited from it as the supply went from erratic to adequate. We can see it that the amount of load-shedding has decreased substantially thus reducing the troubles of the

households. The manufacturing and service sector also benefited from these QRPP as they could maintain steady level of production and service.

However, this cannot be a solution for the long-term energy security. These power plants have duration of 3-5 years. Recently, government has granted rental power plants extension ranging five to fifteen years. The government is selling the electricity at a subsidized price because oil market is very volatile across the world. This has certainly created pressure on the budget as the deficit is increasing. So, long-term energy policy should be taken for the energy sector which is less costly with more efficiency and environment friendly.

More importantly, these power plants generate electricity by burning imported oil which is extracted from petroleum. This raises an ethical consensus about the effects of quick rental companies in Bangladesh. By burning oil, huge amount of Carbon dioxide and harmful greenhouse gas are being released in the environment. Excessive use of oil in the energy sector contributes to the environment degradation by releasing more toxic gases which are mainly responsible for global warming. Therefore, Electricity production is the single biggest contributor to the emissions that cause climate change. To government should grant energy policies and solutions where less fossil fuel are being used and since our rising electricity consumption requires more and more power to be generated, and although peoples' energy efficiency can help reduce this, the real alternative is to source electricity from renewable resources. Switching to a green energy (renewable energy) supplier is a positive step to take – it is a win-win situation both for the environment and the energy consumers. Government can easily make policies that are less costly and more environment friendly, renewable energy as the long-term solution and this will remove the burden of short-term quick rental power plants in the long run.



### **References**

- Amin, S.B., 2015, "The Macroeconomics of Energy Price Shocks and Electricity Market Reforms: The Case of Bangladesh"
- Amin, S.B., Muntasir, M., The Daily Star, 2017, "Bangladesh's energy options"
- Asif, S.K., 2017, Dhaka Tribune, "Tenure of two Quick Rental power plants to be extended"
- Bangladesh Bureau of Statistics, BBS, 2010, 2015
- Bangladesh Economic Review, BER, 2015
- Bangladesh Institute of Development Studies and Global Subsidies Initiative of the International Institute for Sustainable Development, 2012, "A Citizen's Guide to Energy Subsidies in Bangladesh"
- Bangladesh Petroleum Corporation, BPC, Annual Report, 2015
- Bangladesh Post, 2017, "Govt likely to allow quicker rental power plants"
- Bangladesh Power Development Borad, BPDB, Annual Report 2012, 2015
- Benjamin, K.S., and Dworkin, M.H., 2014, "Global Energy Justice"
- Brown, S.P.A., and Yucel, M., 1999, "Oil Prices and US Aggregate Economic Activity"
- Ferguson, R., Wilkinson, W., and Hill, R., 2000, "Electricity use and Economic Development"
- Gunatilake, H., and Ronald- Holst, D., 2013, "Energy Policy Options for Sustainable Development in Bangladesh" ADB Economic Working Series 359, Asian Development Bank
- Hossain, A.K., and Badr, O., 2007, "Prospects of Renewable Energy Utilization for Electricity Generation in Bangladesh"
- International Energy Agency, IEA, 2013, "World Energy Outlook 2013"
- International Monetary Fund, IMF, 2013, "Energy Subsidy Reform: Lessons and Implications"
- James, P.K., "The Ethics of Energy: A Framework for Action"
- K.M., Mustafa, Chowdhury, T.T, 2013, "Quick Rental Power Plants in Bangladesh: An Economic Appraisal"
- Lescaroux, F., and Mignon, V., 2008, "On the Influence of Oil Prices on Economic Activity and Other Macroeconomic and Financial Variables"
- Linnea, L., 2016, "Is Energy an ethical issue?"

- Ministry of Power, Energy and Mineral Resources, 2015
- Noah, S., 2006, "Planning the Funeral at the Birth: Extended Producer Responsibility in the European Union and United States"
- PETROBANGLA, 2015
- Planning Commission, 2011, "6<sup>th</sup> Five Year Plan FY2011-FY2015: Accelerating Growth and Reducing Poverty, Part 2: Sectoral Strategies, Programmes and Policies."
- Planning Commission, 2012, Perspective Plan of Bangladesh 2010-2021: Making Vision 2021 a Reality."
- Power Division, Ministry of Power, Energy and Mineral Resources, Annual Report, 2015
- Power Grid Company Bangladesh, PGCB, ANNUAL Report, 2015
- Saiful, I., Z.R., Khan, 2016, "A review of energy sector of Bangladesh"
- Sioshansi, F.P., 2011, "Can We Have Our Cake and Eat it Too? Energy and Environmental Sustainability"
- US Energy Information Administration, USEIA, 2015
- World Bank, 2000, "Energy and Development Report 2000: Energy Services for the World's poor"
- World Bank, 2010, "Subsidies in the Energy Sector: An Overview"
- World Bank, 2013, "Toward a Sustainable Energy Future for All: Directions for the World Bank Groups Energy Sector"