

Necessity to build three coal power stations

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The Institution of Engineers Sri Lanka (IESL) wish to respond to the opinions expressed by Metthananda Wijekulasuriya (MW) (DN April 20), under the Caption "Build Norochcholai - IESL".

IESL, in keeping with the role a leading professional institution is required to play in matters of national importance, did categorically state that the Norochcholai coal power plant should be built and built first.

Why? The country's power requirements will increase by 3300 MW between now and 2021 (CEB Generation Plan 2001). This is equivalent to three major (900 MW) coal power plants plus the balance coming from other thermal sources, hydro and renewables. These projections are without taking into account the impact of the on-going peace process.

Hence we require not one but three coal power plants. The work on the Norochcholai Plant is now at a stage where construction could commence in 18 months to 2 years and the power plant commissioned in 4 years from then i.e. in 6 years. The funds have been pledged for the first phase of Norochcholai by the Japanese Government. Two other plants will be required and these could come up in Trincomalee and Hambantota. Both these sites are at initial stages of study.

Any delays in implementing the construction of commissioning a coal plant will result in the continued use of expensive diesel plants resulting in consumers having to bear the brunt of even higher tariffs and our exports becoming uncompetitive in the world market.

The IESL stand referred to by MW was in the context of IESL advocating the need to have a coal plant in place at the earliest possible opportunity. It was not to the exclusion of having other plants such as Dendro, Mini Hydro, Wind etc. IESL has always been supportive of these alternative forms of generation. However, in the current context what is required is a proven source of generation capable of meeting the large shortfall that needs to be met, with no further delay.

The response of IESL to specific issues raised by MW are the following:

Hydro

MW's interpretation that the Japanese observed our abundant water resources, runs contrary to the actual situation in the country. All major sources of hydropower have either been utilized or identified for development.

It is because these sources are inadequate for future needs that coal and other non-hydro sources are being pursued.

Paving for coal

We agree with MW that de-silting of reservoirs where appropriate will yield additional potential. While this will certainly help, yet quantified estimates show that large capacity additions must be made

very soon to ensure a continuous low-cost supply of electricity.

Coal for how long

Many of the developed countries currently generate a very large proportion of their power (USA 45%, Australia 90%, Japan 40%) using coal. These and a number of countries in the region plan to build coal plants in the near future. There is no indication whatsoever about any reduction in the availability or the use of coal for electricity generation, as shown in the diagram.

The statement of Sir Arthur C Clarke quoted by MW (2006: Last coal mine closed) is drawn from a series of predictions published in a recent issue of the Readers Digest. Amongst his other predictions in the same publication, not quoted by MW are - 2002 The first commercial device producing clean, safe power by low-temperature nuclear reactions goes on the market,

Dr. Ratnasiri points out, there has to be "Regulations for controlling polluting emissions from power plants on building infrastructure to enforce the regulations, or monitoring the ambient air quality to see whether the air we breathe is free from pollution".

IESL - These are all built-in to the coal fired power plant building infrastructure.

Liquefied Natural Gas (LNG)

MW - "Natural gas power plants are intrinsically free of pollution". Another advantage of LNG is said to be the possibility of installing smaller size LNG plants.

IESL - By 2010, we will require 10,000 GWh/year from non-hydro sources. If we generate all this electricity from LNG in power plants which are 50% efficient, we will require 1.9 million tons/year of

With regard to MW's comments on various opinions, we shall not comment but suffice to say that all the projects considered by the CEB and other agencies have been prepared by internationally recognized and accepted consultants. In respect of Norochcholai, the original proposal was reviewed and accepted with certain modifications by a second group of consultants appointed by the Government in mid 2001. In the process of development of these proposals, the proposals were reviewed and modified at various stages by the appropriate local agencies and bodies. These include the very competent and recognized bodies in the various fields, both in Sri Lanka (e.g. Lanka Hydraulics Institute) and overseas.

False reports

MW - The Japanese Consultancy Institute (JCI) reckoned the project cost for Puttalam - a site near

owing to the structural change in the power plant market, and the subsequent reduction in the orders for new power plants of all types owing to the slow-down in the world economy.

Tariff and prices

MW - But these experts do not say for how long they could supply electricity at Rs. 7 after commissioning coal fired power plants.

IESL - No one can make exact forecasts. What engineers say is based on historical actuals and present trends.

The simpler explanation is the following: The life-cycle cost of the power plant at Norochcholai (fully compliant with all environmental laws, coal delivered at US \$ 48 per MT) will be 4.22 UScts/kWh. Typical Transmission & Distribution (T&D) costs, and overheads are 2.50 UScts/kWh. Therefore the selling price of a unit of electricity from Norochcholai will be about 6.72 UScts/kWh, which at the current exchange rate of 96 Rs/US \$, will be 6.45 Rs/kWh. However, Norochcholai will never be the only source of electricity in the country. We will always have the hydros which are cheaper to run and several committed oil plants with CEB and private sector which are more expensive to run. Therefore, the average tariff, without any taxes, should settle around 7 UScts/kWh, if Norochcholai is built immediately, followed by other sites for coal power.

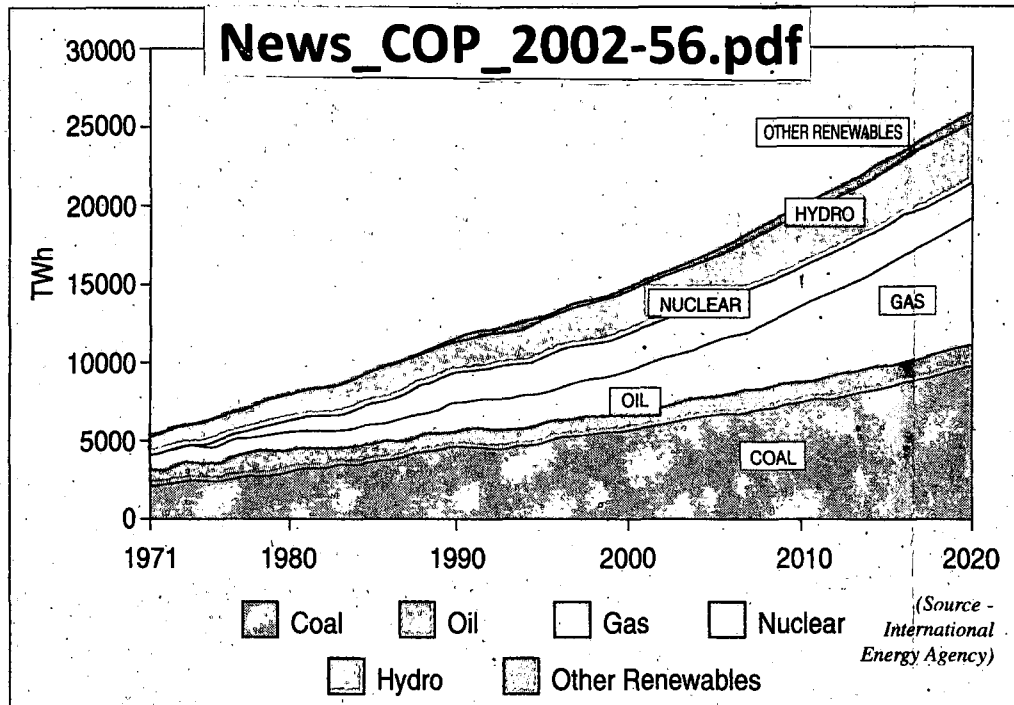
MW - A few months back the consultants and CEB officials were pushing for coal fired power, stating a unit could be sold at Rs. 6. But at the press conference held by the IESL the figure given was Rs. 7. However, the same source at a recent seminar on power crisis has stated (Sunday Times - 7.4.02) a unit could be sold at Rs. 7.50.

IESL - We do not know the basis of the figure of Rs. 6. But we see that this price will be possible if T&D losses drop from the present 22% to the optimal level of 14%. Then, (in very approximate terms), the figure given above as 6.45 Rs/kWh will drop to Rs. 5.84 per kWh. The figure of Rs. 7 given at the IESL Press Conference is according to the Long Run Marginal Cost (LRMC) of electricity delivered from the CEB system (a figure of Rs. 6.92 per kWh) although we did not identify it as LRMC, as it was too much of a detail for the non-technical press.

What Dr. Tilak Siyambalapitiya said in the last sentence of his paper at the March 9 IESL conference, which Sunday Times summarized on 7 April was "Three coal-fired power plants are required for development until 2016 to support a GDP growth of 5% and to ensure electricity price to stabilise around 7.50 Rs/kWh".

He considered Rs. 7.50 to be an upper band, because the LRMC of around Rs. 7 does not account for the present commitments (large expenses on diesel, accumulated losses and commitments to IPPs).

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heralding the end of the Fossil Fuel Age.

2009 The first quantum generators (tapping space energy) are developed. Available in portable and household units, from a few kilowatts upwards, they can produce electricity indefinitely. Central power stations close down: the age of pylons ends.

Thus going by his prediction for 2002, do we now go nuclear to the exclusion of all other sources? If we go by the prediction for 2009, we should by now be phasing out our power plants and the transmission system.

At the end of this article we have provided information on proposed coal power plants in South/South East Asian countries.

Clean energy

Most developed and developing countries generate their electricity from coal. None of these appear to be adversely affected by the so-called pollution. These countries include USA, UK, Japan etc. that are very conscious of the environment.

MW has also referred to comments by Dr. Janaka Ratnasiri: As

LNG by 2010, which is too small for a commercial LNG terminal. Besides LNG prices are linked to oil prices and we will continue to be governed by the problems associated with oil prices, exactly as we experience right now.

Dendro

MW - But we also have another resource hitherto untapped in firewood

IESL fully supports this concept for generation of electricity, but with a full understanding of its technological and economic limits. It is clear that Dendro will not be the source of power to meet the very large deficit (twice the current availability by 2021).

In the recent press release, IESL did not refer to Dendro and other alternatives because the thrust of the IESL stand was the immediate need to initiate action to have adequate and affordable power available to the consumers at the very earliest.

Mini hydro

Here again IESL fully supports this concept as applicable, where appropriate.

Norochcholai to be 680 million US\$. Dr. Siyambalapitiya says (Sunday Times 7 April 2002) in presentation on the power crisis that the investment commitment for any coal-fired plant out of the three sites will be about US\$ 400 million for phase I. On what basis was this estimate done?

IESL - What JCI did in 1992 was a reconnaissance study, on their own initiative, and made an estimate of US\$ 680 million for a site in Puttalam. The JCI site was in Thalawila, not in Norochcholai. In the development of a large project, there are several levels of study: reconnaissance, site selection, pre-feasibility, feasibility, conceptual design and detailed design. The accuracy of cost estimates increase from the reconnaissance level to the detailed design. The cost of US\$ 400 million was quoted as the order of magnitude for the phase 1 of any of the potential sites for coal power development, in the discussion on the possible limitation of expecting a totally private financing package for such a large project. It is also noteworthy that the costs of coal power and other similar steam-turbine based power plants have substantially decreased over 1990-1995

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fast, but not least, we strongly condemn the insinuations made by MW that IESL is financially benefiting by taking a view in support of coal power. If professional institutions such as IESL can be silenced by such accusations, the country will only hear the opinions of vendors and commission agents of power projects, which will definitely be biased towards their own technologies.

IESL's recommendation to proceed with the Norochcholai power plant is based on careful and quantified evaluation of the present and future electricity demand, economics and maturity of different technologies for electricity generation, prices and price stability of fuel options, time constraints in designing and building large power plants,

and the realities of raising finances for large power projects. Proposed Coal Power Plants in South/South East Asian Countries (Details obtained from engineering publications Asian Power) Malaysia - 1400 MW in Jimali and 2100 MW in Bunting Indonesia - 650-700 MW in Paiton.

Thailand

Thailand plans to pursue construction of nearly US\$ 3 billion worth of coal fired power plants to lessen the dependence on natural gas, despite rising environmental concern and substantial under-utilisation of existing capacity.

The government wants to increase the use of imported coal in its energy generation mix with plans to build these coal-fired power plants totalling 3,534 MW in the coun-

try's South and East. With gas reserves expected to last 41 years (since 1973) and with piped-imports from neighbouring Myanmar, Thailand is now 70% reliant on natural gas for power generation.

Of the total, 73% comes from the Gulf of Thailand and Namphong in the North East, with the balance coming from Myanmar.

But the contribution of indigenous gas will be reduced to 61% in 2006 and to 41% in 2011 due to the depletion of reserves said Anton Sirisaengtaksin, Deputy President for natural gas marketing and transmission of the state run Petroleum Authority of Thailand.

"The (Coal) projects will proceed" declared Chaturon Chaisang Minister to the Office of Premier Thaksin

Shinawatra at a recent interview during the Thai power 2001 conference in Bangkok organised by Asia Business Forum.

"We are just in the process of listening to the people, the people who are concerned about the problems that may occur. We still realise the need for resource diversification. I understand coal is still one of the very important sources of power in the country. We need to use or rely on coal to a certain extent. (Ref. Asian Power September 2001).

Korea

Korea Electric Power Corporation (KEPCO) has recently been constructing standardised 500 MW coal-fired supercritical boiler units as a means of reducing South Korean reliance on oil and natural gas imports.

While a number of these units are under construction the company is now adopting the more advanced 800 MW design. In 2001, South Korea commissioned two new 1000 MW coal power plants at Dangin and Hadong. This year, the Taean 1000 MW coal power plant will begin producing electricity. The 1600 MW Yongheung coal power plant is now under construction with a target to be operational by 2004.

Philippines

The six coal fired power plants owned by NPC and IPPs, with a combined capacity of 3,060 MW have to rely mainly on imports from Indonesia, China and Australia. However, coal imports in 2002 are expected to be less than last year due to entry of natural gas into the electricity

generation. Future Projects to meet the Philippines need capacity addition of 10,000 MW between 2000 and 2010. Committed NPC and rehabilitation of a combined 2,065 MW the 200 MW Mindanao Plant.

IPP's have capacity additions of 10,000 MW between 2000 and 2010, which include 1,000 MW Quezon coal plant (Ref. Asia Power September 2001).

Bangladesh

Bangladesh will build its first coal fired power plant with a plan to build a power plant next to the country's largest coal mine, Pukria in the North. The mine will be operational in 50 years, operating as a power station.