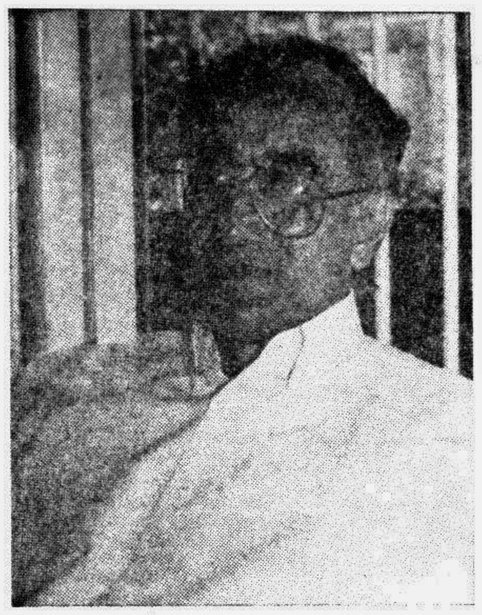
Interview with Dr Jamilur Reza Chowdhury

Development in the Power Sector is a Continual Process

Few things created such widespread furore in the recent times as did the unscheduled and prolonged spells of power failure. Although it might not have come as a surprise to the informed people , most sufferers were left with the poor option of cursing the authorities over a problem they did not know they would overcome how and when. Power still is in short supply. And in the ballyhoo over the suspiciously identical and simultaneous nature of damage to some of the electric towers across the country and the subsequent outcry of sabotage, a clear picture about the power crisis in the country is yet to emerge.

For a closer and clearer look into the heart of darkness, Chandra Shekhar Das, The Daily Star correspondent recently interviewed Dr Jamilur Reza Chowdhury, one of the advisors of the last caretaker government, who was in charge of the Energy Ministry in the transient mechanism for the transition of power to the elected representatives of the people. Although for a brief while, Dr Chowdhury's stay at the highest decision making level gave him a scope for observation which was unique for its immunity from party bias and the unmistakable understanding of an expert. A member of the panel of experts for the Jamuna Multipurpose Bridge (JMB) project, Professor Chowdhury has long been teaching at the department of Civil Engineering of the Bangladesh University of Engineering and Technology (BUET).



Daily Star (DS): Ours seemed to be a rude and sudden awakening to acute power shortage. Was it that abrupt or more or less inevitable?

Jamilur Reza Chowdhury (JRC): Well, I would rather go for the second part of your cue. For developing countries like Bangladesh, which have a very low per capita power consumption, the demand for power is assumed to increase at a rate twice that of the Gross Domestic Product (GDP) growth. Our present demand in the peak hours is 2200 mw. Whereas our production capacity is 1650 mw. There is a shortfall of 550mw. So, there you have a look at the heart of darkness. This has gradually emerged as one of the most serious problems faced by the country.

DS: It is clear, that a large part of the installed capacity remains unutilised. As the demand went up over the years, we evidently could not rise to the occasion in terms of supply for the enhanced demand. One reason for this was the inability to install new power generation plants. Another reason was the poor condition of the existing power plants most of which have outlived their expected functional life. Why?

JRC: Immediately after taking over the responsibilities as an advisor, I appointed a committee to look into the problems and suggest remedial measures. The committee consisted of senior officials representing PDB, REB and DESA and Petrobangla. One of the major problems identified by the committee was shortage of natural gas, which is used as fuel for generating around 90 per cent of our power. Actually, the authorities were caught in a dilemma over the supply of gas from the Bakhrabad gas field. The fertiliser factories at Chittagong (CUFL and Kafco) use the gas as raw material and the power plants at Rauzan, Shikalbaha and Haripur (with a total capacity of around 300 Megawatt) use gas from the same source as fuel. If we continued to give supply for unabated production of fertilisers there was a shortfall in power generation. Besides, the Ministries of Agriculture and Industries, the two government units who deal with production and use of fertiliser, did not help matters by appearing reluctant to compromise on the use of gas. We, however, arrived at some sort of understanding so that at certain phases of the day, the fertiliser factories would have less supply of gas allowing power stations to generate more power. This was the way we tackled the problem then and naturally we could only reduce and not eliminate the impact of load-shedding.

Moreover, many of our generating plants, which contribute about 15% to our total generation, have been in operation for more than 20-25 years and should have been retired. We are still trying to keep them operational — this has an effect on the reliability of the system as well as cut in production.

DS: So you would say it has always been a case of increasing demand and deepening crisis?

JRC: Yes, if you remember last year at about this time when I was in the Ministry of Energy and Mineral Resources, we did have to go through a period of load-shedding.

It was not felt as tellingly as that of the recent times because, luckily I would say, the generation capability was higher than it is now. There are two terms which need to be clarified in the context of power systems. They are, installed capacity and capability. There is a difference between the two. At the moment our installed capacity is 2908 mega watts. However, out of this the maximum that can be generated, assuming fuel supply can be ensured, is around 2100 MW — this is the capability. We cannot generate more than this.

DS: Apparently, the authorities could not foresee the approaching crisis due to dual dependence on one gas field..

JRC: Not really. There was a project conceived some years ago, in view of this problem, to take gas from the gas fields in the north-eastern part of the country, to Bakhrabad via Ashuganj through the AB pipeline. This was supposed to have been completed by April 1996. Contractors were supposed to start the work in November '95 and complete it by April '96. Unfortunately work did not start on time and the whole project got delayed by one year. Once that is completed, gas supply will increase and make some of the power plants in the south-eastern part hum again; so, that would lead to rise in power production by some 250mw.

Things would have improved a lot if we could increase the load factor. It is the ratio of the average and peak demand which is very low in Bangladesh, about 60 per cent. If by load management we could raise the rate i.e. by reducing the consumption in the peak hours — between 6 pm and 10 pm — there would have been more uniform distribution through the day.

DS: Was there any effort to combat it?

JRC: Yes, few measures were considered. One of them was to close all shops at the market places other than those dealing with medicine and food stuff, by 6 pm. It was just an appeal to the shopkeepers and not an enforcement with the cutting edge of any type of punishment. There were some legal obstacles on the way.

Another was the proposal for introducing two-part meter to make the user pay more for power consumption in the peak hours. This was, however, applicable only in the case of large commercial users or industrial units.

Those using irrigation pumps or welding machines were advised not to use these during evening peak hours, i.e. from 6 to 10 pm. Industries which operate on one or two shifts were asked not to operate between 6 and 11 pm. Help was sought from Chambers of Commerce in this regard.

Then captive generation or domestic production of power through generators was encouraged. This had to be done because some industries specially garment manufacturing and those process industries requiring continuous operation would not and could not accept the option of not using power in the peak hours. On the whole load management seems an unmanageable proposition because commercial stakes are very high and consequently no quarter seems prepared to compromise on power consumption.

DS: What about other problems?

JRC: Systems loss is another major problem. As I said earlier, we have a staggering rate of systems loss. Part of it is technical and part of it is pilferage due to the dishonesty of some people in this sector. About 5 per cent of the produced power is consumed by the generating stations themselves. Another 10 per cent is accounted for by the losses during transmission and distribution. Non technical reasons, which mean theft or pilferage eat away another 15 per cent. Systems loss will be there as long as a system is there but the rate ideally should not be more than 20 per cent. It is this systems loss which was 40 per cent at one stage, that provoked the funding agencies to stop investing in new power plants.

DS: What is the way out of this exorbitant systems loss cycle?

JRC: Obviously the problem lies in identifying the culprits, the people who are responsible for illegal connections and underbilling, and punishing them. A touch of improvement is bound to be felt in the area of the technical side of systems loss because the international funding agencies like the WB and ADB who had earlier stopped financing new power generation projects, have decided to restart funding albeit for toning up the condition of distribution and transmission lines.

DS: We have heard conflicting reports about our gas reserve. Some of them are alarming in view of our dependence for power generation. Is there any necessity of thinking about options about fuel for power generation?

JRC: We have proven gas reserve of about 12 trillion cubic feet. Most experts agree that a large part of our gas reserves remains unexplored. Then a foreign gas exploration company very recently made projection about one trillion cubic feet at an offshore site near Chittagong. Our national exploration agency BAPEX has also claimed to have found gas of the volume of one trillion cubic feet at Bhola. We have gas that is for sure, but the present proven reserve will last us upto the year 2015. I have heard probable figures of more than 20 trillion cft.

There are of course, other options of natural resources to produce power like hydro electric, solar power, wind. I can imagine fairly large number of people using solar power for domestic purpose in 10 to 15 years' time and there is actually a French assisted solar power plant at Narsingdi. But practically speaking, at current market prices power production with solar energy is very costly when compared to the traditional method of power generation by using gas. Of course, with the large R&D efforts under way, the investment levels required for solar power will come down and make it more competitive.

In some of the developed countries they do produce power by using the wind energy but this is not viable as a source of continuous supply because the force of wind is not uniform round the year or throughout the day. It varies with seasons; it can be considered as a supplementary option for power production which can be of great use for the agricultural purposes like irrigation.

Although we have some hydro electric power potential, I am afraid this cannot also be considered as the major source.

There are plans for using coal from Barapukuria coal mine for a 300 MW power plant .

So, if we are talking in terms of resources within the country for power production, then I am of the opinion that gas has to be the major energy source of power generation in the foreseeable future.

DS: What about the importing of power?

JRC: Well, we can think seriously about importing power particularly when we have such abundant source of hydro electric power nearby. Nepal has great potential for hydro electric power production. Preliminary studies show that the Himalayan kingdom has a potential of generating 30000 mw. In that case it will have huge surplus because its domestic necessity at present is only more than 300mw. Private investors from developed countries have already started showing interest in this sector and started negotiating with the Nepalese authorities. We can think about importing power from them. But this will call for strong political will for regional cooperation and permission for transmitting power over Indian territory. The recently initiated South Asian Quadrangle comprising India, Nepal, Bhutan and Bangladesh, which used to be known as GBM triangle, can concentrate on this issue. For that matter we can consider import of power from some north eastern states of India which also have hydro electric potential amounting to more than 30,000 mw. This is a very common phenomenon and quite a few countries are importing power like that. However, the environmental impact of hydro-electric projects deserves serious investigation.

It is all a matter of setting priorities. First and foremost we have to come to a decision whether we will use our gas for fertiliser production or power production. There is no room for getting carried away by one consideration or the other. It is the national economy which should be placed above everything. If it proves more profitable to use gas for fertilizer production, there is no reason why we should not think about the option of importing power from our neighbours.

DS: What you think we should focus on as a realistic measure to combat the growing demand for power?

JRC: Well, the option is obvious. We have to switch power generation from public sector to private sector. Let me cite a rough statistics. In the next 13/14 years our demand for power will have increased by some 10000 mw which means we have to add 7000 mw to our present capacity. This will require huge investment of the order of US$8 billion in generation alone. A similar amount would be required for transmission system. Obviously, the public sector would not be able to invest this huge amount.

DS: We have been hearing that for quite some time yet not much progress has been noticed. Why things seem so snail paced here? Is it a problem of not having any policy?

JRC: In most areas, there is nothing wrong with the policy. They are all so very precisely drafted in the government files. But they seem to hit the snags when it comes to implementation. Lack of coordination among the different arms of the government and the inability to delegate decision making authority slow down the process considerably.

A study once revealed that it takes 132 signatures on an average for a project to be approved for implementation. This is assuming that no objection is raised by any of the signatories; if objected then the number can very easily go to 150. You cannot expect speedy implementation of projects in such an atmosphere.

Transparency is another aspect which has to be established before we expect any change in the whole atmosphere. For example, the procurement procedure has to be based on well defined objective criteria so that powerful lobbies, pressure groups and vested interests have no leeway. I tell you many of the projects are held up over problems in the selection of consultants, inconsistent procedures leading to questionable outcome of evaluation exercise. Wherever funding agencies have reasons to raise questions over any of these aspects, the project invariably gets delayed by eight or nine months. So, the first condition for timely implementation of any project is transparency in selection of consultants and awarding of contracts.

DS: How vindicated is the claim that no power was produced at the time of the previous government?

JR.: Well, it is a political statement and I am not a politician. Based on analysis of available data, I can only say this is too sweeping a statement. So far, we come to have a culture which does not promote professional excellence but party allegiance. In any large project having a long gestation period, feasibility studies may be initiated by one government, implementation may begin under another regime and commissioning may take place during the tenure of another government — it is a continuous process which overlaps into the reign of one government from another. Some of the decisions which were taken during the reign of Jatiya Party were implemented in the BNP regime. Similarly, some of the decisions which BNP took are being implemented by the Awami League government. It is like that. When the BNP government took over in early 1991, the installed capacity was 2350 mw, the capability was around 1700 mw and the maximum demand was around 1640 mw, which means, that the demand could be met. Over the years this reserve margin between demand and capability disappeared, so that in 1993-94, the capability came down to 1560 mw as against the maximum demand of 1875 mw. This is when we started having massive load shedding going up to 540 mw in early 1994. Although both capacity and capability have slightly improved, these have failed to keep pace with the growth of demand and this is why we are having this crisis.

Yamuna: Supplying Poison, Day After Day

by Rajat Banerji and Max Martin

The Yamuna meets the Ganges at Allahabad then its water flows with the Ganges to the Bay of Bengal, lastly through Bangladesh.

THE Indian river Yamuna is a poisoned one. Named after the sister of Yama, the dreaded god of death in the Hindu pantheon, its nomenclature seems apt today as the river is full of toxic pesticides, heavy metals, carcinogenic chemicals, sewage and biological wastes right from its source to its confluence point in Allahabad. And this poison is supplied, untreated, day after day, to 57 million people dependent on it.

If this is because of high water treatment costs or the lack of technology? Or is it simply because no one cares: a typical case of 'who cares what happens to those who come after us"... down the river, down the economic ladder and down the generations?"

The truth is that agricultural and industrial development in the northern state of Haryana and its towns like Yamuna Nagar, Panipat, Sonepat and Karnal is taking place at the cost of polluting the Yamuna and the health of millions of people in the capital of the country, Delhi. In its turn, the capital, besides daily disgorging 2,800 million litres daily of sewage through 11 drains, is urbanising and industrialising at the cost of Mathura and Agra, the two major towns of Uttar Pradesh. And both states are equally unwilling to clean up their mess.

By the time the Yamuna reaches Agra, it is nothing more than a drain. A study done by Central Pollution Control Board in 1995, revealed that the amount of benzene hexachloride, a deadly pesticide, that entered Agra (downstream of Mathura) was 1,733.23 nanogram per litre (ng/l), while that entering Delhi was just 218.83 ng/l.

Yamuna's main problem today is that of undetected and untreated chemical impurities — pesticide residues. In Haryana alone, the consumption of pesticides in the years 1995-96 is 5,100 tonnes.

But crucial questions like: What is the level of contamination? Are sources (of drinking water) likely to be affected in the future and if so, to what degree? Are changes in agricultural practices or intensity needed in catchment, or part of catchment to achieve acceptable water quality? What is the impact of new chemicals/practices? And what is the most cost-effective solutions in catchment control and water treatment? — remain unaddressed.

Asked specifically about pesticide contaminants in water, a Delhi Water Supply and Sewage Disposal Undertaking (DWSSDU) spokesperson replied: "We do not test for them as we do not have the facility."

"Organic substances can be assimilated in freshwater, provided there is enough freshwater in the river," states R Dalwani, scientist, Ministry of Environment and Forests. "But for micropollutants such as pesticides, only more freshwater can reduce the percentage of traces in water.

Yet, the fact remains that no amount of freshwater would make trades of micropollutants such as pesticides go away. Also, stagnant water hinders pollution dispersion and assimilation; the mainstream water stagnates at the different barrages that have been built on the river.

The proposed solution of releasing water into the river at its upper segment at Tajewala, in Haryana, could help in dilution and assimilation of pollutants, but as such decisions are entirely political, its implementation may not be a reality. And, though the government has elaborate water quality monitoring systems, studies or efforts to minimise the entry of pesticides into the river are non-existent.

Water treatment technologies in practice in the West are mostly governed by steep costs, something which India can illafford. Says Mary Taylor, senior research officer of the Friends of the Earth, a global environmental NGO, in the UK, "The estimated capital costs to remove pesticides in UK (which has one sixteenth the population of India) is expected to be 81.5 billion, and running costs would also be significant."

Besides, "it is now widely acknowledged that conventional water treatment processes, based on chemical coagulation and filtration or biological slow sand filtration, have little capacity to remove water soluble pesticides," say western experts.

Techniques like the adding of granular activated carbon to sand filter beds and those that are used in desalination plants, which involve removal of salts from brackish sea waters through reverse osmosis membranes, are not always practical in India because of high costs and uncertain results.

In Delhi, the treatment system incorporates prechlorination, sedimentation (chlorifloculation, where alum is used), filtration (using sand beds) and chlorination: all ineffective, as they cannot remove pesticide traces in the water.

Treatment systems in Agra include sedimentation by passing water through Hudson tanks and filtration by sand beds, which are also inadequate. The chlorination level in Agra is 54 kg per million gallons per day, one of the highest in India.

S D Badrinath, a water treatment expert in India, suggests cheaper methods of treatment like capping the existing filters with bituminous charcoal or coconut shells which would absorb pesticide traces; increasing flocculants by adding powdered activated carbon with doses varying from 25-30 mg/l; and using bentonite clay to protect raw water tanks.

Western researchers, on the other hand, are coming to the conclusion that protecting the catchment from chemical contamination — by switching to organic or biological farming methods and stopping the use of pesticides and fertilisers — is possibly the best way to deal with pesticides and industrial toxins.

According to a Centre for Science and Environment researcher Sangeeta Agarwal who spoke to officials of the Sacramento Department of Utilities, California (US), which faced problems with pesticide contamination from rice fields upstream, "The problem was resolved by persuading polluting farmers to use pesticides in such a manner that it does not enter surface water."

A similar situation confronted New York three years ago, when the city awoke to the fact that the *E coli* bacteria was present in its water, because of increased sewage and septic discharges as well as agricultural runoffs, it appealed to the farming community in the catchment area. The farmers cried foul about New York's attempt at 'throttling' their development. The city realised finally that it would cost $2 billion to buy off 32,400 ha of land compared to the requisite $8 billion for water treatment plants.

In India, though public opinion is building over the issue and numerous public interest litigations are forcing the Ministry of Environment and Forests into the alien arena of accountability, the only way to force immediate action is by making clear to the government that the consumer will not accept deadly poisons in his/her water.

Another solution lies in appropriate property rights. Maybe things will change when the people of Delhi get the right to sue Haryana for polluting their drinking water and the people of Agra get the right to sue both Haryana and Delhi together. Just as a private water supply company has recently sued the French authorities for not keeping the river adequately clean, making it difficult for the company to supply clean water to its customers.

Who does the Yamuna belong to, after all?

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What is the level of contamination? Are sources (of drinking water) likely to be affected in the future and if so, to what degree? Are changes in agricultural practices or intensity needed in catchment, or part of catchment to achieve acceptable water quality? What is the impact of new chemicals/practices?

State of the river...

... when it reaches Delhi. Micro-pollutant levels in monsoon (July) and a dry month (March), 1995

Micropollutants	July	March
T-BHC	218.83	11.11
Aldrin	NT	NT
T-Endosulphan	51.30	90.23
Dieldrin	30.44	20.42
T-DDT	203.00	7.55
Cadmium*	0.01	0.01
Chromium*	0.01	NT
Copper*	NT	0.01
Iron*	8.20	7.10
Nickel*	0.02	0.05
Lead*	NT	NT
Zinc*	0.60	0.06

NT: Not traceable
Pesticides are in nanogram per litre and heavy Metals* in milligram per litre

Segment statistics

Pollution outfall in each segment of the Yamuna: Delhi emerges as the problem area, followed by the eutrophicated segment

Segment	Major Outfalls	Total outfall (MLD)	Pollution load (BOD) tonne/day)
I. Himalayan	Nil	Nil	Nil
II. Upper	3	233.50	19.46
III. Delhi	15	1068.00	73.30
IV. Eutrophicated	20	442.00	55.70
V. Diluted	5	155.20	35.80

Comparison between abstraction and outfall in three segments

Segment	Abstraction (MCM)	Outfall (MID)	BOD (tonne/day)
Upper	6375	233.50	19.46
Delhi	1510	1068.00	73.30
Eutrophicated	263	442.00	55.70

MLD: Million litre per day BOD: Biological oxygen demand
MCM: Million cubic metre
Source: Ecological Analysis of the River Yamuna, a Functional Approach in a Diversified exosystem in India, published in Archive fur Hydrobiologie, 1995

Detecting Explosives

A new airport security system is proving five times more effective than X-ray machines in trials at Heathrow Airport, London. The system, invented by scientists at King's College in London, uses radio waves to detect molecules of prohibited substances. It relies on quadrapole resonance (QR) to detect nitrogen, found in all stable high explosives. Drugs such as heroin and cocaine also contain nitrogen. In the QR system, baggage goes along a conveyor, which passes through a coil where a transmitter irradiates it with a burst of radio-frequency energy. The nitrogen atoms in the baggage respond to the irradiation by changing their orientation. When the signal stops, they revert to their original position, and emit a small radio signature, which is picked up by the authorities.

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