

Can we rely on coal power?

by Patali Champika Ranawaka

"The proposed ambitious development projects of the Government" was once the subject of a panel discussion in a television program "People's Forum" on Sirasa TV. I was one of the members of the panel with well-known environmentalist, Dr. Ranil Senanayake and a few other distinguished invitees.

When the topic of a Coal Plant was discussed, Dr. Senanayake expressing his concern said, if the coal plant under construction was built as planned, our greenhouse gas emission level would increase by 600%.

Global warming is a topic which is widely being discussed all over the world and its ill effects are now being experienced by all. The massive snow falling and unusual cold waves now experienced by certain countries clearly show that irreversible climate change is happening due to global warming. As Dr. Senanayake has rightly said, our actions that would result in increasing the carbon emission by six-fold is a serious concern for us to take note of.

If we analyse our coal consumption pattern, one could easily find that our annual coal consumption is mostly limited to heavy industries like cement manufacture. Its consumption in 1980 was 20,000 tons, and in 2006 it was 111,000 tons, although, in between it had been fluctuating unpredictably. The Ceylon Electricity Board is now compelled to use coal plants as its main option to generate electricity due to two reasons.

One reason is the high demand due to the new development drive and the other is the high cost involved in electricity generation.

When I once inquired from one of my University

colleagues working in the Ceylon Electricity Board as to how they forecast electricity demand, he replied that the electricity demand rate was co-related or coupled with the economic growth rate. According to him, the previous data had shown that there is nearly a 2% increase in rate when the economic growth rate is compared with the electricity demand rate. In other words if the economic growth rate is 4%, the electricity demand rate would be 6% or if economic growth rate is 6%, the electricity demand rate be 8% etc.

According to the explanation given by my friend, it is predicted that the economic rate of Sri Lanka will be 6% or more in the future and the electricity demand may increase at a rate of 8% or more. This means that within a space of every 8 to 9 years, the electricity demand is expected to be doubled.

Having observed this simple algorithm, I compared the electricity demand with the economic rate pattern in year 2008 (6% eco : growth rate) and in year 2009 (4% eco: growth rate) with the electricity demand. In year 2008, it should have been 8% as per the assumption, but it remained at 4%! This shows that when predicting electricity demand one cannot depend solely on simple assumptions since it is based on many other factors and complex co-relations.

Electricity costs

The other factor is the high generation costs of electricity.

According to the CEB's own statistics, in 1970 the generation cost of 1 unit (1kwh) was 15 cents and it had remained unchanged till 1978. Due to the high demand it had risen to Re. 1 in 1982 and in 1991 to Rs. 2.25 per unit with the induction of Mahaweli hydro power which was assumed to be a low cost power generation.

It should also be noticed that nearly 100% of the electricity needs were met by our hydro power potential. Presently, 65% of the electricity demand is met by thermally generated power and as a result it costs nearly Rs. 15 per unit which is considered to be the highest in the region. This trend very badly affects our industries and export sector which are competing with other countries where the cost of electricity is comparatively low. One strong argument put forward in favour of using coal instead of oil is that it would reduce the cost of electricity incurred by the CEB. Presently our demand is nearly 10 billion units and a loss of Rs. 2 per unit amounts to an annual loss of Rs. 20 billion to our national economy which is equivalent to twice the amount allocated to our Samurdhi recipients. On the other hand, the environmentalists, quite rightly continue complaining that coal power generates enormous volumes of carbon emissions detrimental to local and global environment and reiterate that coal is not going to be a cheap source of power.

They hold the view that once the oil reserves get exhausted, the price of coal will go up proving the fact that it is not a viable alternative to oil.

It is estimated that 26.5% of the world's primary energy comes from coal. If we analyse the coal prices (Dollars per Mt in Australia) from February to December in 2009, it is evident that the average price value had been fluctuating between US\$ 75 to US\$ 82 when the crude oil prices were fluctuating from US\$ 44 to US\$ 74 during the same period.

Fuel crisis in 2008

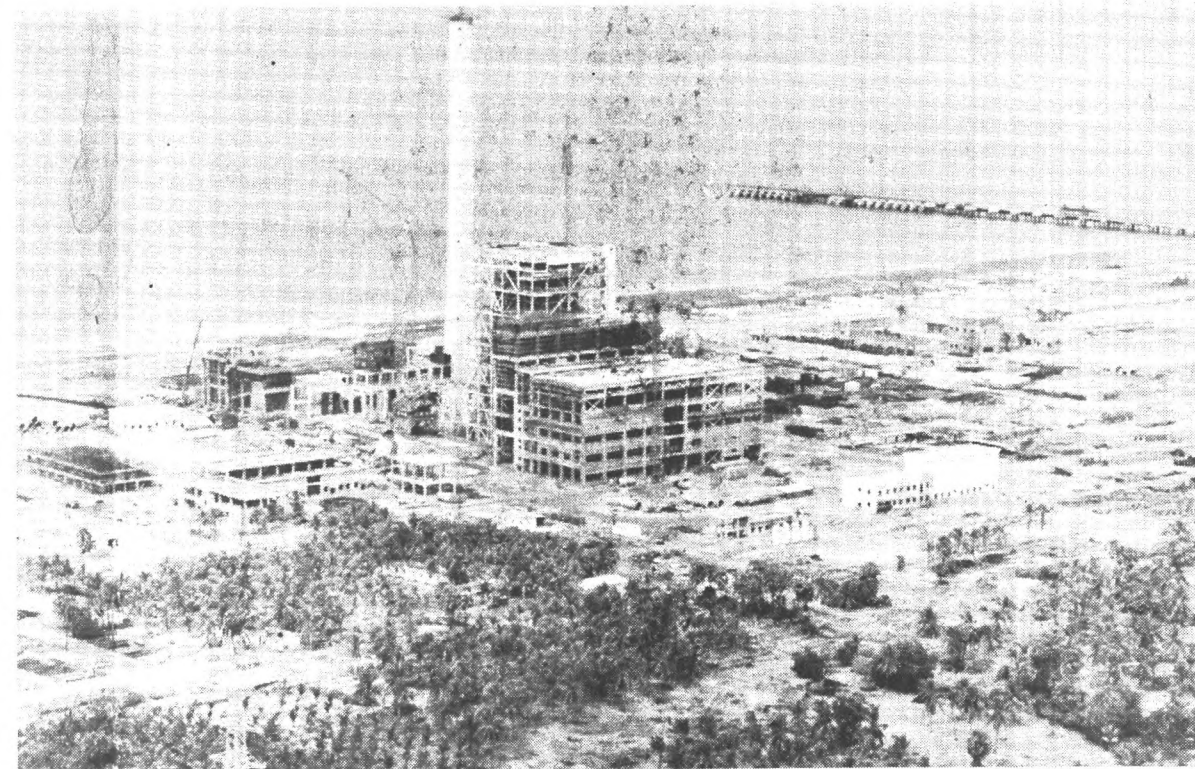
The fuel crisis in 2008, had proved the fact that coal prices were not independent, but is coupled with oil prices although some countries have had the advantage of

having their own coal reserves. The coal prices are expected to remain high due to its rapid increasing demand, specially in countries such as China and India. According to an estimate calculated by Asoka Abeygunawardena, the average generation cost of coal during the period of the ensuing 30 years could be Rs. 30 if the Government abstains from providing any form of subsidy and or cost sharing with power producers. According to an algorithm worked out by Abeygunawardena, the power generation using Dendro will cost only Rs. 23.....?

The main argument against the use of coal is its high emission rate and as I have mentioned in my previous articles it emits 966g (with scrubbing) and 1050g (without scrubbing) per 1kw hour. This means that if we generate 1kw hour using coal we emit nearly 1kg of carbon (Co2).

Assume the Norochcholai Coal Plant is in full operation generating 1,000Mw and using coal power in base load where 24x7 operation is taking place with the 91% plant factor or 8,000 hours per year. It could be easily calculated that the total emission will be 8 Million Mt. The current emission is (2005 data) 11.5 Million Mt and the total emission may rise approximately to 20 Million Mt. So, the per capita emission is raised to 1,000Kg (assuming a 20 Million population - when the population increases the per capita emission level may decrease) which means a 67% increase in emission level. But, the CEB is not going to stop there.

According to their generation expansion plan (2009 to 2023) from 2009 to 2022 at least 3,200Mw coal power is to be introduced to the national grid. It means that the CEB is totally dependent on coal power generation as its main source. Coal is a base load power source and by that way they are going to



Norochcholai coal power plant

increase our emission level by at least 25.6 Million Mt by year 2025. Assuming the population to be 25 Million we could deduce that the per capita emission to be 1500Kg which means we increase our emission level by 250%.

Coal future

There will be serious environmental and political factors going against this coal future. One is definitely the cost factor. When oil and gas prices are soaring coal could be the substitute with its increased price. If we were able to build a coal plant in 1990, we would have gained some economic benefits without considering environmental factors associated with it.

In addition to CO2 emissions it creates serious problems related to its ash and sulphur. However, we cannot expect the same benefits now and definitely not in 2025 when oil as well as the gas peak is expected to be over.

The other main problem is

emission. The IPCC, the scientific body has identified the carbon budget for the whole century and it is estimated to be 1456 Giga Tons of carbon. That means the human population could emit 14.56 Giga Tons of carbon annually while avoiding dangerous environmental calamities which may cause the extinction of humankind at 50 : 50 probability.

That has been calculated assuming 450PPM carbon particles in the atmosphere (now it is 400PPM) and a 2 degree C increase in mean global temperature. The 50 : 50 probability means a very serious gamble. That is why small island nations are agitating for only 1.5 Degree C increase in order to raise the probability factor to save the planet.

Whatever the figure may be environmentally permissible per capita emission figure may be 2,000kg - 1,000kg for the coming 40 years. So if we are going to pass this threshold we may lose our moral high ground and as a result we may face very serious consequences.

For example the US and EU, the worst polluters in the world are now trying to impose a carbon tax on trading, maritime and aviation businesses. That means they can impose carbon tax on our apparel industries if we are manufacturing these goods using high emitting coal power. They could also impose new surcharges for maritime and aviation business causing serious problems to future plans to develop Hambantota and Colombo South new ports and the Mattala Airport.

'Green' concept

So we should adhere to green port and green Airport concepts to achieve the anticipated prospects.

Environmental effects of coal is not limited to emissions. It generates hundreds of millions of tons of waste products including fly ash, bottom ash, flue gas, desulfurisation sludge that contain mercury, uranium, thorium, arsenic and other heavy metals. If we use high sulphur coal it could affect the water-

ways and interfere with ground water and other adverse effects the could also be anticipated. So, many other ill effects will be experienced as black coal is not clean or green in any sense. If we were to reduce the harmful effects it would increase the cost of production.

The Government has decided to limit its coal power generation in Norochcholai and Sampur plants which are to generate nearly 2,000 Mw of power. The Government has been compelled to build coal plants due to the fact that since 1992 the CEB had not implemented its generation plan. We are now paying for the sins committed by our politicians, bureaucrats and policy planners in the past. We should not pass this burden to our future generation. Therefore, while limiting our coal option we have to explore other green possibilities.

(The writer is the Minister of Environment and Natural Resources).

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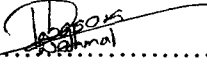
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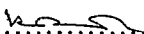
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