CHAPTER I

SYNOPSIS OF THE STUDY

Introduction

Energy should be viewed as an essential commodity like any other valuable raw material required to run a business, not as mere overhead and part of business maintenance. Energy has cost and environmental impacts. It needs to be managed well in order to increase profitability and competitiveness of business organizations and to comply with certain regulations and to mitigate the negative environmental impacts. Energy is treated as a development tool which provides for basic energy needs of humanity and promotes human development inputs such as education, health, sanitation, etc. It does not only serve as mere raw material required to run a business but also helps to build life supporting systems. Thus it must be managed well in order to (a) pave way for sustainable development which could lead to a prosperous economy for communities, a healthy environment for current and future generations and a vibrant and equitable society; (b) provide energy security for the nation to avert future commodity crises so as to protect mainly the disadvantaged populations that are most affected by commodity volatility and commodity scarcity and to cater to minimum basic energy needs of the deprived of the right quality at affordable price (the Total Energy Security Mission launched by the Government of Kerala specifies a minimum electrical energy delivery of one unit of electricity per household per day and a minimum cooking energy equivalent to eight domestic LPG (Liquefied Petroleum Gas) cylinders per household per year); and (c) maintain the corporate social responsibility, subscribing to the view that revenues generated from or using a precious non-renewable commodity (fossil fuel) should be used to fulfill the economic and social development needs of the whole population, particularly of the most needy among them.

Following the first world oil crisis of 1973, India, like many other nations, became more and more concerned with energy security, pricing and usage issues and has taken a few major initiatives in the energy conservation front (Mohanty and Rao, 2001). Two external forces in the early 1990s spurred a revival of interest in promotion of energy efficiency and facilitation facilities -- international understanding to control the amount of greenhouse gases and a dramatic increase in
worldwide industrial competitive pressures. Climate change has shed new light on energy issues, including industrial energy consumption: they evolved from a mainly financial and developmental issue and transformed into a more global environmental concern. As such, the issue of promoting the efficient use of energy, including energy-saving technologies, has gained growing international importance. In view of the policy, financial and technical barriers to the accelerated introduction of energy efficient technologies and measures in industrial sector, a need was felt to address these barriers, at both the national and industrial plant levels (top-down and bottom-up).

It was in this context the Government of India enacted the Energy Conservation Act 2001 (ECA) and accordingly established the Bureau of Energy Efficiency (BEE). The ECA stipulates the following major mandates (Government of India, 2002): establishment of an energy management system, appointment/designation of an energy manager in notified energy-intensive industries, execution of energy audits through accredited energy auditors and implementation of technologically and economically viable recommendations and meeting specific energy consumption norms. Additionally, it promotes energy efficiency in all sectors of the economy through fixation of minimum energy performance standards for notified equipment and appliances and display of the same in the form of labels to give the consumer an informed choice. As a concrete measure, mandatory certified energy managers for 14 energy-intensive industries have been designated. They are backed by regulated energy audits conducted by accredited energy auditor firms, followed by the formulation of mandatory action plans containing financially attractive recommendations. Finally, reporting the result to BEE is obligatory.

Given recent trends in energy and the environment, industrial customers are increasingly recognizing the connections among energy performance, profitability, and future competitiveness. It has been recognized globally that advances in environmental energy technologies are now playing a critical role in helping organizations face the complex and rapidly changing dynamics of the market scenario world over. These technologies are aimed at reducing energy consumption, and reducing harmful emissions to meet the environmental standards, and in turn enhancing the marketability of products and processes. Competing and succeeding in today’s business environment requires clear strategies of managing cost by improving energy efficiency. Energy management, the process of understanding and
managing energy cost to energy efficiency and energy generation strategy has become a significant management issue. Energy management involves organizations and people as much as technology (Turner, 1990). All organizations can save energy by applying the same sound management principles and techniques they use elsewhere in business for key resources such as labour and raw materials. These management practices must include full managerial accountability for energy use. The management of energy consumption and costs reduces waste and brings in ongoing, cumulative savings.

The Small and Medium Enterprise (SME) sector is one of the important sectors of the development process mainly because of its greater employment potential, lesser capital intensiveness and scope for flexible and decentralized operation even in rural environment, contributing greatly to rural industrialization. With a contribution of 40% to the country’s industrial output and 35% to direct exports, the SME sector has achieved significant milestones for the industrial development of India. Till the opening up of the Indian economy in 1991, through LPG, these SMEs, particularly those loosely classified under the rural/ traditional industry category, were all enjoying the protectionist industrial regime of the Central and State governments. Though, it was a known fact that without modernization and quality improvement coupled with cost reduction efforts, it would be difficult to survive in the globalised economic environment, there was complacency in preparedness by many industries and for a pro-active intervention in this direction by the good number of public institutions created for the upliftment of SMEs. With the arrival of better quality products at lower price to the domestic market due to LPG and consumers preferring the same, the local industries started feeling the pressure to compete in the market. Cost reduction has become the most crucial factor in generating profits or even for the very survival of a business when one considers the stiff competition in the market. SMEs, in this liberalized era, often find themselves pre-occupied with looking for various new avenues of cutting down costs. An area where significant cost reduction is possible, though often overlooked, is in the field of Energy Efficiency. Among others, government policy has a major role to play in the promotion of energy efficiency. This is particularly true in the context of SMEs because such enterprises individually may not take any initiative for enhancing energy efficiency due to lack of awareness, prohibitive costs and lack of competence.
Statement of the problem

Research attempts are not found made to explore the relative economic value to firms of the various energy efficiency improvements made in their facilities/operations nor to identify the impact of energy management initiatives on profitability indices of an energy efficient and not-so-efficient firms, with micro-level evidences. Nearly all national and international studies on energy consumption in industrial sector have been based on aggregated data. Information about individual factories level can be very rich and helpful to the target group of similar factories, particularly in SMEs and to the policy makers. Such information is often lost when aggregating data, leading to less pragmatic recommendations. It is also important to understand the motivation for certain units to improve their energy efficiency and the impediments for others not to innovate / modernize. Though many research studies made attempts to identify the non-technical aspects for bettering energy management in industry as a whole, the perspective of different stakeholders at the different levels of industry is not seen captured. This would certainly help to identify the weaknesses existing in the system, which has a fairly good network of facilitating agencies / institutions with the mandate to enhance the technological capabilities of SMEs, and then reveal opportunities for strengthening them.

Objectives

This research study undertaken to address some of the existing research gaps has the following objectives:

- to identify the impact of energy management on the profitability indices or financial ratios of energy efficient and less efficient factories under study;
- to analyse the factors of motivation for certain factories under study to improve their energy efficiency and the impediments for others not to innovate or modernize;
- to understand the preparedness of factories under study to implement a successful energy management program and the level of government support /facilitation; and
- to suggest measures and means to improve energy efficiency as applicable to the number of actors and institutions with this responsibility.
Methodology

As part of achieving the above stated objectives, the propositions (given in the following section) after formulating into appropriate hypotheses, were tested based on the micro-level data. There are fifty three registered clay based tile factories* in the organized sector functioning in Thrissur district under the SME category. All the small and medium tile factories in Thrissur district were selected for the study. It is to be mentioned here that Thrissur district in Kerala has the highest concentration of clay tile industry in the SME category in the country. An extensive literature review was carried out to understand the energy and economic situation in Indian SMEs, research activities in this field, research gaps useful enough to explore ways and means to enhance energy efficiency in this sector, etc. Propositions were framed to aid in preparing the interview schedule and a data collection protocol was arrived at with clear focus on utilization of data being collected for further analysis. This helped in designing a very compact but complementary interview schedule after pre-testing so as to collect data from the enterprises under study. Both primary and secondary data were collected during the field work. Secondary information includes reports of the Kerala State Planning Board, Department of Industries and Commerce, etc. Primary data were gathered through interviews with various functionaries within the company and some external stakeholders viz., marketing agents, financial institutions, local residents and Government Departments. Each interview lasted 1-2 hours. Participatory Rural Appraisal was also conducted in the field with the entrepreneurs to identify the strength, weakness, opportunities and threats in tile industry. Based on the primary data gathered from the field the extent of profitability indices vis-a-vis energy management practices in the industry was studied. Quantitative and qualitative methods have been employed depending on the research issues and purposes. The strengths of qualitative research derive primarily from its inductive approach and its emphasis on words rather than numbers. The influential roles of non-technical aspects in the energy management philosophy of the industrial sector were examined using t-test.

* The terms, industries and factories are used interchangeably in this thesis
Proposition 1: The following are the drives for energy efficiency and energy management in SMEs:

- educational background of entrepreneurs;
- technology modernisation outlook;
- energy information system, integrated into the Management Information System (MIS);
- broad awareness on energy efficiency and need for energy conservation;
- human resource development, which includes periodic training programs for employees and workers on the shop floor; and
- financial incentives like subsidies / low interest loans.

Proposition 2: Among the major operating costs, like raw material, labour and energy, with a given amount of resource, energy cost reduction is the most feasible and cost-effective option.

Proposition 3: Energy efficiency improves profitability.

Map 1.1
India, Kerala and Thrissur
Hypotheses

Hypothesis 1: - The mean of each profitability index (as given below) of energy efficient and energy inefficient tile factories are the same,

- Profit margin (Profit / Sales) index
- Return on Asset (Profit / Total Assets) index
- Asset Turn (Annual Sales / Total Assets) index
- Contribution (Sales - Variable Cost) index
- Labour Productivity (Contribution per employee) index

Hypothesis 2: - The mean of awareness level and qualification of entrepreneurs of energy efficient and energy inefficient tile factories are the same.

Testing of the hypothesis separately for Group A and Group B (refer to the classification below) was done using t-test for two samples (energy efficient and less energy efficient categories) assuming unequal variances.

Figure 1.1
Hypotheses testing: classification of tile factories

Note: - EEI is the Energy Efficiency Index expressed as grams of tile processed per unit of energy (unit as kilo Joule). The more the EEI, the higher is the energy efficiency status of that factory. In fact, EEI is the inverse of Specific Energy Consumption (SEC), which is the energy consumed per unit of product).
**Period of the study**

Data for the study were collected from the study area during 2008 November to 2009 July.

**Scope of the study**

The findings of the study would give inputs to (a) the Government agencies (including the financial intermediaries) on areas to be addressed in their policy measures aimed at enhancing the viability of tile units and increasing the energy efficiency in these units resulting in reduced emissions per unit of production and (b) the tile industry and its association on the benefits and methodologies in optimizing energy cost and conducive policy measures they need to demand from a democratic government using their lobbying power/strategy. The study would identify the existing flaws in the energy efficiency enhancement strategies of the Government agencies, mostly developed with skewed visions for want of data and information on the actual situation, vis-a-vis the current status of the industry and their perspectives on micro and macro energy-environment-economy issues.

**Limitations of the study**

The findings are applicable mostly to the Thrissur clay tile SME sector and may not be strictly applicable to the Indian clay tile SME sector. The information gathered from the stakeholders’ interviews was instrumental in understanding the general attitude of these stakeholders towards the enterprise's energy management strategy. But it cannot be assumed to be sheer representative of the situation in SMEs in India. As the objective of this study is not to identify technical proposals on energy efficiency enhancement, discussions on technical proposals are not attempted.

**Organisation of Thesis**

The outcome of this study has been presented in six chapters. Chapter I gives a brief introduction and statement of the problem, the objectives, methodology, hypothesis, scope and limitation of the study. Chapter II presents an overview of energy scenario, discusses energy and development with conventional
wisdom and philosophical perspective, energy use in Indian industry and elaborates the role of industries in Indian economy with special reference to SMEs. Chapter III provides a brief on the concepts used in this study along with review of literature leading to identification of gaps in research. Chapter IV depicts the profile of the study region -- the Thrissur district -- tile making process and describes the energy scenario in Kerala, the State in which the study is conducted along with highlights of Kerala economy. Chapter V discusses Energy Management in tile industry in Thrissur district based on the analysis of the data, both qualitative and quantitative, along with testing of hypotheses. Chapter VI presents the summary of findings and suggestions for enhancing energy efficiency in tile industry.

References