

Lights will go out in 2004

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The Island

by Dr Tilak Siyambalapitiya

I thank the ISLAND for allowing space in your columns for a valuable professional discussion on the subject of Sri Lanka's electricity development programme. Although certain contributors wonder away from the main theme of the discussion by raising issues such as missions, commissions, contracts and kick-backs, it will be useful to restrict our discussion to the profession of energy and electric utility planning and economics, and the sector's impacts on the environment. We can make our discussions fully transparent, methodical and scientific.

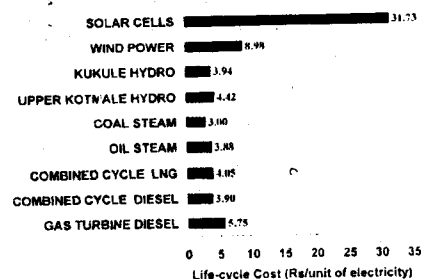
In my letters of 1st July and 6th August in the ISLAND, I explained the two imminent severe electricity crises of unprecedented proportions that will greet our country in the new millennium, and the role played by the Environment Movement (and others) in delaying two vital power projects that will help Sri Lanka to overcome the two crises. Mr. Hemantha Withanage in his article in the ISLAND of 25th and 26th August speaks of many issues, mainly to justify the involvement of the institution by the name of Environment Foundation Limited and the affected people in the decision-making process. This he knows is allowed and already practiced in the Environmental Impact Assessment (EIA) process. If there are any weaknesses in the process, that should be rectified.

I agree with some of Mr. Withanage's comments about today's demand-side energy mix of electricity use, but it is not correct to say that only 30% of electricity is "allocated" to the domestic sector. In electricity use, there is no "allocation" as such, and the customers use electricity to satisfy their requirements, to the limit that they could afford. If they do not use a lot because they cannot afford the present prices, then unfortunately, they will have to wait until the coal-power programme is implemented, which over a period of ten years, can reduce the real price of electricity by at least one rupee. If the Environment Movement and others do not allow that to happen, unfortunately the 30% "allocation" will gradually decrease when electricity prices have to be repeatedly increased in the next decade, and become less affordable to the ordinary Sri Lankan.

Mr. Withanage also observes that "not much attention is devoted to biomass, biogas, sunlight etc.", but makes the knowledgeable mistake of not discussing their total costs and technical limitations. In my letter of 6th August, I described the costs of one of these alternative energy sources, and that the cost of a wind-generated unit of electricity would have to be at least Rs. 6.50. Everything else will be more expensive than wind, with the possible exception of dendro power (dedicated fuelwood plantations fuelling a steam power plant).

The present average selling price of electricity

in Sri Lanka is about Rs 4.75 per unit. Our reasonable, updated estimates of costs of different electricity generating technologies are shown in the figure. Note that the costs are at the point of generation only (no transmission costs added), on the basis of life-cycle costs (i.e. no-grants, no profits, no-loss).



The Environment Movement can and should support their view that we should go all out for biomass, biogas, solar, wind, wave, tidal, OTEC, etc. by,

(a) Presenting information about any country, including the bases of their overseas financiers if any, that meets all or a substantial portion (i.e. say at least 10%) of its electricity requirements with these resources.

(b) Name at least one electric utility in the world that plans to satisfy its demand growth using solar, wind, biogas, wave, tidal etc.

(c) Calculating the life-cycle cost (i.e. the specific cost on a no-grants, no-profit, no loss basis) of a unit of electricity that can be generated from each of these sources. Compare with the average selling price today of Rs 4.75 per unit of electricity, not forgetting that Sri Lanka's prices are almost the same as the prices in the USA.

(d) Implementing a pilot project of sizeable magnitude (say 10 Megawatts) at the above costs, with no grants, and selling electricity to customers in a given area at the cost calculated in (b) above, and investigating their willingness to pay. No investment funds should be taken as loans from any Banks, local or foreign, because the Banks may have hidden motives.

(e) Come-up with a 20-year electricity system expansion plan for the whole country, using solar, biomass, wind, tidal, wave, of course within the free-market principles, that can supply reliable electricity for our people and the economy. The plan must be costed. Calculate the selling prices, and then go to the people and the industry and obtain their agreement to pay the corresponding costs.

I trust that the results of the above exercise will confirm our view that renewable energy sources can only perform a supplementary role but not the

major role in driving our economy of the future.

The statement that wind power and coal power cost the same is totally incorrect. Using Mr. Withanage's own data, both coal and wind cost the same US\$ 1200 per kW to install. Now we come to the hidden part of the cost calculation, which the writer conveniently omits. A coal power plant lasts for 30 years while wind lasts for 20 years. A coal power plant can deliver energy 80% of the time, while a wind plant in Sri Lanka can deliver its equivalent full output only 17% of the time. This owes to the variability of wind speeds. A coal power plant costs Rs 1.20 per unit of electricity to operate (i.e. fuel) and wind costs nothing. Let us neglect the maintenance costs to the benefit of wind. A few more steps of economic calculations will yield the following result: Coal 2.48 Rs per unit, Wind 6.72 Rs per unit. That's the estimate with Mr. Withanage's own data on capital costs. My own updated estimate is Coal 3.00 Rs per unit, Wind 8.98 Rs per unit. So, wind electricity costs at least 2.7 times coal, using Mr. Withanage's own cost figures. And that's what the Environment Movement wants Sri Lanka to use, while the rest of the world uses coal. The inability of wind to technically sustain a continuous power supply and the need to dedicate large stretches of land, is a different story.

On the positive side, I believe that Sri Lanka's Environment Movement knows exactly what they are doing. They know that no country in the world has been able to develop biogas, wind, biomass, solar, tidal, OTEC, etc. to satisfy their bulk electricity needs. They know the technical limitations of solar power and wind power. They know the majority of both developing and developed countries presently use coal power and continue to build more. They know that Sri Lanka has absolutely no option but to go for coal power for its bulk electricity requirements. They know that the financiers of the world-wide environment movement raise their funds through the generosity of industries and businesses that heavily use coal power.

Yet, our Environment Movement does not acknowledge that they fully understand the limitations and economics of electric power systems, but continue with actions to retard the development of the electricity sector and thereby the well-being and development of their own country.

There is no benefit in discussing irrelevant quotations from various foreign publications, which are too general, and do not consider the true status of the country's energy sector: by way of supply security, reliability and economics. They only waste valuable newspaper columns, and serve little purpose. R Goodland and Patrick Mcuallly quoted by Mr. Withanage are most probably two individuals who use at least 8000 units of electricity per year (a Sri Lankan uses only 300), at least 60% of it coming from coal-fired power plants. They probably pay at

a lower rate as well.

The writer has questioned how the Upper Kotmale hydroelectric project could assist the electricity supply in a drought situation. Let me briefly explain how the Upper Kotmale hydroelectric project, while being of run-of-river type with hardly any storage, can assist the electricity supply even during dry spells. When this power plant is built, its availability will avoid the release of a corresponding quantity of water from the major storage reservoirs elsewhere in the country, during periods of high and intermediate levels of river flow. Upper Kotmale receives water mainly in the SW monsoon, while the major reservoirs in the Mahaweli that receive water from NE monsoon have spare capacity during the SW monsoon. When the Kothmale Oya runs dry, stored water in Mahaweli reservoirs will be released to generate electricity, thus reducing expensive thermal generation that will also pollute Colombo. That is what we call the integrated operation and optimization of the hydro-irrigation-thermal system. No single power plant, hydro or thermal, can be discussed in isolation of the behaviour and characteristics of the rest of the system, which includes reservoirs of varying capacities, limitations of flow rates, seasonal irrigation demands, thermal plant limitations and transmission constraints.

No discussion on electricity supply is complete unless we disclose and discuss all the costs. While the country debates the coal-power programme, our economy loses Rs 13 million per day. And we debate Upper Kotmale: the economy loses a further Rs 2.2 million per day.

And let us happily continue our 14.2-million rupees-a-day debate, while the country starves for reliable, low cost electricity.

It will not be a waste of time to educate the public about the true status of the country's electricity supply, the experiences of other countries, the costs of electricity, our levels of electricity consumption and the plans to satisfy the future needs in a cost-effective manner, while satisfying all the local and international environmental standards.

The country should understand the largely unscientific, definitely uneconomic and mostly unrealistic arguments used by various institutions and individuals to block the implementation of national electricity development plans. The problem of most people is their inability to quantify; to quantify the costs and benefits; to quantify the technical limitations; to quantify growth and future requirements; to quantify the levels of pollution; to quantify and learn how other countries supply electricity to their people.

With the next round of electricity price increases followed by power cuts, the public will be anxious to know what plans were there and what happened to the plans.