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THE 'GREENHOUSE' EFFECT

The development of renewable sources of energy (wind, solar, hydro-electric energy etc.) is considered to be at its nascent stage and is yet to reach a level where it can guarantee a sustained economic growth

Availability and accessibility to energy from exhaustible (*conventional*) and/or non-exhaustible or renewable sources continues to be the lifeline not only for economic growth but also for improving the lives and livelihood of millions of poor people concentrated primarily in developing and least developed countries. It is also a fact that most of the contemporary environmental problems leading to its degradation are directly associated with energy production and its use. Electricity generation for development purposes alone contributes nearly one-fourth of total greenhouse gas emission. The world looks to be in a dilemma. On the one hand, lives and livelihood of poor people needs to be protected and improved; protection of environment, which is the source of life and also meet energy requirements, cannot be ignored any longer on the other hand. What makes the task more difficult is that considering the current usage pat-

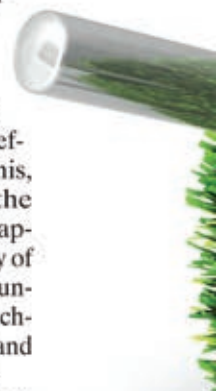
tern of exhaustible energy sources, the availability of such sources is not guaranteed in the long-run. In addition, the development of renewable sources of energy is considered to be at its nascent stage and is yet to reach a level, where it can guarantee a sustained economic growth. Given such circumstances, the sustainability of economic growth could be challenged, if effective steps to ensure supply of energy are not taken at the earliest.

There is a growing realisation among governments and other stakeholders including academia that India, like any other country, will find it increasingly difficult to sustain its economic growth in the coming period. It is also suggested that to counter this issue, there is a greater need to develop and mainstream both alternative energy sources and energy efficiency into India's growth process.

The second option, as indicated above, of promoting an era of energy efficiency appears to be timelier; as a

unit of energy saving through promotion of energy efficiency is more than a unit produced. It could, therefore, result in not only saving of capital expenditure but also direct gains to the consumers. There are two ways to promote energy efficiency in India: (a) promotion of energy efficient products; and (b) adoption of energy efficient technologies. Both the tasks are challenging as they involve a number of diverse stakeholders, including policy makers, manufacturers and more importantly, consumers with varying consumption habits and preferences. As a pre-condition to this, there is a need to understand the ground situation of sustainability approaches of both demand and supply of energy efficient products. And for understanding this, one requires a benchmark on various aspects of demand and supply of energy efficient products.

In addition to what has been said above, for enhancement of energy efficiency in the country as a whole, there



has to be a simultaneous increase in the production and consumption of energy efficient products. Importantly, consumers need to be aware of the benefits of purchasing energy efficient products both from economic and environmental perspectives. Such awareness and concomitant consumer behaviour is a crucial determinant of the use of energy efficient products. As the subject is complex, it is critical for the stakeholders, especially the policy makers to have a comprehensive understanding of demand and supply side factors which are shaping the market for energy efficient products in India, such as existing capacity for production; consumption patterns; consumption trend; future market for such products (*based on changing income levels and change in consumption habits and preferences*); factors that influence consumption habits; information channels that influence purchase decisions, among others.

STANDARDS AND LABELLING PROGRAMME (S&L) SCHEME

The World Energy Council defines energy efficiency (EE) as all changes that result in reduction in the energy used for a given energy service or level of activity. This reduction in the energy use, how-

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ever, may not necessarily be associated with technical changes, as it can also result from a better organisation and management or improved economic efficiency in the sector resulting in overall gains of productivity. There are also other definitions of energy efficiency. To some, energy efficiency is simply the process of doing more with less. Its primary goal is to accomplish the same tasks and functions as before while using less energy. In other words, it implies having a more efficient way of using energy which enables users to keep the same comfort while consuming less energy. Energy efficiency enhances the scope for sustained use of energy, and is based on three elements which are by order of importance:

- reduce energy demand as much as possible,
- use renewable sources of energy, and
- use fossil energy as efficiently as possible and only if sustainable sources are inadequate.

Energy efficiency, overall, can be said to be a matter of individual conscience and is reflected by the rationale of consumers' behaviour.

The Energy Efficiency S&L programme is a key area for energy efficiency and is being successfully implemented in many countries.

The experience of

countries, where S&L programmes are in operation, shows that the programmes are helping countries to reduce energy consumption in a significant way. For example, the implementation of S&L program in US alone has displaced over fifty thousand MW of electricity. In addition to energy savings, to some extent, it is helping in addressing the issue of climate change through the reduction of greenhouse gases (GHG) including carbon dioxide.

These programmes have brought significant impacts in terms of availability of higher quality energy efficient products in the market places resulting in energy as well as money savings for consumers on use of energy labelled products, a healthy competition in the markets through market transformation and lesser pressure on generation of additional power. These measures have also encouraged the manufacturers to produce energy efficient products and helped consumers to make an informed choice before buying these appliances. It has proved to be one of the most cost effective policy tools for improving energy efficiency and lowering energy cost for the consumers. Based on experience of other countries, it can be argued that energy-efficiency labels and standards for appliances and equipment offer a huge opportunity to improve energy efficiency (*Annual Report 2006-07, Ministry of Power*).

In India, the responsibility of bringing in an era of energy conservation and



energy efficiency lies with the Bureau of Energy Efficiency (BEE). The BEE was created in 2002 as a government agency under the provisions of the 2001 Energy Conservation Act. The Agency is a statutory body under the Ministry of Power. The agency's function is to develop programs which will increase the conservation and efficient use of energy in India. The mission of Bureau of Energy Efficiency is to institutionalise energy efficiency services, enable delivery mechanisms in the country and provide leadership to energy efficiency in all sectors of the country. Reducing energy intensity in the economy is its primary objective.

Currently S&L scheme is invoked for 12 equipments, of which the first four (mentioned below) have been notified under the mandatory labelling regime effective from January 2010. The scheme for other equipments is currently under voluntary phase and later depending upon the market transformation they shall also be notified under the mandatory scheme.

OVERALL EFFECTIVENESS OF THE S&L PROGRAMME IN INDIA

The impact of a programme can be assessed by measuring the success of the programme in terms of its set objectives. BEE's S&L programme likewise has the objective of promoting sales of energy efficient appliances to reduce energy consumption on the one hand and to reduce emission of CO₂ on the other hand. Data on sales of these products show that the country has started reaping the benefits of BEE's S&L programme both in terms of reduced energy consumption and reduced CO₂ emissions. Sales of energy efficient appliances are increasing every year in almost all the product categories.

There is so far very limited analysis

of the effectiveness and diffusion of energy efficiency technologies through the S&L program in India. An impact analysis of Standards and Labelling program was initiated by BEE and the status report quotes that the impact of S&L program on energy savings for 2007-08 was around 260 MW and which has been increased to 599.44 MW during the year 2008-09. The savings during the year 2008-09 was contributed only from efficient products in TFLs, refrigerator and AC segments. The savings during the year 2009-10 is 2179 MW. The huge savings are due to the fact of market transformation in greener products.

All the more, BEELINE (quarterly newsletter of BEE, Jan 2011) states that in all, S&L program has resulted in electricity saving of 4350.92 million units, equivalent to avoided generation capacity of 2179.31 MW.

Analysis of the data shows that out of the eight products, AC appears to make the highest contribution in capacity avoided and accounts for about two-third of the total capacity avoided. It is distantly followed by refrigerators, and tube lights. One heartening aspect of this S&L programme is that lately contribution of 5 Star labelled products is increasing at a relatively faster pace than lower label products. Analysis also shows that 3 Star labelled products have the largest share in avoided capacity. It accounts for more than one-third of the total avoided capacity, followed by 5 Star and 2 Star labelled products. Another important development is that contribution of 1 and 2 Star labelled products is negligible in all the products categories except for air conditioners. This gives some indications that impact of S&L programme on avoided capacity will become deeper and more effective in the coming periods.

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MAJOR ISSUES AND CHALLENGES FOR S&L PROGRAMME IN INDIA

The S&L programme is definitely a good initiative undertaken by the government of India to address its increasing need for energy in the coming period. There, however, remain some very serious challenges to the success of S&L programme. Some preliminary findings of a recent study by CUTS International on assessment of consumers' behaviour on energy efficient products in India reveal that the energy efficiency initiative has yet to cover a long distance before it becomes a way of life to ordinary consumers of electrical appliances. The study is based on a survey of over 20,000 consumers, 550 traders and 50 producers of electrical home appliances spread all over India. Though a significant number of consumers (43 per cent) are using one or other type of energy efficient electrical appliances, there are still a significant number of consumers (35 per cent) who



are not aware of energy efficient home appliances. The penetration level of energy efficient products progressively increases with income levels.

Energy efficiency is yet to be impregnated in the mind of consumers as an important factor while making purchase decisions. Product brand and price are the major factors that get primary importance from consumers. This consideration varies from one product to another, but in all the cases, energy efficiency appears to be a laggard.

While over 29 per cent of consumers who are not aware of energy efficient products are interested to know more about energy efficiency, six per cent appear to have no interests in knowing more.

Of those, who are using energy efficient products, only about eight per cent are extremely satisfied, while about 12 per cent are either lowly satisfied or not satisfied.

Out of 7081 consumers who said

CHALLENGES OF ENERGY EFFICIENCY EMERGE FROM THE LOW LEVEL OF AWARENESS AND RELATIVELY HIGHER PRICE OF THE ALTERNATIVES

they have problems in completely shifting to energy efficient products, high cost of appliances is a major barrier for 34 per cent of respondents, while non-availability is an issue for another 21 per cent.

While 29 per cent of traders have gone through formal training to promote sales of energy efficient products, more than 70 per cent are yet to get any formal training. About 56 per cent of these are of the opinion that they need formal training to promote energy efficient products.

For an overwhelming number of consumers (67 per cent), there is need to reduce the price of energy efficient products, either through subsidisation or reduction in the cost.

There are a significant number of consumers, who are unwilling to pay premium for energy efficient products. Some modalities need to be worked out to bring these people in the drive of energy efficiency.

WAY FORWARD

There are both opportunities and challenges faced by India in its drive for bringing in an era of energy efficiency. As indicated above, the challenges to energy efficiency emerge from low level of awareness, relatively higher price, low product use satisfaction, lack of or inadequate training to traders, and others. These need to be addressed to ensure success of S&L programmes in India. Of these, low level of awareness and high product price can be considered to be major challenges which need immediate attention from the government and other stakeholders. This will involve both demand and supply side factors (*stakeholders*) playing their respective role in harmony with each other.

Alternatively, stimulating supply side

forces through measures such as use of technology that help in bringing down the production cost; ensuring easy availability of products, and getting emotional and societal values ingrained in products, could also help the market to transform itself.

CONCLUSION

Although electricity currently accounts for a small share of total household energy consumption, it is the main source of energy for lighting and is predicted to grow six fold by 2031. Out of the total electricity consumption of households, electrical appliances are a major source of household energy consumption, especially in higher-income urban households. Moreover, the share of electrical appliances in household energy consumption is likely to increase significantly in the future because of growth in per capita income. The drive to bring in efficiency in the sector will not only help India to reduce its consumption of electricity but would also help to sustain its economic growth for a longer period of time. More importantly, it will also help to reduce the GHG emission.

To address various barriers that exist and could hamper the progress of S&L programme in India, an integrated market transformation program is required with a combination of both regulatory and market based activities. GID

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