

PREFACE

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World's primary energy demand is projected to grow by 55% between 2005 and 2030. Developing countries, due to fast growth in economy and population, will account for 75% increase in Global Energy demand with China and India alone accounting for 45% of the increase. Developing countries today make up 41% of Global Energy Market which will increase to 47% by 2015 and more than 50% by 2030.

Although, the global share of oil will fall from 35% to 32% during the period still, it remains the single largest source of energy with total energy demand touching 17700 Mtoe in 2030 in comparison to 11400 Mtoe in 2005. Demand for coal will increase by 73% between 2005-2030 and its share increases from 25% to 28%, the increase again coming mostly from China and India. Electricity demand will double and the share of electricity as energy source will jump from 17% to 22%.

In the light of increased energy demand with fossil fuels remaining as the major energy source, energy related CO² emissions would rise resulting in irreversible damage to the Global environment. The recently released report by Inter-Government Panel on Climate Change (IPCC) gives eight to ten year window for mankind to control GHG emissions failing which, the existence of the mankind will be in jeopardy. Under the circumstances, it is imperative for every nation, developed or developing, to seriously work towards energy conservation through energy efficiency improvement programmes which alone offer the solution to the vexed problem of global warming.

Petroleum Conservation Research Association (PCRA), under the aegis of MOP&NG, since its inception in the year 1978, has been actively engaged in formulating strategies to promote energy efficiency and conservation of petroleum products for sustainable development, energy security and environment protection. In pursuance of its objectives, PCRA's core activities are divided into three broad categories, namely Field Activities, Education Campaign and R&D interventions.

Field activities bring PCRA in direct touch with the users in the major energy consuming sectors i.e. Industry, transport, agriculture, household and commercial. During the last 25 years, PCRA conducted more than 12,000 energy audits in small, medium and large industries. This include petroleum refineries, drilling rigs, integrated steel plants, fertilizer plants, petro-chemical complexes, steel re-rolling mills, dairy plants and a large number of SME clusters. Through these energy audits, huge savings potential, particularly in small & medium enterprises has been identified and a major component of the identified savings has been realized and confirmed through follow-up studies.

Transport Sector consumes more than 40% of the total Petroleum products consumed in India. Two popular energy saving programmes of PCRA in the transport sector are, Driver Training Programme (DTP) and Model Depot Project (MDP) studies. These programmes are being extensively imparted to the drivers

and workshop personnel in STUs, Army and Paramilitary forces. LPG and kerosene are the two highly subsidized petroleum products being used in the household sector for cooking and lighting. Conducting LPG and kerosene conservation and safety workshops in association with the field engineers of Oil Marketing Companies (OMCs) is a regular activity of PCRA regions & HQ. Setting up of demonstration centers in rural areas to educate the farmers about the benefit of using BIS marked equipment is another very useful programme of PCRA in the Agriculture Sector. Energy audit of office buildings, hotels and commercial establishments to improve energy efficiency in lighting system, heating & cooling system and power factor improvement are some of the ongoing programmes of PCRA in the commercial sector.

Education campaign seeks to spread the message of oil conservation and environmental protection among the masses and provide simple tips on conservation methodology in different equipment, appliances and processes. These campaigns are carried out using different modes like print media, radio jingles & spots, television commercials, hoardings and bus & train panels etc. Periodic sample surveys are conducted to assess the reach and impact of these campaigns and necessary changes introduced in the strategies, based on the survey results.

Research and Development interventions are aimed at designing, developing and commercializing new products, processes and technologies, which have the potential to contribute substantially to energy conservation efforts through retrofitting, technology upgradation, process changes and fuel substitution particularly in SMEs.

In line with the existing legislations in different countries, concerning efficient utilization of energy; The Energy Conservation Act 2001 (ECA-2001) was enacted by the Government of India, which became effective from 1st March, 2002. The act was framed to promote, facilitate and enforce efficient use of energy and its conservation in all spheres of economic activities, within a legal framework and with the help of mandatory recommendations.


As per the provision of the act, Central Government in consultation with Bureau of Energy Efficiency (BEE), a statutory body under the Ministry of Power, can specify norms for processes/energy consumption standards for any equipment/appliance which consumes, generates, transmits or supplies energy. As per the act, a list of 15 energy intensive sectors called Designated Energy Consumers which include Aluminium, Fertilizers, Cement, Pulp and Paper, Iron & Steel, Chlor-Alkali, Sugar, Textile, Chemicals, Railways, Port Trust, Transport Sector, Petro-Chemicals & Petroleum refineries, Thermal Power Stations and commercial buildings has been published and BEE is actively involved in benchmarking the energy consumption norms for these sectors.

This book covers energy conservation opportunities in utilities (Thermal & Electrical) and some of the designated energy consumers as notified by ECA-2001. The sectors covered are Aluminium, Fertilizers, Cement, Pulp & Paper, Iron & Steel, Sugar, Petroleum refinery, Drilling rigs and Power generation. In addition,

the book also covers India's energy scenario, energy supply projections till 2030, GHG mitigation strategies and sector specific energy conservation measures.

The case studies given in the book are based on the actual findings of some of the energy audits conducted by PCRA field engineers in various types of industries. Also, some of the case studies have been taken from BEE compilation of energy conservation efforts made by various organizations and submitted to BEE, Ministry of Power, as award winning entry to bag National Award on Energy Conservation for Industries, Office Buildings, Hotels and Zonal Railways.

The hard work done by PCRA team to write this book within the given time frame deserves all the appreciation and I compliment the team for this excellent effort. This book will go a long way in conserving energy in all spheres of life as well as meeting the objectives of the National Mission on Enhanced Energy Efficiency, an initiative of Prime Minister's Council on climate change.


(Arun Kumar)