Energy conservation, an urgent need

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Recently we read in the newspapers a statement made by the Minister of Irrigation and Power, General Anuruddha Ratwatte about the urgent need for energy conservation. The Minister has stressed the fact that since we do not have fossil fuel supplies of our own. The country has to spend large sums in importing fuel for power generation. So, conservation of energy is conservation of valuable foreign exchange on one hand.

It is said that one KV conserved is one Kilowatt generated. It is important to reflect on this simple rule to understand the fair-reaching implication of energy conservation.

For some of us energy conservation simply means switching off an unwanted bulb, fan or air-conditioner. To some others who focus on things like demand side management conservation largely means management at end use. The Minister has correctly pointed out that there are distribution losses which should be minimised. In fact generation and distribution losses comprise a substantial area where energy saving can be effected. On the other hand energy saving by means of efficient use of our own resources like fuel wood, development of alternative energy technologies, fuel substitution and determining the optimum fuel mix are other important aspects of energy conservation.

To achieve this important objective of energy conservation a fund was established in 1985 by an act of Parliament, to finance, promote and initiate activities and projects relating to energy conservation and energy substitution schemes specially involving new and renewable sources of energy. In spite of financial, staff and other resource constraints the ECF has been an important catalyst, and a forerunner in the drive for energy conservation and establishment of alternative energy technologies.

In the initial stages ECF forged ahead with a vigorous campaign of awareness programmes with an all island schools quiz competition over the radio, T.V. and other publicity programmes. The improved firewood Cook-Stove programme also went along with this awareness programme with the assistance of the energy unit of the Ceylon Electricity Board.

An energy conservation week was held with the participation of the President along with islandwide speech, drawing, poster and poetry competition. In fact a continues vigorous awareness programs are of vital importance in the energy conservation efforts. The people have to be told and constantly reminded of the benefit to be achieved by way of energy saving both of themselves and the nation at large.

ECF has recently taken steps to introduce the subjects into the schools curriculum through Curriculum Development Center of the Education Department. It is presently engaged in training all science and social science teachers in the various education divisions of the island in energy conservation and related subjects. The subject also be has been introduced as an examination tropic in the question papers of the Examination Department. Plans are afoot to prepare reading materials for the students in addition to the brochures prepare by ECF on different aspects of conservation.

With a view to bringing the message closer to the people the Minister has obtained Government approval to set-up seven provincial units of the ECF in the different provinces. These units are expected to work in close collaboration with the Provincial Councils to achieve optimum use of resources. They are expected to be in close touch with the people, educating and helping them in sorting out their energy problems on the one hand and work with the provincial councils to achieve meaningful Rural Energy Planning.

Fuel wood resources

Management of forest and non-forest wood fuel resources in an important aspects in the energy conservation effort. About 57% of our total energy needs is still supplied by the biomass sector which amounts to around 3,800 T.O.E. On the other hand our total forest cover has fallen below 23%. There is a real need for conserving and efficient use of our fuel wood and other biomass resources.

However the fuel wood sector is still a no man's land. There is no single agency responsible for fuel wood development and the sector has been relatively unattended to all the time in spite of its contribution of 57% to the total energy supply. Establishment of fuel wood plantations has been on the cards for the past several years.

ECF ha been doing studies and trying to persuade various agencies to undertake fuel wood plantation from as far back the early 90s. However nothing substantial has happened in the field until recently, apart from the populisation of the efficient fuel wood stove among the general public which has recorded substantial fire wood savings.

The ECF started a pilot programme of fuel wood plantations in early 1998 with the establishment of trial plantation plots. In the different agro climatic zones of the island, to determine suitable species, cropping patterns and other relevant data. The programme was later incorporated into a joint venture by several agencies, financed by the European Community under the Ministry of Science and Technology. This programme envisages the establishment of fuel wood plantations on a commercial basis in the future, with a view to not only supply our energy needs, but also to produce dendro thermal power on a substantial scale.

The entire fuel wood energy sector is still not properly regulated. Commercial growing of fuel wood, providing proper incentives to the private sector identifying suitable areas for fuel wood plantation, encouraging participating fuel wood growing programme are some of the aspects that need urgent attention. In fact out of the 1.6 Million hectares of marginal land even if 0.5 hectares is converted into commercial energy plantations it would create annually around 10 Million Tonnes of fuel wood which is equivalent to approximately 3.8 Million Tonnes of oil in energy content. This is more than the energy annually imported.

As regards other biomass resources like paddy husk and saw dust, ECF has introduced the use of paddy husk in firing brick kilns and saw dust to fire lime kilns and tobacco barns back in 1990. About 2 years ago ECF successfully introduced saw dust as a fuel service to run boilers in the Textile industry, thereby replacing expensive diesel oil. At the same time production of coconut charcoal and charcoal carbonization was also introduced.

Recently ECF has done a survey of paddy husk available in several districts and a study report is now available for potential investors to undertake power generation by using paddy husk especially in Anuradhapura and Polonnaruwa districts. An estimated 2-4 Mw capacity can be developed in certain locations in the above districts. A saw dust survey also has been undertaken in the Moratuwa area and it has been found that a total generation capacity of about 20 Mw is possible with the saw dust accumulating in the area.

Alternative energy

The Minister has rightly stressed that the country has to spend a large sum of foreign exchange to import the fuel required for power generation. From the beginning ECF has been conducting studies on alternative renewable sources of energy such as Biogas, Mini hydro, Solar photo voltage and wood energy. If these forms of energy could be used economically in the energy mix, source switching and demand, matching can become a reality in meeting demand for electricity at reasonable cost.

Sri Lanka's only indigenous energy source, hydro electricity has only a limited further development potential. Almost all the major hydro electricity production capacity has been utilized. However there is still a possible production capacity of 100 to 150 Mw available in the Mini Hydro sector. ECF started its first Mini Hydro project at Induranaoya with a plant capacity of 30 Kw as a pilot project in 1992. The scheme was built and commissioned by the NERD Centre. Subsequently ECF has also funded several such mini Hydro project on an experimental basis undertaken by Intermediate Technology Development Group (ITDG).

These efforts established the fact that this was the cheapest way of providing energy at village level where villagers themselves can look after the plant and maintain the system. It has been shown that mini and micro hydro projects are in great demand at village level particularly away from the national grid.

Studies also have shown that there is a greater potential in fairly large scale mini hydro projects ranging from 2-10 Mw Capacity. There is considerable entrepreneur interest in developing such projects on a private investment basis. However the assistance they get from the State is minimal. Particularly the purchasing price of power stipulated by the CEB from mini hydro projects has become the biggest obstacles to development. For a long time ECF has been trying to convince the authorities the need for a preferential buying rate from such developers as an encouragement to develop the unexploited potential. The rate offered by the CEB is even lower than the rate offered to private thermal power developers. ECF has recently commenced a full scale study on electricity power purchasing pricing with a view to impress on the authorities the need for differential pricing to motivate private investors to take up to development of alternative sources of energy. One should look at our neighbour India to see the amount of incentives they are offering the developers to develop alternative energy.

ECF studies have also shown that there is a considerable potential for wind energy, development, although the process is a little more expensive. ECF partly funded the first wind energy potential survey carried out by the energy unit of the CEB some years ago.

Solar energy is another area we have to seriously consider for the future, although solar panels are relatively expensive. ECF initially carried out a study to assess the possibility of lighting up 50,000 house holds, in the Badulla District with solar energy. The study brought out the fact that it was too expensive an undertaking even as a state sponsored project. However since this is a clean and natural source of energy it should be considered in the energy mix for the future even in selected applications.

Other important areas of energy conservation

As has been stated earlier conservation is not only just carrying out awareness programmes. Promotion of efficient lighting in households does not mean only getting more and more people to use compact flourescent bulbs. Household and building lighting is a vast area in which considerable savings can be effected. Presently there is a lighting study undertaken by Sri Lanka Energy Managers Association (SLEMA) assisted by the National Science Council and ECF which can lead to building of a lighting and air-conditioning code for Sri Lanka.

Energy labelling is another area for considerable energy savings. At the moment electrical consumer items to various types of motors etc. imported to the country, are not tested for their energy efficiency. Some of the cheaper makes consume considerable larger amounts of energy than more efficient models. Testing electronic ballasts, refrigerators, fans, Irons has to be started as soon as possible. In developed countries such as Korea, Japan, Australia and UK, these items are tested and labels are given on the rating of energy efficiency as A-B-C or on a basis of stars. (Examples five stars, four stars etc.), so that any consumer even without knowledge of energy efficiency standards would be able to purchase energy efficient items by looking at the conspicuous energy labels.

ECF in association with Sri Lanka Standards Institution has just completed a standard for electrical ballast in flourescent lighting. Other items to be considered for testing are refrigerators, fans, irons and motors. However testing of these items require special laboratory facilities. ECF in association with the CEB is now working out a project to obtain ADB funding for a testing laboratory. Development of energy efficient building codes is another area in which large savings can be effected. It is satisfying to observe that the CEB is going ahead with such a study with World Bank assistance to prepare an energy efficient building code. There is much that the architect community could do in this respect in developing an efficient building code. It is the architects who should be convinced and made the prime collaborators if the code is to be a success.

Improvement to tea withering and rubber processing are other important areas for energy saving. Improved drying and withering techniques can lead to considerable saving of energy. Recently ECF in association with the Tea Research Institute has concluded an experiment in tea withering by which energy saving up to 40% in the withering process is made possible. This study is now available for tea plantations interested in installing the process.

Energy audits in industries, hotels and large business establishments is a must for energy conservation. ECF has found instances where up to 35% of energy saving was possible after energy audits in certain industrial establishments. Large hotels waste a considerable amount of heat from their boilers which can be used for other operations there by effecting considerable energy savings. Large hotels also can save energy through efficient lighting and air-condition. It has been found in energy audits that even small industrial units waste large amounts of energy by using outdated and inefficient equipment and regulators.

Institutional drawbacks

The Energy Conservation Fund is essentially an institution meant to promote studies, surveys, pilot projects and research on energy conservation programmes and energy substitution scheme, specially involving new and renewable sources of energy drawback is that it has no provision for implementing such projects by itself. In other words it has no implementing arms thereby making its usefulness rather limited. On the other hand although it is a Fund, it has no sufficient funds to promote energy conservation programmes by providing financial assistance to interested organisations. Nor has it got sufficient manpower resources to undertake large scale programmes.

Importance of energy conservation and development of renewable alternative energy sources cannot be underestimated particularly in our current situation. Sometime back there was even a Project Ministry devoted to energy conservation which meant the commitment of the state in this sphere.

However current is that the ECF should finance itself in the future with minimum assistance from the state. Absence of an implementation in the ECF makes the task all the more difficult. Although the Minister is a highly committed person importance of energy conservation and development of renewable energy sources does not seem to have received serious consideration of the top policy makers. As stated earlier the entire wood energy development activity is assigned to a particular agency. Some useful suggestions in this regard are available in a report by a committee appointed by the Minister of Irrigation and Power, General Anuruddha Ratwatte titled "Energy Policy for Sri Lanka."