Status of biogas technology in Bangladesh

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BANGLADESH is one of the low energy consuming countries of the world. At present, the per capita energy consumption is 220 kgoe. The national grid could so far cover only 35 per cent of the total population, and only 3 per cent people are enjoying piped gas supply. About 70 per cent people of Bangladesh live in rural areas, where the situation is worse. As a result, rural to urban migration is high in Bangladesh.

In the rural areas, the houses are scattered. Neither grid nor piped supply is suitable for those areas. Decentralised supply systems like solar, biogas; wind, etc. have no alternative. About 90 per cent of the electricity now produced in the country is based on natural gas, which has limited reserves and will be exhausted in the near future.

It means that when our gas reserves are exhausted there will be no electricity. To face this grave situation, finding alternative or renewable sources of energy is the only option. Biogas technology may be one of those.

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Bangladesh has a wonderful climate for biogas production. The ideal temperature for biogas is around 35 deg. The temperature in Bangladesh usually varies from 6 deg. to 40 deg. But the inside temperature of a biogas digester remains at 22 deg.-30 deg., which is very near to the optimum requirement.

Raw materials for biogas are easily and cheaply available everywhere. All the hazardous materials that pollute the environment spread bad smell and diseases are raw materials for a biogas plant. Biogas is produced through fermentation of organic matter in an anaerobic condition. So, the process does not only produce gas, but also kills all harmful bacteria.

It is decentralised and appropriate for the rural areas, where neither piped gas supply nor grid electricity supply is possible. Biogas has multiple advantages. It can meet the need for both gas and electricity. At the same time, it gives valuable organic fertiliser. Biogas is an old technology invented by Alexandra Volta in 1776 in Com, Italy.

He collected gas from the bubbles coming up due to stirring of organic sediments deposited at the bottom of an old pond and discovered its combustibility. The technology was at the research stage for many years and got momentum only after the fuel crisis in 1973.

At present, it is widely used in many countries including China, India, Nepal, Vietnam, Cambodia, Thailand etc. There are now about 20 million biogas plants in China, 4 million plants in India, and about 0.16 million plants in Nepal.

In Bangladesh, the first biogas plant was set up by Dr. M A Karim, a professor of Bangladesh Agricultural University (BAU), Mymensingh, in the University campus in 1972. It was a floating dome type plant of 3m^3 gas production capacity.

Subsequently, seeing the success of the plant, 4-5 more plants were constructed in the surroundings. These plants did not last long due to leakage in the domes.

In 1974, the Bangladesh Academy for Rural Development (Bard) constructed one biogas plant following the same design. The Institute of Fuel Research and Development (IFRD) constructed another plant in the campus of the Bangladesh Council of Scientific and Industrial Research (BCSIR) in 1976, followed by a plant at the KBM College in Dinajpur in 1980.

As the construction costs were high and no subsidy was available, the technology did not have any attraction for the common people. In 1981, the government established a department named Environment Pollution Control Department (EPCD), through which they started a program at a cost of Tk. 34 lacs.

Under the project, about 150 floating-dome and 110 fixed-dome plants were installed until 1984. The floating-dome plants initially worked successfully, but did not last long due to lack of after-sale service and leakage in the gasholder. The fixed dome plants did not work even for a day due to design fault. This has created negative impact among the common people as well as the policy makers.

During this period, at the initiative of the then chairman of BSCIC, Mr. Sirajuddin, some engineers of the organisation were trained with technical support from BCSIR, and constructed 92 plants. The Department of Livestock (DLS) also trained many of its engineers on biogas technology and constructed about 70 plants by 1990.

Some NGOs like Danida, Brac, Grameen Bank etc. took initiatives to popularise the technology. These NGOs, with technical support from BCSIR, constructed about 250 biogas plants in districts of Bangladesh including, 17 bag type digesters by Grameen Bank.

These plants also did not last long. Under the "Fuel Saving Project" implemented from 1989 to 1991, IFRD trained local youths who constructed 126 plants in the premises of well-to-do farmers. The gasholder was supplied free of cost. The plants were floating-dome type, but they did not last long.

LGED constructed their first floating-dome model biogas plant in Kurigram district, and arranged a seminar there on December 27, 1986. About 300 scientists, experts, engineers, politicians, and persons interested in biogas technology joined the seminar.

Until 1992, they constructed 7-8 plants following the same design. The plants initially worked successfully, but after 4-5 years went out of order due to leakage in the gasholder, pipeline, and burner.

In 1989, one scientist named Mr. Shamsul Hoque of BCSIR received training on biogas technology from Biogas Research and Training Centre (BRTC), Chengdu, China. After coming back, he constructed one fixed-dome Chinese model biogas plant at BCSIR campus.

Till today, the plant is working successfully. Following the design, one LGED engineer constructed two biogas plants in Noakhali in 1992, with financial support from Danida. These plants are still in operation.

Subsequently, one engineer of LGED and Mr. Shamsul Hoque of BCSIR constructed about 50 fixed-dome type biogas plants in different districts at the cost of the users, and thus the fixed dome model biogas plant was introduced in Bangladesh.

LGED, under Slum Improvement Project and Secondary Towns Infrastructure Development Project, constructed about 100 plants during the period 1992-1996. A MoU was signed between BCSIR and LGED in 1993, and about 70 engineers have been trained under the agreement.

In 1994, LGED supported the establishment of an ecological village (Amgram in Madaripur district), and constructed 15 domestic biogas plants using night soil, kitchen waste, water hyacinth etc.

An important distribution push was delivered by the "Biogas Pilot Plant (1st phase) Project" implemented by BCSIR in the period July 1995 to June 2000. In total 4,664 fixed-dome plants were constructed throughout the country.

BCSIR employed and trained 128 diploma civil engineers who were assigned responsibilities for motivation, installation, and after sales service throughout the country. In addition, 898 youths were trained to support the project. The biogas farmers received an investment subsidy of Taka 5,000 under the project.

MoUs were signed between BCSIR and several other institutes like Brac, LGED and DLS for research, training, and dissemination of the biogas technology. An interim evaluation report in 1999 reported that 99% of the plants installed under the project were in operation, while 91% of the owners could meet their household fuel demand through biogas.

Bio-slurry from the biogas plants was used in horticulture, pisciculture, and agriculture. The average saving per plant amounted to Taka 759 per month (BCSIR, June 2001).

As the 1st phase was successfully completed, and the potential for biogas in Bangladesh considered huge, BCSIR implemented the 2nd phase of the Biogas Pilot Plant in the period July 2000 to June 2004.

The target for this phase was put at 20,000 biogas plants, out of which 17,194 plants were finally built. The investment subsidy for the owner was increased to Taka 7,500 per plant. In addition to the diploma civil engineers employed and paid on a monthly basis by BCSIR, an agency system was introduced on incentive basis.

About 50 agencies were recognised in defined areas (mostly districts), and received a lump sum fee of Taka 5,000 per plant as service charge. About 128 engineers and 250 local youths were trained for 10 days under the project. About 1,000 masons have been trained as well.

LGED, inspired by the then agriculture minister Matia Choudhury, launched a pilot project to construct 5,000 domestic biogas plants in the country. During the period from October 1998 to June 2003, they constructed 1,120 biogas plants under the project.

As the investment subsidy for this project amounted to Taka 5,000 only, it proved to be rather difficult to motivate farmers during the implementation of the 2nd phase of the Biogas Pilot Plant Project when

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BCSIR was providing Taka 7,500 as subsidy.

Therefore, the LGED project was terminated prematurely. Under the Secondary Town Infrastructure Development Project-II, another 20 community biogas plants were installed, which used human excreta only.

In 1994, the government of Bangladesh created a public limited company named Infrastructure Development Company (IDCOL) with financial assistance from the World Bank to support all kinds of infrastructure development, with focus on energy related infrastructure.

They successfully established 450 MW power plants at Meghna Ghat, installed 125,000 solar home systems since 2003 and, recently, with support from Netherlands Development Cooperation (SNV), launched a project for the extension of biogas technology in Bangladesh.

Under the program, 36,450 biogas plants will be built by the year 2009. 16 partner organisations have been identified for the implementation of the project. By now, they have constructed about 2000 plants.

Grameen Shakti (GS), a member of the Grameen family, incorporated in 1996 as a "not for profit company" to promote, develop, and popularise renewable energy technologies in the remote rural areas of Bangladesh.

At present, GS has about 800 engineers and 1000 field staff, serving more than 600,000 beneficiaries through its 300 unit offices, 44 regional offices, and 6 divisional offices. It has installed more than one hundred thousand solar home systems.

For its contribution towards popularising solar technology, GS has won several international awards, such as "The Energy Globe Award," 2002 from Austria, "European Solar Prize Award," 2003 from Germany, "Best Theme Award," 2003 from Usaid, "Solar Prize," 2004 from a government owned company, and " Best Organisation Award," 2005 from the prime minister of Bangladesh. In 2006, GS received "Ashden Award" from UK.

In early 2005, they launched a program for the extension of biogas technology in the country. Until June 2007, they had constructed more than 1000 biogas plants in different districts of the country.

Grameen Shakti has two systems for the biogas extension program. For small family size biogas plants, i.e. 1,6m^3 - 4.8 m^3 gas production per day, they give subsidy of Tk.7,000; and for bigger size plants they do not give any subsidy.

For any biogas plant, GS provides loan without collateral, and recovers it in 24 equal monthly installments with 6% service charge. Recently, Grameen Shakti has been providing technical and financial support for the generation of power using biogas. Instead of developing a new type of generator, GS is using the available gas, petrol, and diesel generators for producing electricity.

Although biogas technology is getting increasing attention all over the world, the use of bio-slurry is still neglected. Giving priority to the bio-slurry, IDCOL renamed their project title, and Grameen Shakti appointed one expert exclusively for the promotion of bio-slurry. But still, in most cases, bio-slurry is not properly used. It is mainly because of the ignorance of the farmers. Recently, Grameen Shakti has taken a decision to demonstrate use of slurry in different districts, so that the farmers become interested in using bio-slurry.

During the last 60 years, rural to urban migration in Bangladesh increased alarmingly. In 1951, only 2.5% people lived in urban areas, which has now risen to 30%. The population of Dhaka city was 0.35 million in 1951, and it is now more than 10 million. Dhaka has now become the 8th mega city in the world.

According to the UN Population Division, Dhaka will be the 2nd mega city in 2015. It is because of the fact that all energy supplies are limited to urban areas. Biogas has potential; it is proven, but highly neglected in Bangladesh.

At present, there is no government program for the extension of biogas technology. There is no government agency to deal with renewable energy issues, although the government of Bangladesh signed the millennium declaration and agreed to raise its renewable energy share to 10% by 2015. The year is not too far, but the share of renewable energy is far below the target.

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Politics overheating in Pakistan

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FOR any political observer the developments in Pakistan are at once interesting and dull. Interesting because new actors are in the play and dull because it is repetition of history. Over the past several weeks there have been a series of reports that a power-sharing deal is in the making between Gen Pervez Musharraf and former prime minister Benazir Bhutto. Now there is another twist -- that of another former Prime Minister Nawaz Sharif -- who is threatening to return to Pakistan to oust Musharraf.

President Farooq Leghari sacked Benazir Bhutto in November 1996, because of massive corruption and incompetence. She fled Pakistan and went into self-exile to escape incarceration. She has been living in Dubai and London alternately, and dreaming of returning to Pakistan some day. That day seems imminent now.

Gen Musharraf overthrew the other political actor, Nawaz Sharif, when he foolhardily tried to sack the army chief in a high-tension drama enacted on October12, 1999. Nawaz was summarily packed off to Saudi Arabia -- apparently under a clandestine deal that he would be spared of his misdeeds in office if he did not return to Pakistan.

Musharraf had a difficult time in the beginning, with the White House cutting off economic assistance and imposing sanctions on arms sales. But the events of 9/11 came as a boon to the beleaguered military leader, who quickly condemned the bombing of the Twin Towers and pledged to support the US in its " war against terror." Since then, Musharraf has been the blue-eyed boy of the White House.

Musharraf quickly realized that he couldn't handle two hot frontiers at the same time -- Afghanistan on the northwest and India in the east. He, thus, moved quickly to cool the eastern frontier and made peace overtures to India. Not to forget that he was famous for the Kargil battle. But his military uniform lacked legitimacy.

Musharraf, thus, manipulated the surrogate politicians to support his brand of democracy and held a presidential referendum in 2002 followed by National Elections, in which a coalition of Islamic parties showed strong representation and extended support to him.

Musharraf assumed the office of president on June 20, 2001. The referendum of April 30, 2002, was held to legitimize his rule. He was the only candidate and was confirmed as president for five years. The current Parliament shall complete its term in mid-October 2007. Musharraf's five-year term as president ended last April, but his tenure as army chief ends on December 31, 2007. He, thus, continues to wear two hats -- as he got a vote of confidence from the Parliament and the four Provincial Assemblies under the provisions of the 17th Amendment.

Though no date has been fixed for the presidential vote, Musharraf has indicated that his reelection as president shall be held sometime between September 15 and October15, 2007. According to the Constitution, an electoral college comprised of members of the Parliament and the Provincial Assemblies elects the president.

In July, Musharraf was made to eat the dismissal order of Chief Justice Iftikhar Mohammed Chaudhury. The Red Mosque confrontation with the fanatics had enraged the religious sentiments of the common man. All these added momentum to the current political opposition. Sensing that Musharraf was on a slippery slope, the two former prime ministers have mounted pressure to oust the military from power.

To make matters worse, the Supreme Court on, August 23, gave a verdict that Nawaz Sharif could return to Pakistan. Nawaz has declared that he shall return to Islamabad on September 10 and drive to Lahore.

Benazir's PPP holds significant strength -- 80 seats out of 342 -- in the Parliament. Musharraf will need that support if he wants to win the presidency. The Constitution gives full powers to the president to dismiss a government if he thinks it is not doing the right things. It also bars anyone from holding the prime minister's post for the third time. The problem here is that Musharraf as president is reluctant to give away the power to dismiss an elected government.

Benazir is willing to share power with Musharraf -- provided the Constitution is amended to curtail the powers of the president, allow her to become prime minister for the third time, and indemnify her government's actions in the 1980s and 1990s. She also insists that Musharraf has to hang his uniform.

Nawaz, too, wants to be become prime minister for the third time and oust the military from power. He wants to return to Pakistan and contest the elections. If he does land in Pakistan, in all likelihood, he will be arrested. He has strongly criticized Benazir Bhutto for trying to make a deal with Musharraf. Nawaz's return shall undoubtedly strengthen the All Party Movement for Democracy (APMD), which he set up after the Multi-Party Conference (MPC) in London on July11.

Pakistan's 150,000-strong legal community, after winning their unique movement to reinstall Iftikhar M. Chaudhury, is expected to swell the ranks of APMD. The judiciary is no longer pliant to the military, and more anti-Musharraf decrees are probably in the offing. Pakistan has already urged the Saudi Government not to allow Nawaz to return.

As the major opposition parties are baying for Musharraf's blood -- many believe that Pakistan is heading for a grave political crisis. The West is concerned that political turmoil in Pakistan will seriously jeopardise the "war on terror." The US has reminded Musharraf of his commitment to resign from the post of army chief. They also hope that free and fair elections will held on time, and the transfer of power will be smooth and orderly.

For Musharraf, the likely strategy could be to strike a deal with Benazir Bhutto, keeping in mind that the White House favours Benazir over Nawaz. Besides, Musharraf detests Nawaz. With Benazir's help he may opt to hang his uniform and get a fresh tenure as president.

All the three actors -- Musharraf, Benazir, Nawaz -- are engaged in brinkmanship, desperately trying to extract as much concession from the others as possible The other strategy for the wily Musharraf is to play Benazir against Nawaz. If, however, Benazir and Nawaz shake hands to launch a united movement -- the game will be over for Musharraf. For now, Musharraf seems to be keeping his options open. His last resort for survival is well known in Pakistan -- Martial Law. That, of course, will be a step further away from "democracy" that everyone is craving for.

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Dealing with existing coal projects

FORREST COOKSON

AT present, Bangladesh has a law that governs the exploration and development of minerals. This law sets out the procedures to be followed and the taxes that are to be paid. Any company wishing to develop mineral resources in Bangladesh must work within this law.

The two major private sector companies involved in coal -- the Tata with a number of proposals and Asia Energy's Phulbari project both conceived and investigated their ideas within the framework of this mineral law. Tata has made definite proposals to the Government reflecting work done on the feasibility of the coal mining and use of the coal in steel production and power generation; these projects are effectively proposals by Tata drawn up and prepared with the full support of the Government.

Tata was encouraged by the Government and their analysis must follow the law of Bangladesh. Asia Energy has carried out exhaustive exploration, environmental and resettlement studies in conjunction with the preparation of a mine development plan, all as required by the Government according to the law.

The implication of the preparation of a new coal policy is that Government intends to modify existing law. Bangladesh has a clear sovereign right to carry out whatever changes it wants to make to existing law.

However, in doing so it must take account of the current law and agreements made or implied under that law. Under the Foreign Investment Protection Act the Government has legislated that it will not destroy a foreign investor's project by major changes in the conditions under which the company operates.

It would be against Bangladesh law for example to raise the taxes

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imposed on a particular company to such a level as to effectively expropriate it. New legislation derived from the coal policy should explain clearly the position of companies working under the existing legislation. The proposed 20% royalty rate has precisely that effect.

While any country has the sovereign right to do what it wants; one has to live in an international community where actions may have consequences. One approach used to handle companies that are investing under a law or regulatory regime that is changed is to "grandfather" the existing companies into the new law; having the old laws apply to these grandfathers. New participants would fall under the new law as such groups would know the rules but Tata and Asia Energy would continue to operate under the old laws.

Persons outside Government have demanded the cancellation of the Asia Energy contracts and agreements. Under the previous regime the Ministry of Law, Justice and Parliamentary Affairs was requested by the Ministry of Energy to give an opinion on whether the contract could be cancelled without serious penalty.

The response of the Ministry is unknown. I have asked several eminent lawyers what they thought. All replied that there is no basis for cancellation of the contract that does not expose the Government to possibility of a significant arbitration award.

The negative factors that may flow from cancellation of the contract or major changes in the rules are:

- Foreign investors would be much more hesitant in investing in Bangladesh for fear that the Government would turn on them canceling contracts without justification, etc. I will be answered with the claim that there will be many investors ready to come forward -- that is correct, but they will demand much better terms. The risk of investing in Bangladesh already perceived as high would be higher still and consequently higher returns would be demanded.
- The coal reserves at Phulbari would be tied up in litigation making it impossible to exploit these resources until the legal issues are settled. Asia Energy's lawyers could attempt to block any exploitation involving a foreign company. There will be endless litigation, prospect of which will discourage foreign companies from working on this asset.

Similarly the World Bank, IDB or ADB would not touch a project at Phulbari with a background of contract cancellation. Even domestic financed exploitation may run into claims by Asia Energy that their rights have been violated and they will attempt to seize Bangladesh Government property overseas.

- The dispute involves investors in the UK. In my view the British Government would face difficulty continuing its program here if such an expropriation of Asia Energy took place; indeed Asia Energy's lawyers may go to court to prevent foreign assistance until their claims are settled.
- The dispute would go to arbitration. Asia Energy would argue for recovery of their costs -- perhaps $40-60 million and recovery of what the existing investors stand to earn. I estimate this at $1-2 per ton of coal.

That is $500-1,000 million over a thirty-year period. In addition there would be court costs and interest costs as it could take years to settle. If Bangladesh refused to pay then the consequences would be very severe in terms of access to the international capital markets as well as the IMF, ADB, World Bank etc. Of course Bangladesh may win its case in arbitration but the risks should be understood.

Cancellation of these projects or changing conditions effectively expropriates and starts down a dangerous path with the outcome uncertain and potentially expensive. Grandfathering under existing law is the better way to go forward here.

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