

Energy efficiency initiatives in “God’s Own Country,” Kerala

Kerala is the first only state in India to have a separate body for overseeing energy conservation activities at the state level. Called the Energy management Centre (EMC), it was established in 1996 as an autonomous body under the Department of Power, Government of Kerala

Energy conservation initiatives had already been started in the state four years before the EMC was established under these initiatives, the government of Kerala made energy Auditing mandatory for all high-tension/extra-high-tension industries and commercial establishments during 1992. The auditing was to be completed within three years.

EMC has been designated to enforce the Energy Conservation Act 2001 with the Concurrence of the Bureau of Energy Efficiency, Ministry of power, Government of India. This was published in the Government Gazette on December 18, 2003.

Objectives of the EMC

The EMC framework is devoted to comprehensive and multi-disciplinary institutional objectives and orientation encompassing all aspects of energy, with a focus on energy-environment-development interactions. The guiding philosophy of the Centre is “achieving sustainable development by enhancing the total energy efficiency and application of renewable energy and environment-friendly energy systems in all sectors of the economy”. To realize this goal, the Centre has adopted a multifaceted institutional and functional strategy focusing on the following programs:

- Promoting energy conservation in all sectors of the economy through scientific and technological research, education and training, and professional consultancy and advice.
- Evolving comprehensive strategy, framework, platform and programs for people's participation with target focus on women and youth in energy conservation.
- Identifying energy intensity and energy efficiency status and evolving energy efficiency standardization in different sectors of the economy.
- Initiating and promoting multidimensional research, training, education and awareness programs on energy-environment-development interface.
- Imparting awareness to all sections of people on issue related to energy conservation.
- Upgrading the skills and capabilities of energy professionals through training on energy and environment management programs.
- Facilitating exchange of energy experts between different regions within India and abroad.
- Instrumentalizing energy systems, especially renewable energy package systems to improve the quality of life (increasing income and employment generation opportunities, health and emotional welfare) of the people, particularly the poor segments of the society who are deprived of electricity and other energy opportunities.

Industrial Energy Conservation Programs

Sustainable energy solutions and technologies are some of the factors which facilitate adequate industrial growth. Therefore, they become part of the rapid transformation of market economies. Hence, energy efficiency is recognized as a key factor in a sustainable industrial development process.

Considering these aspects, EMC has initiated several energy conservation and efficiency improvement programs for the industry sector. Energy conservation activities include investment-grade energy auditing, identification and evaluation of barriers to implementation, and evolving strategies for involving employees in the energy management program.

EMC has initiated research programs / projects to examine the intensity and efficiency of energy use in selected manufacturing industrial enterprises in Kerala for evolving measure which would raise productivity without raising energy inputs. To facilitate these programs on an enduring basis, EMC vigorously pursues training for professionals in industries as an activity. The second major international collaborative training program of EMC meant for energy managers was conducted jointly with the UN-ESCAP Bangkok, in two phases, in 1998. The positive response from this program gave the impetus for the design of a continuing exercise of this sort, making this a training-cum-certification program, open to participants from all parts of the country.

Small and medium enterprises (SMEs) are often affected by the opening of Indian markets to other countries. As such SMEs don't have the technology or the finance to compete with the technology of developed countries. Energy efficiency improvement in these sectors can definitely give immediate results for reducing the product cost and improving product quality. EMC, in association with the industries Department, Government of Kerala, is organizing a series of training-cum-awareness programs throughout the state.

Developing an Energy Monitoring and Management System for Utilities and Industries

Production cost has a direct bearing on the energy consumption of any industry. But this aspect is often neglected by industries that set up infrastructure way back when power tariff was very low. EMC has proposed a PC-based Energy Monitoring System for factories to enable maximizing the efficiency of energy use per service and hence reduces power consumption. In association with CMS Computers, a DSIR recognized R&D Centre, EMC has developed and introduced a pre-paid computer-controlled energy monitoring and management system for KINFRA Industrial Park at Kakkanad, Kochi. One unit was installed in the KINFRA Apparel Park, too.

Traditional SMEs

The experience gathered through the projects at Raja Tiles (during 1997) further enriched by the glass industry program at Firozabad (during 2000-2003) and feedback from the client demanded up gradation of the Temperature Monitoring and Altering System (TMAS). Quite confident about the deliverables and cost effectiveness of TMAS, EMC supported a program to upgrade TMAS and demonstrate the system in four tiles industries in Kerala. Results of the energy efficiency improvement (by better temperature control and better heat utilization) and profitability improvement (by improving product quality and reducing rejections) in the four units are summarized in Table 1.

Table 1: Energy efficiency and profitability improvement by TMAS

Industry	Estimated annual energy savings				Estimated increase in profit (%)	Feedback from client
	Better temp. control (RS)	Better heat utilization (Rs)	Total (Rs)	% Energy savings		
Mandakan Ceramics	91,000	23,250	1,14,250	11.4	3.4	Rejection minimized Fuel wood savings – 350 kg per day, equivalent to Rs 109,000 per year @ 300 days of operation
Smarana Tiles	71,000	1,065	72,065	7.2	0.4	Fuel wood savings- 200 kg per day, equivalent to Rs 88,000 per year @ 300 days of operation, flooring tiles alone
Standard Ceramics	66,500	12,705	79,205	11.3	1.7	Lesser over-baked & under – burnt tiles. Better uniformity in color of tiles. Fuel wood savings – 300 kg per day, equivalent to Rs 126,000 per year @300 days of operation
Thompson Tile Factory	54,900	15,120	70,020	7.8	20.4	Sawdust used as fuel

The EMC-CMS combine has been successful in producing 5 models of the Temperature Monitoring and Alerting System – TMAS-8 channel, 16 channels, 24 channels, 32 channels and 64 channels – which can be now be made available for tile and other allied industries for energy management through temperature control.

It is clear from Table 2 that the domestic sector consumes more electricity than any other sector. Energy conservation, therefore, makes sense in this area. The problem with this type of consumption pattern is that the peak load demand (from 6.30 pm to 10.30 pm) is nearly double the normal Load. So Kerala faces quality power problem during these 4 hours.

Table 2: Percentage electricity consumption pattern in Kerala

Sector	Year 1979	Year 2003
Domestic	11.5	48.0
Commercial	6.0	8.0
Small-scale Ind	8.2	6.0
Large-scale Ind	63.8	30.0
Others	10.5	8.0

Even the Kerala is managing the stable power supply system without any load shedding or power cuts. In order to propagate the message of energy conservation, EMC is targeting both women and children in the state. Both these groups are affected by energy scarcity.

The specific programs for women and children are listed below:

Energy Efficient Village Programme

The Energy Efficient Village Programme (EEVP) is a model project of EMC. In the demonstration stage, three villages from three cultural regions were selected to be transformed into ideal energy-efficient villages and for learning from their experience. A preliminary energy survey was conducted for evaluating the energy consumption pattern and also for understanding the socio-economic parameters of the population. All households in these villages were supplied with energy-efficient equipment and gadgets. The project is implemented through trained volunteers, who keep regular contact with the households and help them get over the psychological barriers in adopting the energy-efficient devices, during and after project execution.

Energy Clinic Programme

Energy Clinic (EC) is a novel programme of energy conservation activities in the domestic sector through women as agents of change for creating energy conservation awareness among rural housewives. EMC's experience shows that by mere awareness on energy efficiency, 10-15 percent of the total energy could be saved. The EC programme provides valuable information to the rural population on energy conservation, energy-efficient equipment and gadgets, right methods of energy use to reduce wastage, etc. As a part of the EC Programme, EMC provides training to selected women volunteers to organize demonstration classes on energy conservation in different villages. Trained women volunteers display and demonstrate energy efficient aids to gathering during the clinic programs. The demonstration equipment and gadgets included CFL, electronic ballasts, pressure cookers, thermal cookers, Nutan kerosene stoves, and portable smokeless *chulahs* – all provided by the EMC. The programme attracted a large number of people, mostly housewives, and many have started practicing energy conservation by adopting and using energy-efficient equipment. EMC aims to deploy 1,000 trained women volunteers, one each in every *panchayat* in Kerala through continuing awareness programs.

Employment generation through energy conservation activities

The cost-effective thermal cooker called *thaapabharani* developed by EMC has the potential of saving upto 80 percent energy, irrespective of the fuel used – firewood, kerosene or LPG while cooking rice, tubers and pulses, which form the main diet of Keralites. It can also be used for thermal storage about 7-8 hours. *Thaapabharani* is designed in such a way that it can be fabricated by rural women groups using local resources. The device finds application in 5 million rural houses of the state. Fabrication and distribution of these cookers generate employment and, in a way, help the rural women to sustain themselves. Many women groups from different parts of the state have come forward to get trained in this income-generation activity. If the entire population of Kerala uses this energy-efficient thermal cooker, the approximate firewood saving alone would be 8.5 million tones per year.

School Energy Conservation Club Programme

The School Energy Conservation Club (ECC) programme of EMC aims at awareness creation among students on energy conservation and environment-friendly energy technologies as this would help in inculcating a habit in the younger generation on the judicious use of the scarce and depleting energy resources. EMC, through the efforts of Energy Conservation Club Project (ECCP) of the Energy

Conservation Society (ECS), sets up energy conservation clubs in schools and colleges all over the state. Such clubs now exist in about 400 schools and 50 colleges / ITCs. EMC provides the necessary technical and financial support to the ECCP for conducting different activities such as energy quiz, elocution, project preparation, domestic energy surveys, etc.

Transport Clinic

Energy efficiency in the transport sector has so far been neglected in the state. Therefore, to achieve comprehensive energy efficiency improvement in the transport sector, EMC in association with PCRA, designed the Transport Clinic Programme as one of the immediate solutions. This includes a structured training programme for drivers with practical driving tests on roads before and after the classroom sessions. PCRA and EMC jointly run these clinics at various locations in the state.

Energy Conservation Awards

To encourage energy conservation activities in the state, EMC invites applications every year for energy conservation awards instituted by the Government of Kerala. The government decided to give awards in six different categories viz large-scale enterprises, medium-scale enterprises, small-scale enterprises, non-profit organizations, individuals, for R&D and innovations.

The state level monitoring committee for energy conservation in Kerala, on evaluating the various entries for the state-level awards and after ascertaining the facts through discussions, selects the organizations/individuals for conferring the Kerala Energy Conservation Awards during the National Energy Conservation Day.

Courtesy: K.M. Dharesan Unnithan
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Reference Book:

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