

09 Aug. 2006 (Island midweek Review 2P)

by Dinesh Weerakkody

We all know how well the CEB's supply and distribution arms serve the public and most people are also aware that we are faced with an impending power crisis looming large in the horizon. In addition we also know that the power reforms proposed by the government cannot bring down the price of power because the JVP will not allow any change to the way it is managed. The inefficiency, corruption and waste in the CEB also adds to the high cost of power. So if we actually need substantial benefits from the proposed reform there has to be some fundamental reforms, perhaps even some form of privatization or franchise options. The Minister of Power and energy says that there would be power cuts soon if consumers do not reduce their usage. If what the Minister is saying is true, then it is necessary that the power generation capability of the CEB is reviewed immediately and steps taken to develop our capability. That would save the country a lot of economic hardship and prevent the country going back to the dark era of 2001. However, due to many years of bungling, the saving grace would definitely come at a high price to the consumer. Hydro is still our best option, but we have used up most of our best sites. As oil prices continue to rise we may need to look at alternate energy sources. We may need to supplement traditional fuels by at least 10 to 20 per cent by 2015. The World Bank and the IMF have said many times that power is a sector, which the government needs to pay special attention to regarding infrastructure development. The options are many. In fact Susil Premajayanath, a former Power Minister, has stated that that the quick implementation of the Norochchalai Coal Power Plant would save the country a lot of economic hardship. But the problem with coal now is that though it was one of the cheapest sources six years ago, it is not so at present because prices have seen a huge increase. Therefore, if and when the Norochchalai power project is completed, chances of the country spending a lot more than anticipated on purchasing coal would become a major issue for any government. Despite opposition from the Church and protest from the public to stop the project, the President laid the foundation stone for this project saying he was committed to providing power to the country at affordable rates. Undoubtedly, all citizens of the country would support the President to avoid another dreaded power crisis, provided all the financial transactions associated with the project are done in a transparent way and the project

is managed by competent professionals.

Norochchalai Project

According to CEB sources, the government is looking at a 900 MW of coal power costing the CEB over three billion dollars. The first project will have 300 MW of coal power. Analysts however say the CEB has not done its homework on the Norochchalai project properly and therefore it could have disastrous results on some fronts. Let us examine some of the factors that could have a negative impact on the environment, CEB Finance and the country in general.

The site

In the Report prepared by Electro watt Engineering, Zurich, Switzerland, the Consultants to the Ceylon Electricity Board, under the title "Study Report Phase 1, Document No: RE-12548-022-02 of April 1998 on the Coal Fired Thermal Development Project, West Coast" the following has been stated with regard to the site conditions:

Section 2.2.2 (Page 2-5)

"The level of the existing terrain, on average +2.7 meters MSL, is too low to satisfy the development of the power plant. Therefore a platform 1.8 meters high is required.

"The proposed Site level has to provide sufficient hydraulic head to allow the overflow of the storm water (rainwater) ditch surrounding the Site and the treated waste waters to be discharged to the sea." Therefore, about 1,000,000 cubic meters of fill material will be required to construct this platform.

According to the report, the possible sources of fill material are sea sand and by levelling of the sand dunes. However, not more than 30 per cent of sea sand can be used and also the report does not identify any other fill material that can be used.

Levelling of the dunes to provide sand, according to consultants, is unacceptable as these are natural barriers that protect the land from sea erosion.

What is most disturbing is that the design of the plant makes limited reference to site filling requirements. The Environmental Impact Assessment Study Report, Document No: Re-12548-017-02 of March 1998, by the same

consultants, Electro watt Engineering of Zurich, Switzerland, according to Consultants glosses over the site filling and preparation and the connected environmental impact. Page 0-1, Executive Summary, sub-paragraph 0.1. Para 2 only states that the prepared total area of land (about 102.6 hectares) will meet the full requirements of the three construction phases and that no other clearance is required (apart from the transmission line corridor)"

Filling of site

According to consultants, the filling of the site to bring it up to the required level would pose a huge challenge and would have very serious environmental consequences. For example;

1) Filling of the site will take 50, 10-ton truck loads per day for 365 days. The dust from the trucks carrying and dumping earth will pose a major health hazard for the people in the area.

2) The earth would have to be excavated, which would leave an aggregate area of about 500 acres

of excavated land.

3) Flooding. When an area of 102 hectares or 270 acres is raised 6 feet or more above the surrounding area there should be a way to manage the run-off water during monsoons, when three inches of rain are frequent. The report proposes a canal for the run-off water. This canal, according to engineers, may have to be as much as 240 feet wide at the top and not more than 4 feet deep to prevent seawater entering it. The canal will also require about another 50 acres of land.

Ash disposal

Today there is ample research in China and India which shows that ash disposal from coal power plants is a major environmental challenge and needs to be managed professionally. The Environmental Impact Assessment Report (EIAR) does not deal with this issue adequately. The following are some excerpts from the EIA Report:

1) Ash deposit

The following are the quantities of Ash produced per year (in tons):

Para 2, page 2-9 merely states "Ash produced by the coal fired power

plant is potentially a useful raw material for the cement and concrete industries. It is anticipated that the bulk of the fly ash will be taken over by the industry, and therefore only a small part of the total ash (namely the bottom wet ash) will have to be disposed. The Puttalam Cement factory has shown interest to recycle the re-useable fly ash within the manufacture of cement and cement products. (see SD Sec.1 2.1)

Consultants challenge this statement and say it is incorrect. According to Sri Lanka Standards Institute (SLS), specification 107, the percentage of fly ash in cement is limited to 5 per cent by weight. The capacity of the Puttalam Cement factory is 500,000 metric tons per year. Therefore the quantity of fly ash that can be mixed with cement is 25,000 tons per year. The first 300 MW plant will produce 78,840 tons of fly ash per year. Hence there will be a surplus of 53,840 tons of ash that will have to be disposed each year elsewhere.

2) Fly ash

Coal ash has to be collected,

allowed to cool and then loaded in to trucks for transport. The following are the problems associated with transport and unloading of ash:

First there will be leaching into the soil during rain and contamination of underground water springs. Also fly ash will escape to the atmosphere during the following operations:

(i) When ash is filled into a truck, an equal volume of air is displaced; the displaced air will move ash around.

(ii) A similar phenomenon will occur when ash is unloaded. Again ash will escape to the atmosphere

(iii) Ash has to be stored until it is used; during the dry season the wind will make it airborne.

Coal ash contains potentially harmful elements including arsenic and mercury. Coal ash is extremely fine in nature and easily airborne. When inhaled coal ash can cause irritation of the lung tissues and aggravate respiratory diseases, such as asthma, emphysema, and similar lung diseases. Prolong inhalation of fly ash and coal dust could give rise to lung disease or pneumonia. Rainwater run-off from coal stor-

age areas and ash dumps could contaminate the underground water, lakes and rivers.

Experience

The difficulty in ash disposal can be seen from the experience in the following countries that both produce and use coal for power generation:

India: Damandeep Singh, a journalist with a top Indian newspaper, says in a recent article that fly ash poses major health hazard for people living in Delhi.

According to him, driving down the Capital's Ring Road during summer is a nightmare. Strong westerly winds pick up fly ash from the Indraprastha power station, and disperse it over a large area. Residents of the surrounding areas and commuters are the worst hit. Within four years of its commissioning in 1982, the Indraprastha, power plant is today perceived by people living in Delhi as a serious health hazard.

Although plant authorities insist that their electrostatic precipitators—the devices used to trap fly ash—are working properly, breakdowns are a common occur-

rence. As much as 1,300 tons is generated by the Indraprastha power station daily. Only a small fraction of this is utilized. The rest flies into the air or is washed into the Yamuna River and adds to the city's pollution levels.

The Indian fly ash problem grew unabated in the 80s. Power plant developers continued to trivialize the problem and claimed that fly ash had many uses. In June 1998, the Government enacted legislation to control "the fly ash menace". The Indian Express of June 20, 1998 summarizes the action taken by the Government to control fly ash accumulation:

Delhi, June 19, 1998: "In order to check the growing menace of coal ash, the Ministry of Environment and Forests (MEF) has brought out a notification which bars clearance of new power stations without fly ash utilization plans.

"Right from their inception, plants will have to provide 20 per cent fly ash utilization during the first year and increase it by 10 per cent every year after that. This is being done to discourage the indiscriminate and rampant dumping of fly ash."

Australia: Australian coal-fired power plants produce over 8 million tons of fly ash every year.

Approximately 10 per cent of this is put into cement and concrete; the rest end up in ash dams.

USA: The American Coal Association (ACAA) reports that utilities and other coal-burning facilities generate nearly 50 million tons of fly ash annually. Of this total, approximately thirty-seven million (37) tons are land filled, while only 22 per cent, or thirteen (13) million tons are used in road construction and in mixture with cement and concrete products.

Generally unused fly ash will be transported to abandoned mines or areas where strip mining has occurred.

Ash accumulation

In the absence of other means of utilising fly ash, the only option is to accumulate the ash. The ash accumulation area needed for a 30-year period, estimated in a feasibility study prepared in the 1970s, for the then proposed 300 MW coal power plant in Trincomalee, is given below.

If the ash was piled to a height of 66 feet, the area required would be around 220 acres. If the ash was piled to a height of 20 feet, the area required would be around 455 acres. In contrast Electro watt has identified an area of 30 acres based on the assumption that ash can be readily absorbed by the construction and cement industries. If ash has to be accumulated, an area of 1,365 acres will be required. Therefore the CEB should work on a reliable ash disposal plan to ensure that the community does not suffer due to poor planning.

Conclusion

In this analysis I have only attempted to highlight some of the site-specific problems and the environmental impact of using coal power plants. In the interest of the community at large, the first question that has to be answered by the CEB is about the ash disposal. Then secondly, whether coal should become the core fuel for future power generation? If they don't have proper answers they should do an indepth study before they embark on any investments, even if this means delays. Such a study does not require international consultants. There are national-interest minded Sri Lankan professionals both in the public and private sector who could within a short period address some of these issues. In the final analysis there are many other means for generating power with limited environmental impacts. The government should therefore do more than simply appeal to the people to conserve energy and stop interfering with the lives of the people. Instead, the government should focus on reforming the CEB, which is costing the taxpayer Billions of Rupees.

Are coal fired plants viable for power generation?

True facts about Coal Power Generation

Point of View

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Most people are aware that we are faced with an impending power crisis looming large in the horizon. The Power Minister is saying there would be power cuts soon if consumers do not reduce their usage. If what the Minister is saying is true, then it is necessary that the power generation capability of the CEB is reviewed immediately and steps taken to develop our capability. That would save the country a lot of economic hardship and prevent the country going back to the dark era of 2001. However, due to many years of bungling the saving grace would definitely come at a high price to the consumer. The World Bank and the IMF have said many times that the power sector is one the government needs to pay special attention to in infrastructure development. The options are many. In fact Susil Premajayantha a former Power Minister has stated that that the quick implementation of the Norochchalai Coal Power Plant would save the country a lot of economic hardship. But the problem with coal now is that though it was one of the cheapest source six years ago, it is not so at present because prices since then have seen a huge increase. Therefore if and when the Norochchalai power project is completed, chances of the country spending a lot more than anticipated on purchasing coal would become a major issue for any government. Despite opposition from the Church and protest from the public to stop the project Mahinda Rajapaksa laid the foundation stone for this project saying he was committed to providing power to the country at affordable rates. Undoubtedly all citizens of the country would support the President to avoid another dreaded power crisis, provided all the financial transactions associated with the project are done in a transparent way and the project is managed by competent professionals.

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Applause: President Mahinda Rajapaksa unveils the plaque to commemorate the launch of the coal power plant in Norochchalai recently. File photo.

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3) Flooding -when an area of 102 hectares or 270 acres are raised 6 feet or more above the surroundings - the report proposes a canal for the run-off water - the environmental report does not say how they plan to manage the run-off water during monsoons, when 3 inches of rain are frequent, this canal according engineers may have to be as much as 240 feet wide at the top and not more than 4 feet deep to prevent seawater entering the canal. The canal will also require about another 50 acres of land.

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1) Ash Deposit

Gives a table of Ash Production. Per the table the following are the quantities of Ash produced per year (in tons):

Coal Power Plant	Capacity	300 MW	78,840 Tons of Ash Produced per year	900 MW	236,520 Tons of Ash Produced per year

Para 2, page 2-9 merely states "Ash produced by the coal fired power plant is potentially a useful raw material for the cement and concrete industries. It is anticipated that the bulk of the fly ash will be taken over by the industry, and therefore only a small part of the total ash (namely the bottom wet ash) will have to be disposed. The Puttalam Cement factory has shown interest to recycle the re-

useable fly ash within the manufacture of cement and cement products (see SD Sec.1 2.1)".

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fraction of this is utilized. The rest flies in the air or is washed into the Yamuna river and just adds to the city's pollution levels.

The Indian fly ash problem grew unabated in the 80s. Power plant developers continued to trivialize the problem and claimed that fly ash had many uses. In June 1998, the Government enacted legislation to control 'the fly ash menace'. The Indian Express of June 20, 1998 summarizes the action taken by the Government to control fly ash accumulation:

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Right from their inception, plants will have to provide 20 percent fly ash utilization during the first year and increase it by 10 percent every year after that. This is being done to discourage the indiscriminate and rampant dumping of fly ash." Australia: Australian coal-fired power plants produce over 8 million tons of fly ash every year. Approximately 10 percent of this is put into cement and concrete; the rest end up in ash dams.

Source: CSIRO, Australia, 1997

USA: "The American Coal Association (ACAA) reports that utilities and other coal-burning facilities generate nearly 50 million tons of fly ash annually. Of this total, approximately thirty-seven million (37) tons are land filled, while only 22%, or thirteen (13) million tons are used in road construction and in mixture with cement and concrete products.

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Source: www. Coal Ash Utilization Technologies - Introduction, 1996

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Conclusion

In this analysis I have only attempted to highlight some of the site-specific problems and the environmental impact of using coal power plants. In the interest of the community at large the first question that has to be answered by the CEB is about the ash disposal? Then secondly, whether coal should become the core fuel for future power generation? If they don't have proper answers they should do an in depth study before they embark on any investments, even if this means delays.

Such a study need not even require international consultants. There are national-interest minded Sri Lankan professionals both in the public and private sector who could within a short period address some of these issues. In the final analysis there are many other means for generating power with limited environmental impact and also more competitive than coal. The government should therefore do more than simply appealing to the people to conserve energy and stop interfering with the lives of the people. Instead focus on reforming the CEB, which is costing the taxpayer Billions of Rupees a year.