

# Is energy security achievable in Bangladesh?



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AHMED A. AZAD

A CUTIE shortage of electricity and natural gas has forced the government to resort to the establishment of rental power stations, bypassing official procurement procedures. For the moment the people are prepared to accept the government's compulsion to rent equipment and buy fuel at exorbitant prices, but they are aware that the crisis has arisen because of policy failures of past governments and the lack of readiness of the present one.

Unless a comprehensive energy policy that recognises the paucity of our natural resources and the need to invest in alternative energy sources and contemporary technologies is developed Bangladesh will not be able to achieve long-term energy security.

A much better and more permanent option would be to buy electricity from Nepal and Bhutan or, even better, to go into joint venture projects with them. This would, of course, depend on friendly relations and cooperation in South Asia. The government must be given due credit for actively championing this cause.

The projected establishment with Russian help of two commercial nuclear reactors in Rooppur has caused a lot of excitement and also some apprehension. When fully operational in the next seven to ten years these reactors will help to meet a substantial portion of our power needs and is, therefore, a welcome development.

Some valid concerns regarding cost, safety and security have been raised by many commentators in both the print

and the electronic media. It is true that third generation nuclear reactors are much safer but they cannot be guaranteed to be failsafe, and Bangladesh is ill-equipped to manage a major nuclear disaster arising from leakage or meltdown. I expect that the government will review all safety concerns before signing the final agreement.

Although nuclear energy could fulfil some of our energy needs for the foreseeable future it cannot be a long-term solution as Bangladesh will remain dependent on others for enriched reactor fuel. Known reserves of uranium, contrary to what has been claimed, are expected to run out in the next few decades. It will be prudent to base our long-term plans on what is available in Bangladesh.

The coal and gas reserves in Bangladesh are national assets that belong to the people, and rights to these cannot be sold off for ridiculously low royalties to foreign companies. When local expertise and capacity are not available then the exploration and mining rights could be leased to foreign companies in return for payment of adequate resources tax; a better option would be to hire required expertise and equipment for a defined period.

Because of the very low reserves of fossil fuels and the huge domestic demand it would not be sensible to export even an iota of any gas or coal mined in Bangladesh before meeting domestic needs.

Bangladesh relies almost exclusively on natural gas for electricity production even though the known reserves of natural gas are very limited. There is no doubt that much more natural gas is required than is produced in Bangladesh. First, it should be established if existing gas wells are capable of producing more, and any imposed ceilings on higher production should be removed.

Secondly, there has to be a much bigger effort given to the discovery and mining of new wells, with preference for exploration given to local companies if they have the required expertise and capabilities.

Thirdly natural gas should not be wasted for the production of urea if alternative fertilisers can be found. Finally, the unrestricted supply of natural gas (CNG) at very low price to private cars, the owners of which can easily afford to buy gasoline, is another wasteful policy that needs to be stopped

immediately.

Bangladesh has reasonable reserves of relatively good quality coal and there is no other option to using this valuable resource for economic development and employment generation, which are required for poverty alleviation.

Satisfactory solutions to the successful mining of each of the coalfields can be found through consultations and discussions with local residents, environmentalists and technical experts. Bangladesh should also seriously consider alternatives to mining such as in situ gasification and minimisation of atmospheric pollution through carbon capture.

Over the years, some local energy companies have built up valuable expertise, but much of it has been lost due to their under-utilisation and subsequent brain drain. Many of these home-grown experts, and NRB scientists and technicians that have been trained overseas, now hold important positions with multinational energy companies and academic and research institutions in other countries.

It would be best to create conditions to reverse the brain drain and, at the very least, to request NRB experts to volunteer their time to build up capacity at home. There are many NRB scientists and technicians who would gladly volunteer their time and valuable expertise during their annual holidays if the government and universities were prepared to look after their travel and pool expenses. They could also form a pool of technical experts that could provide relevant and appropriate advice.

Bangladesh's known gas reserves will run out soon and the coal reserves will last for only the next few decades. Supply of enriched nuclear fuel, which is governed by geopolitical and security considerations, cannot be guaranteed for long as known uranium reserves are also expected to run out in the not too distant future. Moreover, fossil fuel-fired and nuclear power generation are technologies of the past, and we need to immediately start investing in environment-friendly and renewable energy technologies.

Large-scale production of bio-fertilisers from agricultural waste to replace urea would help to greatly decrease the pressure on the natural gas reserve. Lessening the use of urea will also decrease chemical poisoning of the soil and waterways.

The process is simple and the technology is already in place. All that is required is an active local government system to manage local agricultural and plant waste. Microbiologists and process biotechnologists in university and government research centres could help to improve efficiency and yield by speeding up the fermentation process.

Eco-friendly technology for the production of biogas is already available,

and large-scale production from animal waste can be coordinated by local governments with the support of the BCSIR and the ministry of industry. Large-scale production of biogas in rural areas would decrease the dependence on natural gas for domestic purposes and also lessen the load on the electricity grid by powering irrigation pumps.

It has been suggested that Bangladesh could offset some of its oil import by producing bio-fuel from food grains and sugarcane. Diverting food to bio-fuel production is not sensible for Bangladesh. However, there are some innovative ways that can be adopted to produce ethanol from the breakdown of lignocellulose in plant material through newly discovered enzymes from wood-digesting insects and micro-organisms.

Large-scale biotechnological production of such enzymes could allow the conversion of agricultural waste into bio-fuel. Bangladeshi scientists should get involved in this type of research as production of bio-fuels from waste material has huge potential in our country.

The most promising renewable energy source is sunlight, which is available most of the year in Bangladesh. Although, on technological and cost considerations, solar energy

cannot match fossil fuels now there is huge potential for solar energy as elaborated in two excellent articles in the May issue of Forum.

In many parts of rural Bangladesh solar energy can form the major source of electricity. Now that solar panels are being assembled in Bangladesh the price will come down substantially and solar energy could become the cheapest and most abundant energy option. Further research to increase the efficiency of photovoltaic cells and decrease their cost of production should be a priority.

Because of low labour costs large-scale production of solar panels could attract substantial foreign investment, create jobs and become a major foreign exchange earner. This could pave the way for industrial scale solar thermal units.

The alternative and renewable energy sources that are likely to be a major part of our future energy plans are also friendly to the environment and an insurance against climate change. Their proper utilisation will require extensive investment in education, research and technology.

A substantial portion of the climate fund should be allocated to innovation and technology transfer related to the development of these new forms of environment friendly energy options that help to fight the adverse effects of climate change.

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## Russian reactor for Rooppur

Incidentally, let us not brush all Russian nuclear technology as unsafe because of one accident at Chernobyl (op-ed, May 31) as we will not treat all US nuclear technology unsafe because of one accident at Three Mile Island.

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THERE has been a call (ref. Engr. Abdul Wadud's letter dated May 24) for a fresh technical feasibility study for the proposed Russian reactor for Rooppur before the government signs a billion dollar deal. This is entirely justified.

In the early sixties when Rooppur was selected as the site for the country's first nuclear power plant, the size of the reactor was 70 MW. Now we are thinking of two 1,000 MW reactors at the same site. Such a large scaling up has its ramifications.

For example, the weight of the largest component (reactor pressure vessel) of the Russian reactor could be of the order of 800 tons and size 5m diameter and 12m high (actual figures need to be ascertained from the vendor). Ponder over it. That's more or less the height of a four-storey building.

Transporting such weights by road or rail from Mongla port to Rooppur site is virtually ruled out unless a major upgrading of the roads and bridges is undertaken. Transporting by a shallow draft barge up the rivers during a narrow time window of the high monsoon season is possibly the only option available. But it needs to

be investigated and found feasible before a final decision in favour of the Rooppur site is made. Remember that the rivers are getting shallower and shallower each year due to silt deposit.

Another new twist is the wide variation in the flow of the Ganges due to the Farakka barrage coming into operation since the mid-seventies. From a maximum flow of over 2,000,000 cusecs in the high flood season to a recorded minimum of only 9,000 cusecs in the leanest period do not augur well for using the river water for cooling the condenser in the once-through mode, i.e. returning the water to the river, as was anticipated in the beginning. Cooling towers (dumping the residual heat to the atmosphere) could provide the solution.

The argument that we have no experience of nuclear technology holds no water. Any country embarking on its first reactor project had no experience. But now South Korea, by building a series of reactors and through sustained efforts to enhance local capability, has emerged as a major exporter of reactor technology. Last December, it beat out rivals from the West to secure a ground-breaking contract from UAE for four 1,400 MW

reactors.

As a result of the multiple spin-off benefits of using nuclear technology, South Korea has emerged from the shadows of the developing world to the sunshine of the developed world.

As for the concern about nuclear waste management, expressed also during The Daily Star round table, it would be a matter of history if the Russians would take back the spent fuel as they had indicated.

For the Russians it makes eminent sense because they do not want the plutonium in the spent fuel to fall into wrong hands. If the Russians do take back the spent fuel, then mostly low-level nuclear waste would be generated at Rooppur. A national repository for the low level wastes from all the nuclear facilities in the country could be built with relative ease.

As regards obtaining fresh nuclear fuel for the reactor, it raises suspicion in the West if a developing country tries to enrich uranium and fabricate its own fuel for its fledgling nuclear project(s) from a jingoistic concept of national independence.

Look at the myriad problems and sanctions Iran is facing on this account. In fact, UAE could clinch the deal for its four reactors mentioned above by promising to buy enriched fuel from the existing suppliers rather than making its own.

Russia, it is understood, as a matter of policy ensures supply of fresh fuel for the lifetime of the reactor it exports to the developing countries. In the very unlikely scenario of fresh fuel supply from Russia being stopped for any reason, there are

plenty of fuel fabricators around the world who would be glad to step in.

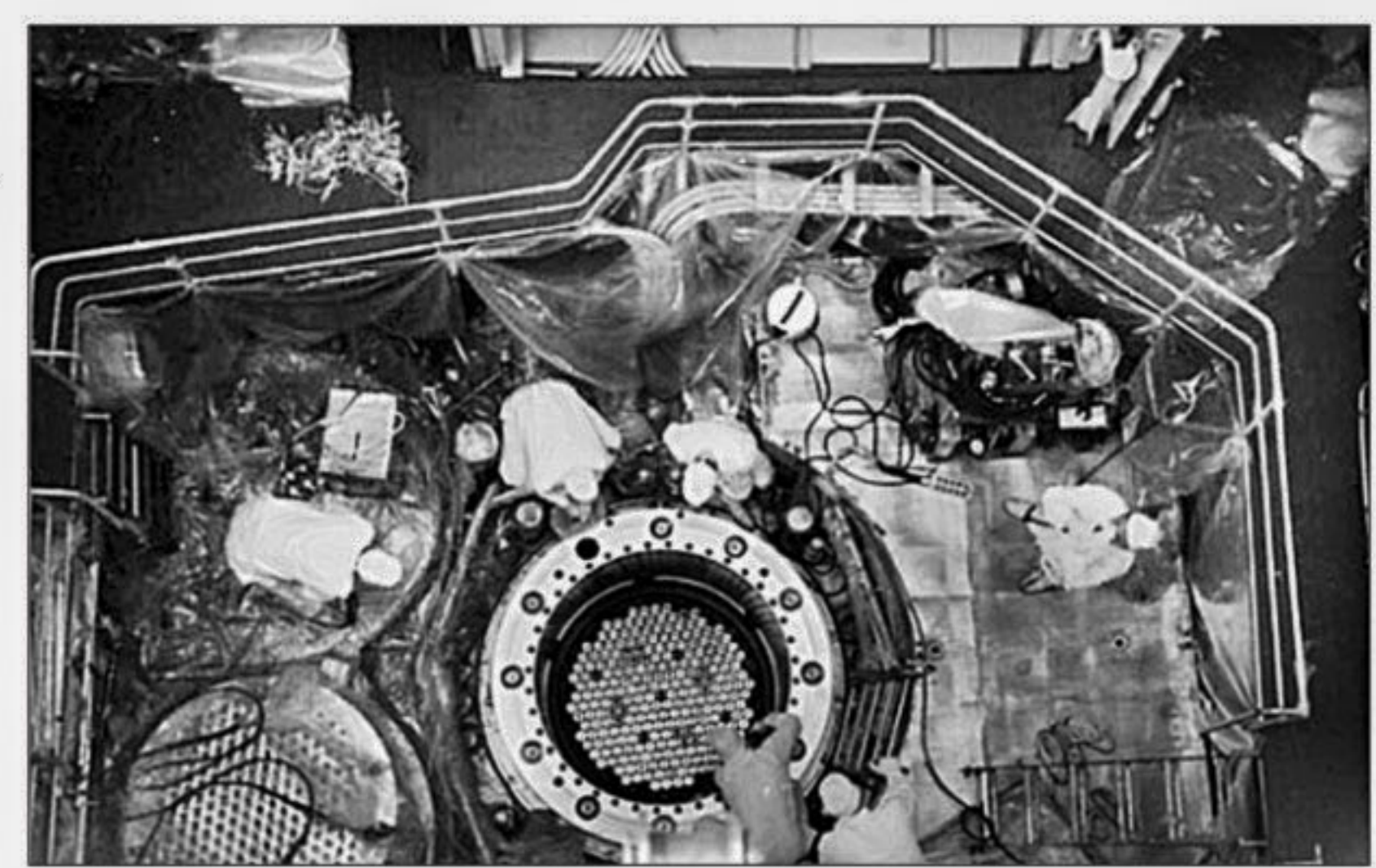
Interdependence in the nuclear field is now a ground reality. For example, South Korea, now a major player in the nuclear field, does not produce enriched uranium fuel for its own reactors but obtains it mostly from France.

Incidentally, let us not brush all Russian nuclear technology as unsafe because of one accident at Chernobyl (op-ed, May 31) as we will not treat all US nuclear technology unsafe because of one accident at Three Mile Island. Chernobyl was a unique design, using graphite as moderator and water as coolant, which had some inherent instability.

The Russian technology being offered for Rooppur is based on using water both as moderator and as coolant, known as a Pressurised Water Reactor (PWR), which has an excellent safety record worldwide. In fact, of the 438 reactors operating round the world, 266 are PWRs. Two such Russian PWRs are under construction in India and one in China, with the added proviso that the instrumentation and control systems used therein are made in the West. We may follow the same arrangement for the Rooppur reactors.

It is worth noting here that India is now negotiating for 16 more PWRs from Russia. Shall we wait for the super-safe reactor, as the op-ed writer has suggested, while the rest of the world moves on? No risk, no gain. It is as simple as that.

While comparing the Rooppur nuclear project with its rival conven-



Reactors are much safer nowadays.

tional plants, three points need to be taken into account to allow for a level playing field:

- For a coal-fired plant, either clean coal technology should be insisted upon or a carbon tax (say of the order of \$50-250 per ton carbon emitted) should be considered for the damage it does to the environment;
- For a gas-fired plant, since we are running out of this resource in the foreseeable future, instead of using the production cost of gas in calculating its generation cost, its substitution value (i.e. international price for fuel) should be used. Let us not repeat the mistake of the past by using the cheap production price of gas and burning it with gay abandon. Carbon tax should also be considered for the gas-fired plant;
- For the nuclear plant, there would

be no carbon tax because of its near carbon-free nature.

This is not to suggest that Bangladesh should actually levy the carbon tax, but while comparing the generation cost from competing sources each should be given credit or discredit for its plus or minus points.

Let the Rooppur nuclear power project, if justified on its merit, roll without any further delay.

However let us spend years on the feasibility study. Taking into account all the site-related studies that have taken place over decades for this most talked about project of the country, one should be able to conclude a feasibility study over a period of say six months.

Time is money.

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