

How to adopt clean coal technology



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Bangladesh has a vision to make electricity available to every household within 2021—the year that marks the 50th anniversary of independence. Within this period the government has set a target for power generation of 24,000 MW. The government also intends to attain per capita annual income of USD 2,000 (at constant 2013 dollars) from the present USD 1,400 by 2021, thus crossing the middle income threshold. Whatever target we put forward as a developing country intending to graduate from the present status to a middle income country will depend on the availability of energy supply, including electric energy. Growth cannot happen without effective energy supply. At the same time, growth will have an impact on the demand for commercial energy. And per capita income rise will demand more energy use.

To attain the vision of the government to make electricity available for all by 2021, a plan has been prepared for short-, medium- and long-term power generation, using gas, coal, liquid fuel, nuclear and renewable energy resources. The government has made remarkable progress in managing power crisis during the last eight years by adopting short term power generation based on imported liquid fuel and partly by using local natural gas. Presently, 28 percent of the country's power generation is dependent on

are included, the natural gas deficit will be no less than 1,000 mmcf per day.), and there is little indication of addition of new gas reserve in the near future. As a result, dependency of imported primary fuel for power generation is increasing day by day. Draft Power Systems Master Plan (PSMP) 2016 of the government has estimated 35 percent contribution of natural gas and imported Liquid Natural Gas (LNG) for power generation. The same document estimates 35 percent contribution of coal (imported) for power generation. The balance of 30 percent is to be met from fuel oil, power import, nuclear and renewable sources. The annual import of liquid fuel oil now reached 6.2 million tonnes. 47 percent of the imported fuel oil has been used in the transport sector, 17 percent in irrigation and 26 percent for power generation. Installed capacity of liquid fuel based (furnace oil and diesel) power generation in the country is now about 3,000 MW. In 2018 it is expected that the liquid fuel based power plants' installed capacity will reach 4,500 MW and accordingly use of liquid fuel for power generation in the country will increase 1.5 times compared to the present consumptions. Implementation of public sector coal-fired mega power plant projects in Matarbari, Rampal and Payra have been progressing but with delay. Construction works on a number of contracts signed for coal based power plants (in Banshkhali, Anwara, Moheshkhali, Mawa) with private sec-

Experts have been raising concerns as to how the price shock can be absorbed in the local market if the planned 2,500-3,000 million cubic feet of LNG converted gas per day is injected in the pipelines from import sources between 2018 and 2030.

Bangladesh has little option but to develop coal based power generation and mine its own coal from the known resource fields in the northern part of the country as the existing alternatives are costlier and technically and financially unsustainable. At the same time, Bangladesh can take advantage of the availability of advanced and least emitting technology for coal fired power generation as it has delayed in coal use (present coal based power generation is less than 2 percent) for power generation. Sector experts consider that appropriate fuel fix for power generation and sustainable growth can be achieved only with increasing share of coal and with domestic coal productions and their increased use. Failure to utilise domestic coal would force the country to be 90 percent reliant on imported fuel by 2030.

Generally, coal has been considered as a 'dirty' fuel but it has been used as the vital energy resource for power generation worldwide. Coal fired power generation technology has been significantly advanced restricting emissions and cost of power. Globally, coal is the cheapest primary energy source, most readily available fuel. Coal consump-

tion is expected to rise by 18 percent by 2040 in the world and its major part will be consumed in Asia. Despite aggressive initiatives worldwide for pushing alternative energy sources, coal could not be totally replaced, and in the coming decades it will continue to play a significant role in supplying

For facilitating import of coal in large volumes, Bangladesh needs to develop suitable locations for imported coal based power plants, coal handling and unloading ports suitable for allowing berthing of ocean-going vessels with coal load.

electric power to the world. Global warming and climate concerns demand adoption of clean coal technology. Also, major greenhouse gas emitting countries have been capping coal use to a certain limit for power generation. Developed nations have been engaged

in rebuilding the outdated technology-based power plants using clean coal technology and heading towards balanced mix with coal fired power generation and alternatives to reduce greenhouse gas emission.

Clean coal technology includes a set of technologies being developed to mitigate the environmental impacts of coal fired power generation. Initially, the clean coal technology focus was to reduce emissions of particulates, SO_x, NO_x and mercury but later the focus moved to the development of low or near zero greenhouse gas emission technologies such as CO₂ capture and storage (CCS) technology. Depending on the properties of coal used as fuel, the gaseous emissions generated by the burning of coal include sulphur dioxide (SO₂), nitrogen oxides (NO_x), carbon dioxide (CO₂), soot and smog, mercury, chlorine and other chemical by-products. These emissions have been established to cause visible air pollution and deleterious effects on human health.

To reduce pollution coal can be washed and dried to purify before it burns. Coal washing removes unwanted minerals by mixing crushed coal with water and allowing the impurities to separate and settle.

Other technologies minimise emissions of sulphur dioxide, nitrogen oxides and particulates.

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liquid fuel, and more oil based plants are in the pipeline to generate power. Ensuring uninterrupted supply of primary fuel for power generation is a major challenge for base load power project implementation in the country. For the last couple of years the government was able to avoid serious financial difficulties for importing large volumes of liquid petroleum as the international petroleum market was depressed and crude oil supply outstripped demands. But with the changing global oil market, the government may encounter an extremely difficult situation to secure fuel oil and power supply at an affordable price to all sections of people. In the recent past, the government intended to reduce fuel oil prices for domestic market. The State Minister for Power, Energy and Mineral Resources stated on January 18, 2017 that, "We had planned to reduce fuel prices in two phases. But that is not happening as the oil price is showing an upward trend in the global market." According to World Bank forecast, oil price would continue to show an upward trend in the next one year. The International Monetary Fund also expects the average oil price to grow by 19.9 percent in 2017 in comparison with the average indicator of 2016.

Proven reserve of natural gas has been depleting fast (Petrobangla, the public sector company, can now supply 2,750 million cubic feet (mmcf) of gas per day against the daily demand for 3,300 mmcf. If the unserved demands

for investors have not started as yet. Concerns have been raised whether the investors can implement these projects timely to reduce reliance on costly liquid fuel and LNG. With the delay in coal based power plant project implementation, and increasing fuel oil prices in the international market, Bangladesh may have to face the reality that power generation will be costlier and more dependent on imported liquid fuel and LNG.

Coal and natural gas are the only proven sources of commercial fuel in Bangladesh. The government has been hesitant for several years to go for local coal mine development in a commercial scale, mainly due to political reasons. At the same time, the government has been struggling to address the challenges of coal and LNG import facilities development. For facilitating import of coal in large volumes, Bangladesh needs to develop suitable locations for imported coal based power plants, coal handling and unloading ports suitable for allowing berthing of ocean-going vessels with coal load. Ensuring reliable and cost effective facilities for import, coal transportation and handling remains a major challenge for now. They will continue to be challenging in future.

Plans for increasing reliance on imported LNG are linked to cost risks. The present weighted average cost for 1000 million cubic feet of natural gas is USD 2.5, contrary to the equivalent volume of LNG costing USD 14-15.

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