

Rental Power Plants: Solutions or Problems?

ONE OF THE MOSTLY HYPED ISSUES OF RECENT TIMES

By Md. Ashaduzaman Riadh and Rajib Kumar Das



49 Liquid Fuel Based Power Plant Deals So Far

Category	No.	Capacity (MW)
Rentals	3	265
Quick Rentals	17	1388
IPPs	11	1656
Government Owned	18	2110
Total	49	5419

Liquid Fuel Based Power Plants In Operation

Category	No.	Capacity (MW)
Rentals	3	265
Quick Rentals	13	1088
Government Owned	8	591
Total	24	1944



Liquid Fuel Based Power Plants Under Construction

Category	No.	Capacity (MW)
Quick Rentals	4	300
IPPs	11	1656
Government Owned	10	1519
Total	25	3475

The quick-rental operation launched in the country's power sector is the single factor that disrupted discipline in the financial system as a whole. Bangladesh Petroleum Corporation (BPC) is being overburdened with the debts to import oil being used to run the plants. In order to reduce the debt, the price of fuel has been raised on five occasions in a single year. Power tariffs have been raised manifold over the three and a half years and another round of increase is in the offing. Purchasing power of general mass has significantly dropped down.

All these consequences have triggered down the feasibility of rental power plants whether these plants are reaping real benefits for the economy or not. We had the opportunity to talk with two veteran energy experts, Dr. Mohammad Tamim and Md. Taubidul Islam, about the pros and cons of much-debated rental power plants and other crucial issues about energy sector.

According to Bangladesh Power Development Board (BPDB), maximum electricity generation in 2012 was 6,066 MW as on 22 March 2012 which is very close to the installed capacity of 6,693 MW. It is also to be noted that this is the maximum electricity generation in the history of Bangladesh in a single day. But in general, the average electricity generation hovers around 5,000 MW in summer against demand of about 7,500 MW.

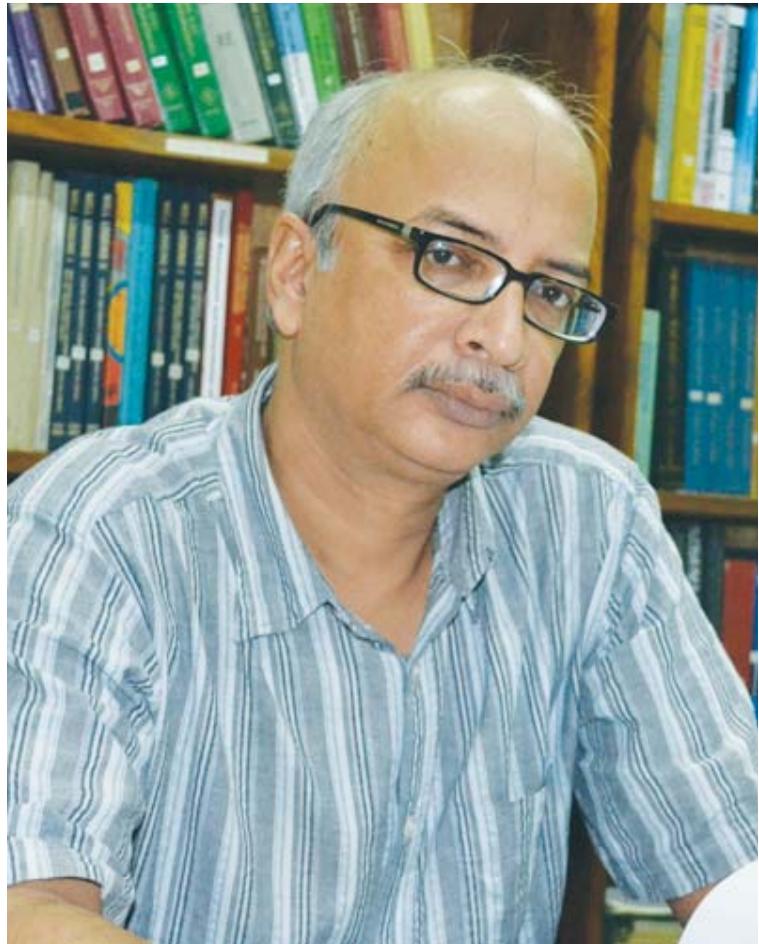
Bangladesh always had demand-supply deficit in electricity generation over the last several years except a surplus for a very short period during 1999-2001. The mega gas-fired power projects in Meghnaghat and Haripur helped BPDB to have some surplus in electricity generation at that period. The demand supply mismatch was quite manageable but fuel shortage, mainly acute scarcity of natural gas, was suddenly discovered in 2004-05 period and the whole story started getting changed.

“I SUPPORT RENTAL POWER PLANTS. I BELIEVE THAT FOR SHORT TIME AND QUICK SOLUTION, THERE WAS NO OPTION BUT TO GO FOR RENTAL POWER PLANTS. BUT THERE SHOULD HAVE BEEN A CAP AND THOROUGH UNDERSTANDING.”

Dr. Mohammad Tamim

Professor

Head of the Department of Petroleum and Mineral Resources Engineering
Bangladesh University of Engineering & Technology (BUET)





IF YOU TRULY WANT TO JUDGE WHAT IS HAPPENING, YOU ACTUALLY NEED TO SEE THE SUFFERINGS OF PEOPLE. YOU DO NOT BELIEVE NUMBERS BECAUSE ELECTRICITY GENERATION NUMBERS BY BPDB ARE FINE BUT ELECTRICITY DEMAND NUMBERS ARE COOKED UP. EITHER BPDB HAS NO IDEA OR ANALYSIS ABOUT DEMAND OR THEY DO NOT CONFIRM REAL NUMBERS EVEN IF THEY KNOW.

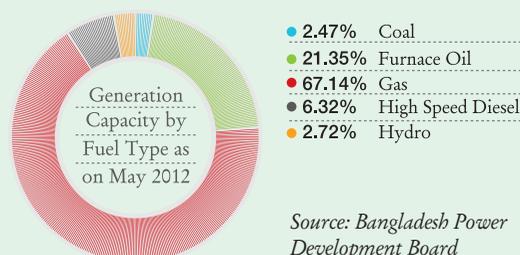
The load-shedding generally ranges between 500 MW to 2,000 MW which mainly depends on two issues. The first reason is hot summer when the demand is so high and the second is the production of electricity. Electricity generation is hovering around 5,000 MW to 5,300 MW now. During summer of 2008, the electricity generation was hovering around 4,200 MW. So, the net electricity addition to nation grid had been around 1,000 MW during the last four years. This does not mean that less electricity has been added to the national grid. Actual electricity generation was about 1,500 MW to 2,000 MW considering average capacity utilization and shut down of 800 MW old aged gas-fired power plants due to acute gas crisis and operational inefficiency. During 1999-2007 periods, the problem of power sector was no new generation of electricity even after having sufficient fuel especially natural gas. The shortage of primary fuel was suddenly exposed in 2007. Under that scenario, choices were very limited to augment the electricity generation. The options available were either increasing gas supply through exploration of on-shore and off-shore gas fields to feed the power plants which was time consuming or installing oil run power plants which is the quickest possible alternative to increase electricity generation. At the end of 2006, the then government thought about the rental power plants and prepared 35 initial contracts. But then the caretaker government cancelled all those contracts and prepared fresh bidding of 10 contracts with a capacity of around 800 MW to 1,000 MW in 2007. The idea of rental power plants at that time was to install no more than 2,000 MW oil-fired power plants since it was considered a temporary high priced solution. During the caretaker government 250 MW was added to the national grid and 600 MW was in the pipeline which was added to the national grid in current government tenure. Tamim explained the background of current demand-supply mismatch.

How long these oil-fired power plants will run requires a thorough analysis at the planning stage. This includes forecasting of necessary volume of fuel import and its cost, financing sources, developing transportation and storage capacity of fuel etc. All these have to be planned and coordinated with the help of Ministry of Power, Energy and Mineral Resources, Ministry of Finance, Ministry of Shipping, Bangladesh Railway and other related government agencies. The caretaker government tried to go for coal based power plants and some gas based power plants like two combined cycle Bibiyana power plants of 341 MW each in Sylhet and 225 MW combined cycle Shahbazpur power plant in Bhola. Unfortunately, the caretaker government could not award those contracts as there was only single bid at that time and the bidder was asking for higher price. With short tenure of the caretaker government it was difficult to finalize and implement the long-term projects. Yet the government focused on short-term management and tried to establish some long-term goals also. The current government was not also in favor of rental

power plants because of its high cost. But the government had no other option but to install rental power plants to keep pace with the exponential electricity demand and to keep the load-shedding at a tolerable level. The government should have focused more on the mid-term and long-term plans from the first day of their office. The government could have strongly focused on gas based power plants in Bibiyana I & II, Meghnaghat and Shahbazpur totaling a capacity of 1,242 MW. That would have helped swap some of the costly oil-fired power plants by this time which was the original plan of the government.

The government claims that 3,700 MW electricity has been added to the national grid so far. In accordance with that, the net electricity addition should have been around 2,500 MW considering the average utilization capacity. Thus, total electricity generation should be around 6,000-6,500 MW. But the reality is somewhat different because the average electricity generation is around 5,000 MW in summer. These power plants could not have been able to run at full capacity due to high fuel price in international market, fund crunch, insufficient infrastructure in transportation and storage etc. In addition, mounting subsidy burden due to soaring fuel import and high import cost pushed the government to raise the fuel and electricity prices manifold in recent time. In some cases, the government found it more appropriate to compensate the rental power plants by stand-by payment referred to as 'capacity payment'. Those plants were ready to go for electricity generation but could not do so as the government failed to supply sufficient volume of fuel to the plants. Interestingly, the power policy issued by BPDB in 2009-2010 includes the plant to generate electricity of 2500 MW oil fired, 2200 MW dual fuel fired, and 4000 MW gas fired. This policy itself was questionable from the perspective that BPDB planned to generate about 4,000 MW electricity by expensive furnace oil and diesel effectively. Tamim extended his explanation.

Fuel diversification has been a buzzword in the development of power sector. Gas has been the major primary fuel in generating electricity which held about 75 percent of the total electricity generation over the years. But acute gas crisis has almost forced the government to install expensive fuel run power plants to reduce the power crisis in shortest possible time. There were mid-term and long term plans in the power policy to ease the power crisis, but all went in



vein since no base-load power plants are in place to substitute the expensive fuel based power plants.

improve capacity building in true sense.

The government has taken initiatives to set a LNG terminal. Four international companies were invited to submit bids. But the project suffered a setback when none of the short-listed firms turned up and submitted bid on close of bid submission deadline. From the viewpoint of fuel diversification, LNG can be an alternative. The per unit cost of LNG would be little cheaper than that of heavy fuel oil. But it requires an upfront investment of \$1 billion for temporary terminal and \$2 billion for permanent terminal. Again,

What Should Be The Appropriate Fuel Mix?



Furnace oil and diesel run power plants are holding approximately 30 percent of total electricity generation now in the country. Most of these projects are run by private electricity generation companies tagging tenure of 3 to 5 years. It seems that the tenure of these power plants would be extended for some more years since the government may not be able to generate electricity from base-load power plants (especially from indigenous or imported coal) before 2015 or 2016.

When asked whether the appropriate policy level initiatives by the government to develop the gas sector is in place or not, the energy expert marked out little success by the government in this cause. Bangladesh's overall gas production is now around 2.15 BCF (Billion Cubic Feet) per day against the demand for over 2.7-3.0 BCF per day. BAPEX, responsible for the development of gas sector, showed some success by exploring on-shore gas fields through 3D seismic survey in recent times. BAPEX has so far drilled six exploratory wells and found gas in four wells meaning that its success ratio is 3:2. This step up in national capacity building is a fully essential for the country from long-term perspective. But it is more demanding that the government seriously try for extensive off-shore exploration by International Oil Companies (IOCs) which is technologically and financially viable, because BAPEX cannot accomplish the entire exploration at the rate that it needs. But the government can devise the deal with IOCs in such a method that BAPEX can be involved with IOCs in exploration process that help the national authority



IT IS A COMPLETELY DECEIVING STATEMENT BY PETROBANGLA ABOUT EXPLORATION OF NEW OIL FIELD IN HARIPUR IN RECENT TIME. PETROBANGLA HAS JUST GIVEN STATISTICS ON PROBABLE RESERVES. BUT THE WAY IT WAS TALKED ABOUT AS IF IT WERE PROVEN RESERVES. WE PREVIOUSLY FOUND OIL IN THE HIGHER STRUCTURES IN HARIPUR. NOW BAPEX CLAIMED THAT IT FOUND ANOTHER TWO OR THREE STRUCTURES BENEATH IT FROM WHICH OIL CAN BE EXTRACTED. THEY ARE ASSUMING THAT THESE NEW STRUCTURES HAVE OIL SINCE THESE ARE ADJACENT TO THE HIGHER STRUCTURE FROM WHICH OIL HAD ALREADY BEEN EXTRACTED.



YOU JUST CANNOT TAKE A WRONG POLICY IN POWER SECTOR. YOU CAN ONLY GO FOR EXPENSIVE SOLUTIONS AFTER EXHAUSTING THE CHEAP SOLUTION. BY EXPLORING YOUR CHEAP SOLUTION, YOU HAVE A CHANCE TO IMPROVE YOUR ECONOMY TO A LEVEL WHERE YOU CAN AFFORD A HIGH-PRICED SOLUTION. THAT IS THE WHOLE IDEA. THE COMPARATIVE ADVANTAGE OF BANGLADESH IS CHEAP ENERGY AND CHEAP LABOR. ENERGY SECURITY REQUIRES THE GOVERNMENT TO PROVIDE ACCESSIBILITY, AVAILABILITY AND AFFORDABILITY.

the cost of importing LNG would be around \$15 per unit at the terminal. The cost will be further adjusted upward when the LNG will be distributed to the end users from the terminal. So it will be difficult for the government to set a price for LNG consumers while the weighted average gas price is \$ 1.60 per unit which is very low compared to other developing countries. In the process, the government will be forced to raise the gas price upto \$4 at minimum to compensate the high LNG price. This will result in natural gas price hike manifold. Thus, the feasibility study of LNG project requires further thorough reassessment whether the LNG project is financially and economically viable or not.

Sudden changes in tariff structure are forcing the residential electricity users in the city to pay at least 50 per cent more in their bills since March this year. The government hiked power prices on March 01 and withdrew the common lowest slab facility that had been enjoyed by all residential users earlier. The households now pay BDT 3.05 for per kilowatt of power consumption if their total monthly usage is below 100 units. However, they have to pay BDT 4.29 per unit for electricity usage above 100 units and below 400 units a month. Households consuming more than 400 units have to pay a hefty BDT 7.89 per unit. The rates apply to customers of the Power Development Board (PDB), Dhaka Power Distribution Company Ltd (DPDC), Dhaka Electric Supply Company Ltd (DESCO) and West Zone Power Distribution Company Ltd (WZPDC). Earlier, households used to pay a mandatory minimum bill plus an additional amount of money as electricity charges for their consumption above 100 units. If the electricity consumption of a home exceeded 100 units and remained below 400 units, they paid higher rates for the units consumed above the 100 mark. Now, the unit price of electricity for households squarely depends on how much power is consumed in a month. On its part, Bangladesh Energy Regulatory Commission (BERC) contended that the common lowest slab facility has been withdrawn in order to relieve the government from a huge load of subsidies in the power sector. Tamim termed the withdrawal of common lowest slab facility as unethical because there was no consensus through public hearing

on this crucial issue.

The government has signed a Memorandum of Understanding (MoU) with Russia to install a nuclear power plant of 1000 MW as the country looks to close a yawning power deficit. The construction of the plant would start by 2013 and would take five years to complete. Russia will provide technical support for building the two generators - at Ruppur in Pabna district, 120km (75 miles) north of the capital, Dhaka. Russia will help to provide legal and staffing support. Russia will supply funding for the plants in addition to providing fuel. Russia will also take back depleted fuel rods for safe storage. The plants will have a life cycle of 60 years with another 20-year extension. The safety is vital issue for any nuclear energy plant which is brought by the massive disaster in Fukushima in Japan after the Tsunami. The plants will implement new safety features following the nuclear accident in Fukushima in Japan. Bangladesh is buying the latest Third Generation technology from Russia where a five-layer security measure will be installed. It will be built to resist the combined effect of a powerful tsunami and earthquake. It will have a water-based cooling system, but in case of a power failure, automatic air ventilation system will start the cool-down process. The plant structure will be built to withstand even a big aircraft crash. When asked about the potential about nuclear power plant in Bangladesh, the energy expert told that nuclear can be another option from fuel diversification perspective. But for a country like Bangladesh with high population density, nuclear would be a highly risky alternative. Tamim also points out that the electricity generation cost would be much cheaper than other alternatives. Though Russia assured the funding of \$3 billion in the nuclear power project, it would be a challenge for the government to implement the project in scheduled time. Assuming that all the technical, economical and financial concerns are mitigated, it will take at least 5-7 years to complete the nuclear power projects after the ground-breaking.

The biggest impediment to developing coal based power plants is the lackluster role played by the governments of present and past tenures. In true sense, there is no need for much-hyped fresh coal policy if both political parties come into a consensus to develop coal based power plants. He also asked the authority to take amendments earlier rather than later if necessary. The coal reserves possess highly-valued coking coal. Coking coal can either be exported or guaranteed to local heavy steel mill or aluminum companies. This would help generate employment and the economy can get direct benefit of it. The energy expert suggested the government to take time-befitting initiatives to develop coal sector as the country has better bargaining position with foreign firms in terms of royalty payment and other crucial issues. He feared that this bargaining



I DO NOT THINK IT IS WORTH TAKING THE RISK OF ESTABLISHING NUCLEAR POWER PLANTS. IF YOU DEVELOP COAL, YOU CAN PRODUCE 10,000 MW ELECTRICITY FOR 30 YEARS EASILY WITH WHATEVER COAL RESERVES WE HAVE.

position will no longer be available when the power crisis will get worse and worse.

The government is going to prepare a guideline by December on the automatic price adjustment of fuel oil on the local market. By way of the new system, prices of petroleum products will be set at the local level in line with the prices of the international market. The government now sets prices of petroleum products, which are all imported, under a system called 'administrative price adjustment policy'. The overall size of the subsidy has grown rapidly in recent years because of rising import costs and inadequate cost recovery undermining the fiscal position and overall macroeconomic stability. The energy expert advocated the idea of automatic price adjustment of fuel only under the condition that the whole benefit of subsidy should reach the general people which would be really difficult to ensure. Subsidy is being provided in two tiers: one in the fuel price and another in the electricity tariff. In Bangladesh, general people do not get the direct benefit of subsidy. Moreover, government is the main buyer of the two-thirds of petroleum products which are being used for generating electricity and supplying to the end users through petrol pumps. Tamim suggested elimination of at least one tier of subsidy, especially adjustment of electricity tariff, which is more controllable. Automatic adjustment of fuel price generally requires proportionate adjustment in fare of public transportation vehicles. The government needs to establish an integrated mechanism of automatic price adjustment of fuel that ensures proportionate adjustment in fare of public transportation

vehicles in both directions.



EVENTUALLY, THE SUBSIDY ON FUEL IS PASSED TO THE GENERAL PEOPLE THROUGH ELECTRICITY PRICE HIKE. YOU ARE INCREASING THE ELECTRICITY PRICE TO REDUCE THE SUBSIDY. IF YOU INCREASE ELECTRICITY PRICE, YOU CAN NOT INCREASE THE FUEL PRICE. YOU CAN NOT HAVE DOUBLE ADJUSTMENT IN BOTH ENDS.

“IT IS AN OPTION BETWEEN COSTLY POWER AND NO POWER. WHICH OPTION WILL YOU CHOOSE? IF YOU DON'T TAKE COSTLY POWER OPTION, YOU HAVE TO ACCEPT NO POWER SITUATION. THE GAP BETWEEN DEMAND AND SUPPLY OF ELECTRICITY BASED ON NATURAL GAS IS SO ACUTE THAT THERE IS NO WAY TO GO FOR NO POWER OPTION.”

Md. Tauhidul Islam
Managing Director
Summit Power Limited



When asked about the progress of power sector so far, Islam, energy professional with 41 years of experience, thoughtfully replied that power sector in Bangladesh has exhibited development but the development could have been more noteworthy if appropriate and time-befitting policy level supports were in place. More than 3,000 MW electricity that had been added to the national grid during last three years is mostly rental HFO based power plants which require larger volume of furnace oil and diesel. Most of rental power plants are operating below their full capacity mainly because of inability of Bangladesh Petroleum Corporation (BPC) to supply required furnace oil and diesel due to financial crunch. It is to be noted that the government provides subsidy in two layers; initially in imported fuel components' price sold to Bangladesh Power Development Board (BPDB) and later on the electricity tariff that has been generated through that subsidized fuel components.

The basic idea of establishing rental power plants or any other costly power plants is that these are generally set up to mitigate the demand-supply mismatch between peak and off-peak hours. These rental power plants are also used in seasonal peak time like irrigation season.



RENTAL POWER PLANTS HAVE BOTH SIDES OF THE COIN: GOOD AND BAD. THE GOOD SIDE IS THAT THE COUNTRY BADLY NEEDED ADDITIONAL ELECTRICITY TO REMAIN ITS ECONOMIC ACTIVITIES OPERATIONAL TO MAINTAIN GDP GROWTH RATE ABOVE 6 PERCENT. THE BAD SIDE IS THAT THE GOVERNMENT COULD HAVE LIMITED ITS ISSUANCE OF RENTAL POWER PLANTS TO A REASONABLE LEVEL THAT DOES NOT HURT THE ECONOMY AS A WHOLE.

Most of the rental power plants have been shut down or operated below capacity due to mounting subsidy burden by BPC and BPDB. BPDB should have done its thorough study before installing these power plants especially the fuel requirement and financing sources. The return on investment of these projects seems bleak and the whole idea of rental and quick rental power plants becomes dubious. Islam continued his examination of installing rental power plants.

Islam firmly believes that there is no other alternative to add electricity to national grid in quickest possible time but to install HFO based rental power plants. The government's decision of installing rental power plants with short tenure of 3 to 5 years was a wrong decision. It would be better to install HFO based power plants of large scale generation capacity with longer tenure like 15 years. Thus the investment cost in these power plants would be relatively less and the investment return would be higher; the

OIL IMPORT DURING LAST FEW YEARS

FUEL IMPORT EXPERIENCED STAGGERING 84.62% GROWTH DURING 2010-11 IN LINE WITH INSTALLING LIQUID FUEL BASED POWER PLANTS. FUEL IMPORT HAD DROPPED DOWN TO 10.42% IN 2011-12.



economy would have reaped the real benefit of rental power plants. He also marked the point that the original rental concept does not match the rental concept popularized in Bangladesh. Because the foundation cost of setting up a rental power plant is much less than that is practiced here. These plants are generally replaced and sold to other destinations as these are easily floated to another place.

There is an accusation that most of private electricity generation companies have used low quality machineries in power projects. This is supposed to hamper the generation of electricity by these power plants at full capacity. Islam agreed that approximately 30 percent of HFO based power plants employed low quality reconditioned machineries. He also criticized BPDB for setting a shorter tenure of 5 years for rental power plants. This provision may have enticed many business people to book short term profit.

Most of private electricity generation companies were penalized

AGES OF OLD POWER PLANTS

Too many gas-fired old aged power plants. Need Renovation...

Power Plants Age	No of Power Plants
Over 40 Years	5
31 to 40 Years	11
21 to 30 Years	23
11 to 20 Years	19

AGED POWER PLANTS

Ghorasal Power Plant
 Ashuganj Power Plant
 Pausan Power Plant
 Khulna Power Plant
 Shahjibazar Power Plant
 Barisal Power Plant
 Barapukuria Power Plant
 Siddhirganj Power Plant

OIL UTILIZED IN POWER GENERATION (%)

PROPORTIONATE LIQUID FUEL UTILIZATION IN POWER GENERATION SEEMS TO SURGE AS NO BASE-LOAD POWER PLANTS WOULD REPLACE THE COSTLY HFO BASED RENTAL POWER PLANTS IN NEXT FEW YEARS.



■ Oil Utilized in Power Generation (%) ■ Oil Import (Mn Metric Tonnes)

SUBSIDY IN ELECTRICITY

SUBSIDY TO THE POWER SECTOR TAKES UP MOST OF THE ALLOCATION. RELIANCE OF FUEL BASED QUICK RENTALS IS NOT WELL BALANCED IN THE MACRO-ECONOMIC PERSPECTIVE OF THE COUNTRY BECAUSE IT IS CREATING A HEFTY SUBSIDY BURDEN ON THE ECONOMY.



■ Total Subsidy (BDT Crore) ■ Subsidy in Electricity (BDT Crore)

for not commissioning the quick rental power plants in scheduled time. This indicates lack of ground study by the private electricity companies winning the bidding and by the government as well. The energy professional termed setting up a rental power plant within 9 months after contract signing as highly ambitious by BPDB. According to international standard, at least 13 months should be given to a rental power plant to come into commercial operation.

There has been a great deal of interest and press write-ups on imported coal-fired power plants to generate what is thought to be cheaper power, and talk on why the government did not go for cheaper coal power in the first place. A 1,000 MW coal-fired plant consumes between 3 million to 3.5 million tonnes of coal per annum. If the entire liquid-fuelled rental power capacity of 3,000 MW was generated in 3 coal power plants of 1,000 MW each it would have required over 10 million tonnes of imported coal every year. The present port facilities in the country are completely incapable of handling bulk cargo, leave alone 10 million tonnes of coal. There is no way imported coal fired plants would have been viable without a deep water seaport facility to handle 200,000 tonne bulk coal carriers. By default a coal-based power project would be based in Chittagong near a deep seaport facility. There are plenty of examples of coastal power plants based on imported coal in Japan, Korea and more recently in India.

Further, unlike HFO, bulk coal is sold on long term contracts. This would mean entering into 30 year contracts, which is the estimated economic lifetime of a coal-fired power plant, with coal mine concessionaires in the major coal exporting countries such as Indonesia or South Africa. This would have meant huge up-front payments to the concessionaire or buying a stake in the mine as most power utilities in the world do. Further, the huge concentrated power of 3,000 MW would have required a high voltage, of at least 400 Kv, power grid for distributing the power. The cost of building such a grid would have been enormous. Considering the huge amortization costs of a deep water port for coal handling and a coal-based power complex and a high voltage grid the very thought of low cost power from coal is a mirage.

Islam focused more on the coal sector development. Lack of political will and inability to deal with international contracts are the main reasons behind the underdevelopment of coal sector. He is also skeptical about the success of power plants based on imported coal signed by the government due to lack of adequate infrastructure, navigability of sea, and unplanned project location.

The veteran energy professional strongly advocates the government initiatives to set a mechanism for automatic fuel price adjustment tagged with international fuel price. He firmly believes that subsidy should be directly provided only to targeted people. Islam also suggested the government to go for extensive exploration of on-shore and off-shore gas fields. Islam also recommended to take proper initiatives to set LNG terminal to ensure energy security.

Islam strongly proposed nuclear power plants as an alternative solution as these power plants have longer tenure like 50 to 60 years with extension time provision. The per unit electricity cost is much cheaper than any other alternatives even though the initial investment cost is very high. Advanced technology should be used to reduce the radiation leak and other environmental concerns.

Both veteran energy personality concluded their interview by suggesting the government to explore the on-shore and off-shore gas fields, develop coal based power plants immediately and ensure energy security through appropriate fuel diversification.

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