

Internship Report on *Future of Power Generation Sector in Bangladesh*



Thanking Orion Group



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Executive Summary

Bangladesh is one of the fastest growing economies in South Asia with a progressive economy has grown at an annual rate of around 6%. The Government of Bangladesh now promise to achieve the status of a 'middle-income country' by 2021 and that of a 'high-income country' by 2041. Working as an Executive Engineer at Orion Group, I am always very much interested on the power sector of our country. As electricity plays a vital role in poverty eradication, sustained economic growth, infrastructure development and security of any country, Bangladesh will need to address the barriers to higher growth posed by low access to reliable and affordable power, rapid urbanisation, limited availability of serviced and vulnerability to climate change and natural disasters and many more to achieve its socioeconomic growth targets. The performance of Bangladesh's power sector in the last five years has been impressive due to the progressive efforts of policymakers, support from developing partners, and effective project implementation by public and private developers. Moreover, massive capacity enhancement and expansion projects of the power sector are being undertaken. In accordance with the recent Power System Master Plan, Bangladesh aims to add 2 GW renewable energy (RE) projects to achieve installed capacity of 2,470 MW by 2021, and 3,864 MW by 2041. Solar and wind will be the key focus areas for future capacity addition, which shall account for about 50% and 40% of the 2,896 MW of RE-based installed capacity by 2021, respectively. This report provides views on the megatrends in the global power sector and how those will impact Bangladesh in its power sector transformation journey. Besides, the report provides suggested actions for Bangladesh on thematic areas such as government and regulations, financing and investments, RE, and technology in which disruptions are impacting the country's power sector.

Acknowledgement

First of all, I would like to recall Almighty Allah, whose kindness helped us to end up with an extensive effort. I offer my sincere gratitude and thanks to Dr. Md. Mamun Habib (Associate Professor of BRAC Business School) BRAC University, whose inspiring guidance and valuable suggestions have made this report possible.

I also express my gratitude to Mr. Arun Kumar (Vice President, Orion Power) of Orion Group for his keen interest, guidance and support to my achievement of more than three years practical experience.

Finally, I would like to thank all staff and employees of Orion Group for their cooperation in my profession as well as this report.

Letter of Transmittal

Dr. Md. Mamun Habib

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Subject: Submission of report for completion of course.

Dear Sir

This is to inform you that I have completed the report on 'Future of Power Generation Sector in Bangladesh'. It has been prepared for the completion of the course BUS 699, (Internship). This report focuses on all your specific instructions regarding the report writing and I have tried to express my experience and views in the easiest possible manner. However, I will be glad to clarify any discrepancy that may arise.

Thank you.

Sincerely yours,

Sabrina Hoque

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Introduction

Orion Group has been one of the leading industrial conglomerates in Bangladesh over the years. Orion has achieved a degree of success that is unparalleled in the country's business history with the support of a highly skilled management structure and 18000 dedicated professionals. Orion has managed the leadership role with its operations in the Pharmaceuticals, Cosmetics & Toiletries, Infrastructure Development, Real Estate & Construction, Power, High-tech Agro Products, Hospitality, Textiles & Garments, Aviation Management sectors.

Orion is one of the market leaders in Pharmaceuticals and Cosmetics & Toiletries sectors over the years in the country. Besides, Orion has extensively focused on Infrastructure Development and Power Generation businesses through major investment undertakings and such significantly contributing to the country's national economy's stability through the right business to business strategy.

Orion has achieved a degree of success that is unparalleled in the country's business history. Most of its projects have been success stories and this fact alone is enough to justify a sense of confidence in the Group's future. Orion extensively focused on infrastructure and power generation businesses with the principle that it will reduce rural poverty and foster sustainable economic development of the country. To help with the joining of the latest scenario in the global trade, Orion is remodeling current infrastructure platforms with international markets and above all, to provide major contribution in the country's GDP through the right business to business strategy.



The Origin of Orion Group

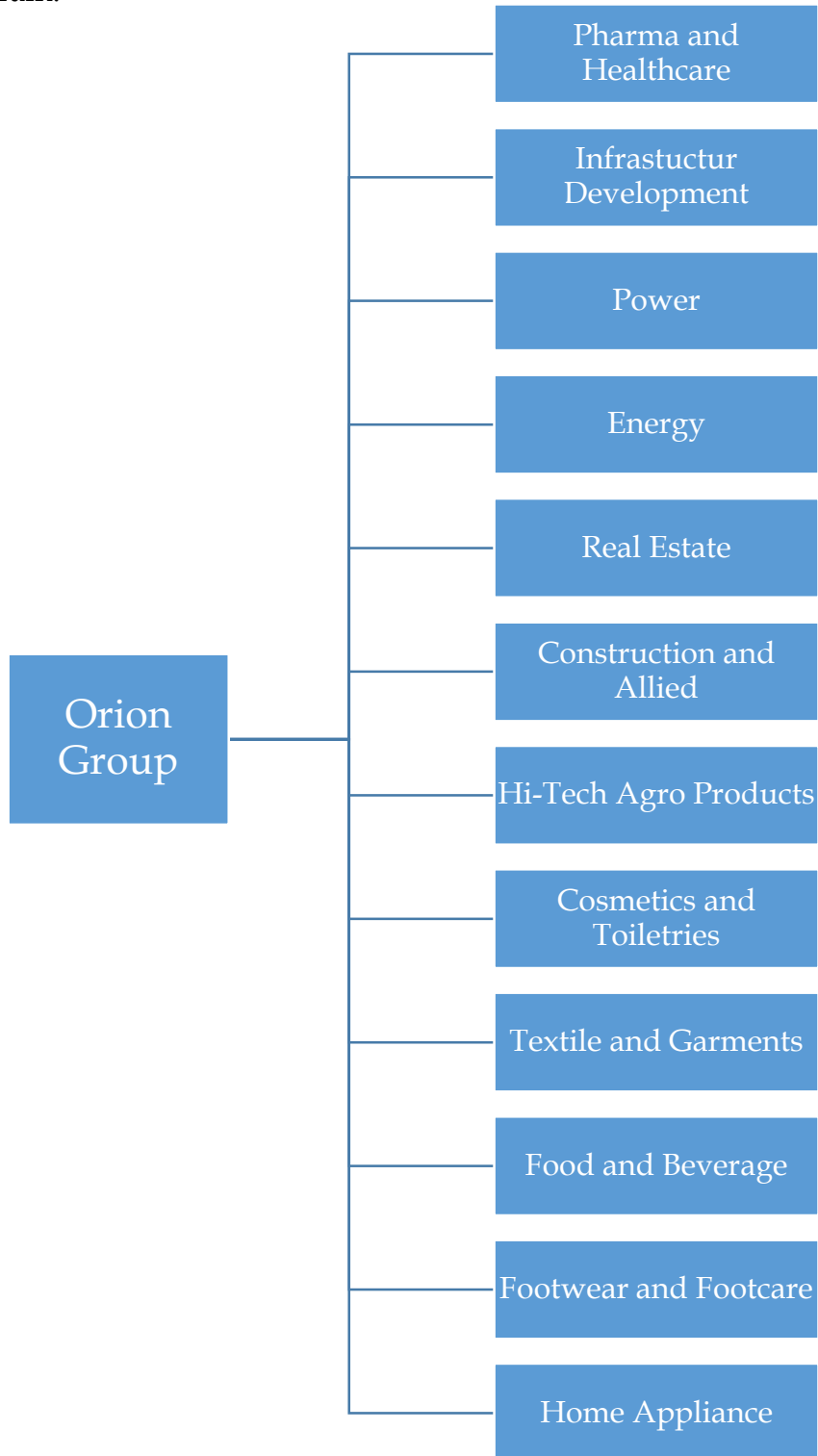
Mr. Mohammad Obaidul Karim, a distinguished self-achieved Industrialist & Businessman is the founder Chairman of Orion Group. Starting from early eighty's with a vision of 'taking our nation a step towards tomorrow', Mr. Karim has been one of the leading entrepreneurs in the country over the years. The road had been quite difficult and the tasks forbidding, but Mr. Karim modeled it possible only by his true commitment, hard-work, dedication and immense self-confidence. With the support of a highly skilled management structure under the leadership of Mr. Karim and support of almost 18000 dedicated professionals, Orion has achieved a degree of success that is unparalleled in the country's business history. Orion has assumed the leadership role with its operations in the pharmaceuticals, cosmetics & toiletries, infrastructure development, Real Estate & construction, power, high-tech agro products, textiles & garments, aviation management and trading sectors. Some of the units of the Group are successfully listed in the Stock Exchange of Bangladesh.

Mission of Orion Group

The Group's main objective follows the principle to reduce rural poverty and foster sustainable economic development of the country.

Concerns of Orion Group

There are twelve distinguished concerns of Orion group which are shown below in the diagram:





Orion Power Generation

As I am working as an Executive Engineer at Orion Group holding the responsibility of documentation and MIS part in my report I will be discussing about the power plants that Orion is currently running, their upcoming projects and the future of power generation sector in Bangladesh.

Bangladesh is progressing through a phase of development where automation is the key to its economy and business. The importance of power generation and electricity supply becomes a key government priority as the country continues to emphasize on industrialization revolution phase.

According to present statistical data, 47% of the total population of Bangladesh is enjoying the electric facilities. As of April 2010, the total numbers of transmission and distribution lines are recorded to 8,359 km and 266,460 km respectively. However, 53,281 villages are receiving electricity so far. However, in Bangladesh per capita generation is 220 KW-hr which is comparatively lower than other developed countries in the world.

Electricity has always been one of the most important key ingredients for the socio-economic and over all development of a country. The government has given top priority to develop the sector considering its importance in the overall development of the country. The government has set the goal of providing electricity to all citizens by 2021. In this regard, adequate and reliable supply of electricity is an important pre-requisite for attracting both domestic and foreign investment.

As the power sector is a capital-intensive industry, huge investments are required in order to generate addition to the capacity. To compete demands on the government resources and declining levels of external assistance from multilateral and bilateral donor agencies constrained the potential for public investment in the power sector. Recognizing these trends, the government of Bangladesh amended its industrial policies to permit private investment in the power sector.



The Power Cell which has been created under the Power Division of Ministry of Power, Energy and Mineral Resources, received the mandate to lead private power development. The government is strongly committed to attract private investment for installing new power generation capacity on build-own-operate basis.

Orion has successfully completed 3 units of 100MW each HFO based Power Plants and distributing to the national grid on a regular basis. A similar Plant and about 1300 MW Coal Fired IPPs are under construction. Orion has recently won another 3 coal based power plant about 1600MW and one 850 MW LNG based IPPs. With these, Orion has become one of the pioneers in private sector power generation sector of the country. The power plants of Orion Group are listed below:

| Orion Power Sector at a glance | |
|--|--------|
| Orion Power Meghnaghat Ltd. | 100 MW |
| Dutch Bangla Power and Associates Ltd. | 100 MW |
| Digital Power and Associates Ltd | 102 MW |
| Orion Power Dhaka Ltd. | 630 MW |
| Orion Power Dhaka-2 Ltd. | 635 MW |
| Orion Power Rupsha Ltd. | 105 MW |

Orion Power Meghnaghat Ltd. (OPML):



Orion Power Meghnaghat Ltd.

Orion Power Meghnaghat Power Plant (OPML) is a Power generation Company of capacity 100 MW under the government policy QRPP (Quick Rental Power Plants). It is a HFO based Power Plant with brand new European machineries and equipment and it's situated at Power village, Meghnaghat, Sonargaon, Narayangonj, near the bank of the Meghna river. The construction of plant was completed in a record time of just 9 months. The plant is distributing electricity to the national grid on regular basis since May 2011 and recently been renewed for five more years. There are 92 workers and staffs are working round the clock in three shift, shifting is 8 hrs. /day. It is connected with National Grid, Sonargaon Substation. Total Plant area is around 8 acres. The total cost of the project was 624 crore.

Dutch Bangla Power & Associates Ltd. (DBPL):



Dutch Bangla Power & Associates Ltd.

Dutch Bangla Power and Associates Ltd (DBPL), a 100 MW HFO fired engine based Quick Rental Power Plant (QRPP) situated beside in the bank of Sitalakha River at Siddhirganj, Narayanganj. the world class equipment's and deployed world class EPC contractor who has enabled to finish this projects in due time, this construction was completed in 9 months and the generated output is regularly supplied to national grid since July, 2011. There are two engine halls and a common control room at the center, a workshop for the maintenance works, a warehouse, a laboratory, a workers dormitory, a canteen and an admin building. It has HFO & LO (Lube-oil) purification plant. Moreover, there is HFO, LFO & LO storage and service tank.it is producing electricity as per the requirement of NLDC, BPDB and from last three years they running this project successfully with maintaining all the rules and regulations. The total cost of the project was 650 crore.

Digital Power & Associates Ltd. (DPAL):



Digital Power & Associates Ltd.

Digital Power and Associates Ltd is a 102 MW HFO based Power Plant under the scope of Government project IPP. It was started for commercial operation from 9th June, 2014 and running continuously from then. It is situated in the bank of the Buriganga River at Gognagar, Kashipur in Narayanganj district. It is taking HFO as a fuel and producing electricity and dispatching power to our national grid. This power evacuated to 132 KV line at Shitalaakha substation.it also usage of world class equipment and EPC contractor has enabled us to finish this projects in due time, the erection period of this period was only 9 months.

Orion Power Dhaka Ltd. (OPDL):



Orion Power Dhaka Ltd.

Coal is the most reliable source of future energy. Since the country would need 24,000MW power in 2021, to meet the demand, 50% of total electricity would be generated from coal according to power sector master plan 2010. Orion's coal projects would use the best technology to ensure that there's least possibility of emission or discharge in the air and water and no impact on environment and surrounding eco-system. OPDL is the biggest IPP and the first coal based advanced super-critical power plant in Bangladesh to be implemented in Charbetaki, Gozaria, Munshiganj with a net capacity of 630 MW (Gross 700MW). Taking the advisory and engineering consultancies from world's most renowned consulting firms and with financing participation by US Exim and K-Exim for the first time in Bangladesh, OPDL has already started implementation of the project. To implement the project OPDL is also using best technology and equipment from GE of the USA and Doosan of Korea/Europe. The plant has been designed based on Clean Coal Technology to ensure most reliable, available and efficient operations with compliance of all environmental regulations.

Orion Power Dhaka-2 Ltd. (OPDL-2):



Orion Power Dhaka-2 Ltd.

Similar to OPDL, Orion power Dhaka-2 Ltd.(OPDL-2) is also one of the largest single unit coal based ultra-super-critical power plant (IPP)being implemented in Gozaria, Munshiganj with a net capacity of 635MW (Gross 700MW) taking the advisory and engineering consultancies from worlds most renowned consulting firms Ramboll, Denmark as owners engineer, with the financial participation of KUKA and Sinosure,OPDL-2 has already started implementation of the project at site. To implement the project OPDL-2 is also using technology and equipment- Boiler, Turbine & Generator (BTG) from general electric Europe. The plant has been designed on state-of-the-art clean coal technology to ensure reliable and efficient operations with compliance of all environmental regulations and confirming zero emission.

Orion Power Rupsha Limited (OPRL):



Orion Power Rupsha Limited

The upcoming power plant is Orion Power Rupsha Ltd. It will be a 105MW power plant at Lobonchora, Khulna at the side of river Rupsha. It has been Awarded of Contract issued on 10.08.2017. Contract finalization done with M/s Wartsila, M/s Aalborg, and M/s Triveni.it is also HFO based power plant.it has 6 HFO engine containing each 18.5MW. Its boiler technology is WHBR (Waste Heat Recovery Boiler) system.

Power Sector Scenario in Bangladesh

Power and energy are vital factors that determine the growth path of a developing country like Bangladesh whereas; electricity is the major source of power for country's most of the economic activities. Consistent supply of power and energy can ensure development of the economy. Nonetheless the huge demand supply gap prevailing in the power sector has turned out to be a hurdle for the economic expansion of the nation.

The per capital electricity consumption in Bangladesh remains one of the lowest in the Asian region, At present, only about 68% of the total population (including renewable energy) has access to electricity and per capita generation is 348 kW-H, which is very low compared to other developing countries. Even though power has reached many urban areas, approximately 53,000 of the 68,000 villages are connected to power. Further, one million retail electricity connections are pending. The contribution of power sector to GDP ratio has been stagnant around 1.3% for last 5 years with the power generation being increased annually by 2.8% during this period. The majority of power produced in the country is used for commercial purposes. Hence, the electricity supply to households remains delicate which is also a politically sensitive issue. The demand for electricity in the rural areas has experienced significant growth over the years mainly driven by agriculture and small & medium enterprises.

According to Bangladesh Power Development Board (BPDB) presently the installed capacity as on July 2012 in the power sector is 6,693.00 MW, whereas the desired generation capacity is 6,061.00 MW. According to a demand projection analysis, the peak electricity demand is more than 7000 MW in 2012 and 7400 MW in 2013. So, still there is a gap between supply and generation of electricity. BPDB has undertaken studies to project the electricity demand over the next 20 years up to 2030 under the Power System Master Plan Study 2010. According to the study the total demand would reach 33,708 MW assuming a 7% GDP growth over the time period. Now the biggest challenge for



Bangladesh's economic growth is to ensure uninterrupted electricity supply to reduce the demand- supply gap for the growing industrial, agricultural and household needs.

Because of the critical nature, the Government of Bangladesh has given highest priority to the power sector to enhance the generation capacity. BPDB has come up with a comprehensive plan to meet the surging demand in power. Accordingly, the government plans to eliminate the demand supply gap by the end of 2012 and achieve the ultimate goal of providing "electricity to all" by 2021 by having generation capacity of 20,000 MW. To ensure overall and balanced development of the sector government has devised immediate, short term, medium term and long term generation plans. The plans have been developed based on a techno-economic analysis and least cost options. Accordingly, the generation capacity would triple to 13,554 MW by 2016.

However, the timely implementation of above plans is a concern as there are issues with regards to availability of finance, competency of project sponsors and inherent bureaucracies and other bottlenecks in the system. Further, the demand estimates for power may also be understated to some extent. Strategies have been made to meet the investment requirement by involving private sector with Government through Public Private Partnership (PPP) initiatives. A successful IPP model has been designed with a lot of comforts and protection to investors.

Future of Power Plants in Bangladesh

Bangladesh is one of the world's most populated countries with a population of 160 million. Agriculture used to be the main source of income for the people of this country previously. However, the Gross Domestic Product (GDP) in Bangladesh was 7.65% percent in 2018. Bangladesh Bank forecasts that on 2017 the economic growth will be more than 7%. A huge demand of energy has created due to rapid urbanization fueled by stable economic growth. It is well known that energy plays a vital role in poverty eradication, sustainable infrastructure development, economic growth and security of any country. In Bangladesh, electricity is the most widely used form of energy. In this reason, future economic growth significantly depends on the availability of electricity.

Bangladesh Government has an aim to ensure affordable and environmentally friendly source of electrical energy for the people. Since 1971, the country has struggled to generate adequate electricity to meet the demand. The state-owned electricity utilities suffer from large energy shortages. Moreover, due to poor pricing policies and other bottlenecks, the energy sector has also failed to attract adequate private investments in power business. This shortage of investment is a contributing factor toward energy dilemma. The present government is committed to ensure access to affordable and reliable electricity for all citizens by 2021.

Now a days, only half of the population (approximately) has access to electricity. The supply is also not adequately reliable at all. The per capita energy consumption in Bangladesh is one of the lowest (311 kWh in 2014) in the world. To improve the situation, the Government has adopted a comprehensive energy development strategy to explore supply-side options along with demand management that conserves energy and discourages inefficient use. The maximum power demand in the country has always been increasing and the rate has noticeably increased over the past couple of years. According

to recent statistics, about one third of the total population still do not have access to electricity.

The quality of power cannot be maintained because of the shortage of generation and insufficient capacity plus low quality of transmission and distribution networks of PGCB. Moreover, the demand increased rapidly after 2010. This is due to the fact that this demand actually represents the demand of connected loads of the grid. The installed capacity also has similarity in terms of increase. Whereas the industrial sector used to be major consumer in early part of this century, interestingly the domestic sector is the major consumer of electricity in recent time. The Government of Bangladesh has always given effort to improve the energy access results in increase in energy consumption in for domestic sector.

Around the world, the use of renewable energy has become the supreme choice for ensuring affordable, reliable, and clean energy services. By 2050 Germany has set their target to generate at least 80 per cent of its required power from renewable energy and Denmark has ensured a target to get 50 per cent of its power from renewables by 2020. In case of India, by 2027 the non-fossil fuel based capacity development target is 57 per cent of the total electricity generation capacity. On the contrary, for Bangladesh renewable energy and imported power has presented as substitute for each other in PSMP-2016. Sadly, in the whole energy matrix, only 15 per cent of electricity generation target has been fixed for renewable energy or imported power capacity addition. The renewable energy based generation is shown as 7 TW-h in the same document which is going to be only 3 per cent comparing to the total demand by 2041. The Power System Master Plan (PSMP-2016) estimated 3.6 GW renewable energy based power generation potential all together. Although, a recent research predicted that, only from wind, there are 20 GW capacity potentials in Bangladesh. The cost of renewable energy generation is rapidly decreasing around the world. The PSMP-2016 also mentions that the cost of power

generation from renewable sources will decrease in near future. Mysteriously, the PSMP-2016 has no reflection of this global trend.

In order to developing the renewable energy sector, initial investment is not an issue anymore. The downward spiral trend of it's per unit cost made the payback period shorter than any other means of power generation. To solve problem of land and space constraint, various techniques are already available. Some of the most popular techniques worldly used are - floating solar, solar sharing, mini grid, micro grid, off shore installation and more. Fossil fuel based power generation is not possible on shallow wetlands, river banks, road lanes, empty rooftops space of buildings where as solar panel is very well fitted for these areas. While conventional power generation is encouraging lavish as well as luxurious consumption, renewable energy is fostering innovation and conservation.

The Sustainable & Renewable Energy Development Authority (SREDA) of Bangladesh has set a target to achieve about 2,337 MW of RE (Renewable Energy) installation by 2020. It will ensure that the share of RE installation in the entire generation mix is minimum 10%. Under the Power System Master Plan 2016, Bangladesh aims to add 2 GW RE projects to achieve installed capacity of 2,470 MW by 2021 and 3,864 MW by 2041.

Surprisingly, solar and wind will be the key focus areas for future capacity addition. These two sectors will account for about 50% and 40% of the 2,896 MW of RE-based installed capacity by 2021, respectively. Wind based generation accounts for only 0.6% of the RE-based generation in Bangladesh, will be thus register the largest growth. SREDA is also encouraging energy savings by adopting energy conservation measures. It has a target of saving 15% of the total energy consumption by 2021. A skilled workforce, conducive policy and regulatory mechanisms and an innovative enterprising business model encouraging prodigious investments will serve some of the key enablers for this growth in RE installations

| Technology | Percentage of Production | Installed Capacity by 2050 (MW) | Estimated Investment Required by 2050 (2013-billion \$) | Total End-use Power Delivered by 2050 (TW-h/year) |
|---------------------------------------|--------------------------|---|---|---|
| Residential rooftop solar | 27.8% | 66637 | 550 | 330.6 |
| Commercial & government rooftop solar | 7.8% | 19026 | | |
| Solar plants | 40% | 94722 | | |
| Concentrated solar plant (CSP) | 11.9% | 10915 (additional 6548 MW of CSP and 28375 MW of solar thermal for heat to address intermittency of wind and solar) | | |
| Wind (Onshore) | 5.8% | 5944 | | |
| Wind (Offshore) | 5.8% | 13077 | | |
| Wave energy | 0.5% | 1584 | | |
| Tidal energy | 0.1% | 150 | | |
| Hydro power | 0.3% | 230 | | |
| Geothermal | 0% | 0 | | |
| Total | 100% | 212285 | | |

Table: A vision map designed by Stanford University researchers for transition to 100 per cent wind, water, and solar for all purposes (electricity, transportation, heating/cooling, industry) of Bangladesh by 2050

- **Rationalization of electricity tariff:**

As a single buyer, BPDB procures power from Independent Power Producers (IPPs), Small Power Producers (SPPs), corporatized generation companies and other publicly owned power plants based on negotiated bulk power tariff rates. These rates are based on fuel type the plant uses, plant load factor and other operational parameters. On the other hand, BPDB sells electricity to the distribution utilities based on Bangladesh Energy

Regulatory Commission (BERC) the organization which regulates wholesale tariff rates. The overall objective of tariff rationalization should be to develop and maintain a simplified tariff framework with a reduced number of tariff categories and tariff levels that would ensure affordability, cost reflectivity and progressivity, and at the same time would encourage competition that promotes efficiency, economical use of the resources, good performance and investments in the sector.

The upcoming tariff pricing structures of Bangladesh's power sector need to forecast signals of efficient consumption, demand-side management and use of alternative energy sources which is only possible through the mechanisms of multi-part tariff, time-of-day tariffs, demand-based tariff, opt-in tariff and other novel solutions. A uniform and methodical process of tariff rationalization is thus essential to adequately reflect costs, improve the financial health of Palli Bidyut Samities (PBSs), optimise subsidies and fulfil tariff principles of fairness, transparency, availability and affordability.

- **Reforming subsidy arrangements:**

There are two types of electricity subsidies in Bangladesh: (i) For reducing the generation cost by subsidising the fuel (for example:- natural gas, diesel, coal furnace oil) cost for electricity generation; (ii) For reducing electricity tariffs for domestic consumers (including residential customers and farmers) and adjusting the losses incurred by BPDB through budgetary support. The total subsidy received from Government of Bangladesh from 2006-07 to 2015-16 on account of insufficiency in electricity tariffs amounts to 32,629 crore BDT.

Direct Benefit Transfer (DBT) is an attempt to change the mechanism of transferring subsidies to the end consumers and not to route them through utilities. It shall be designed to provide cash subsidies to lifeline customers, rural and poor families for using the electricity and avoiding subsidy leakage. Government directly makes cash payment to families covered under the electricity subsidy program so that it can decrease

overheads and corruption. However, large fuel subsidies make the country's fiscal position highly vulnerable to changes in global energy prices, which in a way provides benefits to low-, medium- and high-income groups whereas energy subsidies are provided in order to help the poor and low-income household groups. DBT focuses on the low-income segment of households and can be a more accurate way to provide relief to such groups which will also bring about savings through reduction in the subsidies provided by government. An indicative process which may be followed for DBT can be described as - a) formulation of legislative framework and setting up nodal agencies, b) providing a unique reference to all the residents of Bangladesh, c) efficient and up to date metering and billing system and d) link consumer bank accounts for subsidy transfer.

- **Facilitating RE (Renewable Energy) development:**

The lead actors need to adopt a collaborative approach to address the key barriers and facilitate a conducive market environment to increase the penetration of RE systems. The key stakeholders who need to be part of the action plan are:

Government: Along with policymakers at the national, regional and local levels, the government need to detach deployment barriers; establish frameworks that promote close collaboration between the PV (Photovoltaic) industry and the wider power sector. It is their duty to encourage private sector investment alongside increased public investment and establishing RE generation targets and incentives to ensure a stable policy landscape with a predictable financing environment and low soft costs to boost investor confidence.

Utilities: The utilities which includes all the power generation, transmission and distribution companies and power regulatory authorities, are key players in encouraging RE due to the technical and commercial impact on their operations. These power system factors are responsible for managing the integration of RE into the grid as well as maintaining system stability. They need to adopt appropriate technical and regulatory

guidelines to enable the deployment of RE systems that are distributed and changeable in nature.

RE Industry: To improve the robustness and efficiency of RE systems it is highly recommended to create skilled local jobs, lower project costs, develop sustainable business models and an efficient supply chain. Experts should provide a roadmap which will detail actions and milestones to aid policymakers, industry and power system factors (such as utilities) in their efforts to successfully deploy RE systems in an efficient manner to maximize their potential in Bangladesh.

- **Financing power sector projects – the current context**

By 2041, it is anticipated that Bangladesh will require investment of about 35 billion USD in the power generation sector. However, Bangladesh may face challenges to fund such investment requirement due to the following key limitations, such as:- lack of project finance Inadequate domestic funding options globally, project finance is used as a means to finance large infrastructure projects involving a special purpose vehicle (SPV) structure. Generally, project finance is not a recourse or limited course financing. This allows sponsors to protect their other investments. However, in Bangladesh, lenders sometimes demand corporate guarantees from sponsor shareholders as collateral besides project assets and sometimes assets of the sponsor shareholders outside of project assets. This tends to increase the cost of equity for sponsor shareholders. Bangladesh's bond market represents only 12% of its GDP which includes government bonds dominating the market as well. Historically, a few corporate bonds (non-power sector) that have been issued in Bangladesh have been privately placed, with only one listed on the Dhaka Stock Exchange. Most of the lending are for very short term periods. Further, the private equity industry (including venture capital) in Bangladesh is largely at an initial stage. As a result, the power companies typically fund the projects through accumulated earnings or by the help of long-term multilateral loans. Nevertheless, accumulated earnings are often

limited and long term multilateral loans are bound by country and sector limits. Hence, companies often turn to financing long-term project with short-term financing, thereby causing asset liability mismatches.

Recommendation

In today's economy to sustain in the long run, not only the availability but also the quality and cost of electricity are fundamental. No one wants to buy and use electricity at a high price off course. Unfortunately, power sector of Bangladesh is heading towards that direction. According to PSMP-2016, average electricity tariff will be Tk 8.52, 11.02 and 12.79 per unit in nominal price by the year of 2021, 2031 and 2041 respectively. However, there is still hope as renewable energy dependent self-reliant energy mix can produce electricity at a very lower rate than this. At the same time this process will protect our life, livelihood, ecology and environment. Indeed Bangladesh needs a people oriented energy sector rather than a sector that manipulates the question of energy generation as means of making a handful of people rich and deplete the nations of its biodiversity and natural resources. To get rid of the turmoil in power sector, we need to be aware and challenge the status quo for a better future.

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