

Development of resources at regional level to meet national requirements

by Eng. A.T.G.A.
Wickremasuriya

Since the early 1980s the engineers at the CEB had been warning the Government of an impending power crisis, and the imperative need to find ways and means of adding more power to the National Grid. The demand for electricity for household and industry was increasing annually by leaps and bounds, but the rainfall pattern was extremely erratic and providing power only through hydro-generation was becoming well nigh impossible. The idea of having a coal-fired power plant was mooted at that stage, and Trincomalee many was chosen as the most suitable location. However, due to the unexpected events of 1983, and the tense security situation that followed made Trincomalee totally unsafe for the installation of a Coal Power Plant.

Thereafter other locations were suggested by the CEB, and some of these places were Mawella, Hambantota, Puttalam (Norocholai) etc. Of all these, the majority decision seems to have been Norocholai, and according to newspaper reports, a sum of Rs. 500 million was spent on a pre-feasibility study alone!! However, due to various reasons, social, political and religious, this plan to commence building this coal-fired power plant has been stalled for the past fifteen years or more! And the whole country is undergoing enormous hardship and suffering due to the prevailing power cuts which commenced from May last year.

But the question arises, whether the people should be made to suffer, because the planners decided on one big power plant, instead of planning for smaller, mini hydro and thermal power plants, as well as alternate sources of energy available in a country like Sri Lanka. In this connection the views expressed in an article in the Tribune of August 1981, by the late Engineer D.W.R. Kahawita who was the head of the branch of Research, Planning & Design of the Irrigation Dept, during the 1950s are meaningful and quoted below:

"A solution to the power problem."

"The debate is on once again over the power crisis. Who was right and who was wrong is not going to find a solution to our power problem, what is hard thinking and bold decisions in the interest of the people and the country. What these decisions should be, cannot be thought out

overnight. First, we must understand the problems-generation, distribution, concentration of consumer points, future requirements and growth rates etc. etc.

The problem is worsening because we have not yet understood our rainfall patterns and the variations to be expected year to year, and for how many months there should be carry-over storage to meet the vagaries of the rains.

Yet we are banking fully on hydro-power to turn the wheels of industry. The alternative sources of energy i.e. gas, fuel oils, solar, tidal, nuclear etc. are too expensive, nor do we have the technology, nor has allied technology advanced for universal adoption etc. A small country like ours will always be confronted with problems, major in our own context, but may not be so elsewhere.

Hydro-power should be our mainstay. But unfortunately our thinking is not in keeping with our financial and natural resources. Out terms of reference are for massive hydrel projects where the rich nations can participate and even practice charity. So we are today, engaged in multi-billion projects, Kotmale, Victoria, Samanawewa, Randenigala and so on, where abundant rainfall and its storage is the sine qua non to success.

Whereas there are several minor schemes, more certain of water resources than the above and within our own financial resources for execution and to meet the power needs of a region rather than at national level. Our first hydrel project was on such a scale - thanks to Wimalasurendra. In the twenties we were used to thinking in terms of hundreds not even in thousands, so we were interested in small projects. In spite of our advance thinking the 'average man' still thinks only in hundreds. That is all that comes his way. Therefore, we still have to think in such terms, otherwise we will not be able to sell the energy, nor can our 'average man' benefit.

We mentioned 'regions'. Why not in our future planning for energy divide the country into energy regions? To our mind there can be 20 regions, each region getting its power priority according to consumption patterns and concentrations. In turn these can be classified as mainly hydrel and mainly thermal, that is to say, that 'X' percent of the time, source of energy will be Hydrel and 'Y' percent of the time thermal, the balance (100 - X) or (100 - Y) of the time to depend on the central and national supply system of projects like Victoria etc.

There are certain problems connected with steam generation using charcoal fuels but none of them are insurmountable. If we are thinking of research in 'power alcohol derived from crops' as an alternative, it will be cheaper in time and money to investigate the efficient use of shell and wood charcoal, both of which we have in plenty.

Once we have settled on the primary source of power hydrel or thermal in each region, then we can take points of micro or mini hydro development in each such region according to its own resources, and the others to be the thermal development regions. Today we think in terms of fuel oils or gas to generate energy. We will have to abandon this idea till we strike on better times.

At the moment our economy is such that we can think only of simple, and cheap sources like steam generation fuelled by coal etc. These are in vogue today in some of the advanced countries like England where coal is available in plenty. We have no coal.

What is the alternative? -

Coconut shell charcoal, coal and wood charcoal - not ipil ipil, there are other woods still available which were used as standby fuels during the first World War.

Steam generation is very simple compared to other methods. Many advances were made when steam held its ground against cheaper forms.

There were techniques developed then to recycle condensation water to save fuel to reduce cost of electricity generation. These techniques are still available though they were edged out by sophisticated techniques.

In this country we have a variety of fuel woods, of which coconut shell charcoal is one of the most important items.

This is now available as an export item. The first step then towards thermal generation is to stop the export of shell charcoal to conserve it for local use, followed by four or five units, located in the

coconut triangle, to produce a high efficiency shell charcoal. Even in this, Western countries have developed techniques to increase the heat efficiency of shell charcoal.

The quantum that can be produced can be estimated and this quantity will be available annually. The shortfall in shell charcoal can be made up by importing coal from India - transport from Calcutta may not be more than three days to our northern or eastern ports. Wood charcoal will be the third form of fuel. If we can rationalise the production of shell and wood charcoal as an alternative source, for fuel oils, then the picture in a nutshell is:

a) Development of small hydrel plants in the wet zones rivers.

b) Small steam generation plants in areas where (a) is not possible using local 'fuels' available.

c) Each type to be assigned a region, and

d) The national system supplementing when the need arises in any region.

Steam generation will be the cheapest source of electricity for us, using what is available locally. Water, shell and wood charcoal supplemented by imports of coal from India.

There are certain problems connected with steam generation using charcoal fuels but none of them are insurmountable. If we are thinking of research in 'power alcohol derived from crops' as an alternative, it will be cheaper in time and money to investigate the efficient use of shell and wood charcoal, both of which we have in plenty. Research efforts in this

direction will be more fruitful than power alcohol from sugar shells and wood are wasted, when it could be used for power generation. We remember of a shell charcoal unit set up at Madampe (Chilaw district), long years ago to produce high efficiency shell charcoal and acetic acid as a by-product. As usual we never followed it up. We strayed in search of new pastures.

The regions for mini schemes may be

a) Thermal: Jaffna, Vavuniya, Mannar, Anuradhapura, Puttalam, Kurunegala, Katunayake.

b) Hydro power: Trincomalee, Batticaloa, Matale, Minneriya, Kandy, Ratnapura, Badulla, Galle, Matara, Tangalle, Hambantota, Nuwara Eliya, Kegalle.

If we concentrate on a system of this nature, we will be able to find a permanent solution to our power problems within reasonable limits - both for production and to the consumer in the rural areas; 80 per cent of the consumer potential is in the rural areas. Load of the rural supply system can be taken over by these mini schemes."

Contrast

In contrast to the Rs. 500 million that was spent on a pre-feasibility study that was said to have been done, for Norocholai, I can do no better than to quote how the local specialists attached to different departments contributed to the proper planning of the multi-purpose project at Gal Oya. The excerpt that follows is taken from the Centenary Volume of the Irrigation Department, (page 461):

"Many illustrious engineers have contributed to the investigation, design and construction of the Gal Oya project. We owe its creation to the judgement and vision of a Director of Irrigation, J. S. Kennedy, who selected the site for the dam.

Thereafter it was our own veteran Director, W. T. I. Alagaratnam, who, as an Irrigation Engineer of the Department walked into the wilderness and set up camp at Inginiyagala to carry out the surveys and investigations.

Later came the soil surveys of the dam-site and of the burrow areas and the testing of the samples in our soil mechanics laboratory. Preliminary designs and estimates were prepared by D. W. R. Kahawita, who took them to the Consultants, the International Engineering Co., Denver, Colorado, USA.

They said that they had never received such a complete and

comprehensive set of drawings, soil tests, gauge readings and all other information necessary to formulate and design a multipurpose project as those supplied by the Irrigation Department of Ceylon. This is certainly a great credit to the officers of the Irrigation Department responsible for the collection and presentation of the information required.

At the same time the Survey Department carried out contour surveys of the entire area commanded by the dam and Dr. A. W. R. Joachim of the Agriculture Department made a reconnaissance soil survey of the area. The estimate for the construction was awarded to Morrisons Knudsens International Co. on the basis of target estimate.

In the meantime, M. C. Abraham, Divisional Irrigation Engineer carried out the construction of the A class access road from Kalmuhai to Inginiyagala; this was completed in 15 months including the reinforced concrete bridge across the Namal Oya. The annexed bar chart is the copy of the construction programme from the report on this project."

'Self-reliance'

In conclusion, I wish to say that the present policy of the government which is developing the country based on the resources available regionally, and co-ordinating such resources to meet the needs of the country at a national level are in keeping with the plan of development outlined by the late Eng. D. W. R. Kahawita.

Let us also learn by past experiences of success as in the case of the Gal Oya project on the one hand, and the miserable blunders and failures at Samanawewa; finally, the problem and challenges that have arisen due to the growing impact of the sea, that surrounds Sri Lanka.

The drawings provide sufficient evidence of unsuitability of constructing massive coal power plants in sites such as Norocholai. It is needless and even foolish to depend on imported fuels, when we could tap the energy differences that so obviously exist between the water on either sides of several head-lands etc. that exist in our coastal region.

Unfortunately action on such matters are ignored by the authorities concerned. Hope the private sector involved in the hotel or cottage level industries explore the possibilities at least on an experimental level, at a site like the sea out-fall of Bentota ganga, or others in the Matara and Hambantota districts.