SAMEEEKSHA
SMALL AND MEDIUM ENTERPRISES: ENERGY EFFICIENCY KNOWLEDGE SHARING
Vol 1 • Issue 1 • December 2010
NEWSLETTER

A PLATFORM FOR PROMOTING ENERGY EFFICIENCY IN SMEs

In this issue...

Editorial

It is quite exciting that the first issue of *SAMEEEKSHA* is now in your hands.

SAMEEEKSHA (an acronym for "Small and Medium Enterprises: Energy Efficiency Knowledge Sharing") seeks to bring together the various initiatives, experiences and lessons associated with enhancing energy efficiency in SMEs. Various organizations and agencies who work in this area have partnered to learn together – and SAMEEEKSHA is one of our efforts to learn together.

Energy efficiency interventions in SMEs are complex and challenging because of the lack of 'off-the-shelf' technologies on the one hand, and the lack of incentives to develop specific technological solutions on the other. The dynamic is further complicated by the lack of human resources in most SMEs to assess technological risk, or to create business models to enable risk sharing and mitigation.

Consequently, I look forward to SAMEEEKSHA becoming a vehicle for disseminating new projects, technologies and applications, as well as innovative business and financial models that can help in large-scale replication. We look forward to receiving inputs for SAMEEEKSHA not only from our partners, but from all individuals and organizations who are willing to share their experience in this area.

I warmly commend the Swiss Agency for Development and Cooperation (SDC) and The Energy and Resources Institute (TERI) for their initiative in bringing out this newsletter.

Dr Ajay Mathur
Director General
Bureau of Energy Efficiency

ENERGY IS LIFE
BEE
CONSERVE IT

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

teri
The Energy and Resources Institute

Government of India
MSME

CLUSTER PROFILE

MORBI CERAMIC CLUSTER

Background

The heart of the Indian ceramic industry is at Morbi, about 250 km from Ahmedabad, in the Rajkot district of Gujarat. The main products are wall tiles, floor tiles, vitrified tiles, and sanitary ware. The cluster commands about 70% of the market share of these ceramic products. The ceramic industry's location in Morbi is based on sound logistical reasons: the basic raw materials for making ceramic products—such as various types of clay, red and black soil, minerals such as calcite/ wollastonite, and frits and glazes—are readily available either locally or from neighbouring Rajasthan.

There are 459 industrial units operating in the cluster, of which 178 produce wall tiles, 52 produce floor tiles, 26 produce vitrified tiles, and 43 produce various kinds of sanitary ware. Around 40 units manufacture spray-dried mud, which is supplied to the smaller units. In addition, there are about 120 tile units that produce roofing tiles. The ceramic units may be categorized as small, medium or large, based on their production capacities.

The cluster produces 5.28 million tonnes per year (tpy) of ceramic products. Of this, tile units account for about 5.10 million tpy, and sanitary ware 0.18 million tpy. The production of roofing tiles is about 0.36 million tpy. The annual turnover of the cluster is estimated to be 100 billion ($ 2.2 billion approx.). The cluster provides direct employment to about 68,000 people. About 50 new wall and vitrified tile units are coming up in the cluster.

There are five main industry associations active in Morbi cluster:

- Gujarat Ceramic Floor Tiles Manufacturers' Association;
- Morbi Sanitary Wares Manufacturers Association;
- Morbi Dhuva Glaze Tiles Association;
- Vitrified Floor Tiles Association
- Roofing Tiles Association.

Technology status and energy use

The ceramic units use roller kilns for tile manufacturing and tunnel kilns for the production of sanitary ware. Natural gas (NG), charcoal, and lignite are used as fuel in the firing process. More than half of the thermal energy requirement is met through NG. Charcoal and lignite are mainly used in spray dryers. Energy cost comprises 30–35% of the total production cost.

The specific energy consumption (SEC) of ceramic units varies widely with the type of product and processes used. The SEC of a vitrified tile unit ranges between 6.0 and 8.9 GJ/tonne; that of a wall/ floor tile unit varies between 4.8 and 8.8 GJ/tonne; while the corresponding range for a sanitary ware unit is 3.1–4.4 GJ/tonne. It may be noted that many of the small and medium units meet part of their raw material requirement from spray-dried mud manufacturing units operating in the cluster. The main energy consuming processes in tile and sanitary ware units, and the forms of energy used, are listed below.

Profile of ceramic units in Morbi cluster

Type of unit	*Small*		*Medium*		*Large*	
	Units	*Production (tpd)*	*Units*	*Production (tpd)*	*Units*	*Production (tpd)*
Wall tile	43	25	100	35	35	75
Floor tile	8	42	38	56	6	98
Vitrified tile	–	–	22	112	4	224
Sanitary ware	10	4	24	8	9	14
Total	61	71	184	211	54	411

tpd – tonnes per day

Energy use in tiles and sanitary ware units

Energy centre	*Tiles*	*Sanitary ware*
Kiln	Thermal & Electrical	Thermal & Electrical
Air compressor	Electrical	Electrical
Glazing	Electrical	Electrical
Slip section	Electrical	Electrical
Press	Electrical	–
Spray dryer	Thermal & Electrical	–

Annual energy consumption of Morbi cluster		
Fuel	*Quantity*	*Energy share*
Charcoal	0.165 million tonnes	10%
Lignite	1.32 million tonnes	29%
Diesel	800,000 litres	1%
NG	660 million Sm^3	51%
Electricity	1.2 billion kWh	9%
Total energy consumption : 45.8 Peta Joule/yr Total CO_2 generation : 3.8 million tonnes per year Emission intensity: 0.67 tonne CO_2/ tonne of product		

Options for energy saving

Morbi is one of the 29 clusters covered under the BEE-SME program, which aims at accelerating the adoption of energy-efficient technology and practices in select clusters. It is also one of the clusters included under the proposed UNIDO-GEF project. Morbi offers potential for various energy-saving options in both thermal and electrical areas. These would help in reducing the energy consumption of the cluster by about 150,000 tonnes of oil equivalent (toe), corresponding to a CO_2 reduction of 0.44 million tonnes. Some of the energy conservation options that can be explored are given below:

Thermal

- The kiln and spray dryer are the primary consumers of thermal energy offering significant potential for energy saving through measures such as improving insulation of the kiln structure to reduce structural heat losses, gas turbines/gas engines for combined heat and power applications and use of hot air from cooling zone.
- High thermal mass cars are generally used for moving the products through the tunnel kiln. The dead weight of the refractories is quite high, and these are subjected to alternate heating and cooling cycles, resulting in substantial loss of thermal energy. Low thermal mass cars would help in reducing these losses.
- The slurry generally enters the spray dryer is generally at ambient temperature. Preheating of slurry by a solar dryer or heat pump would help in bringing down the energy consumption.

View of a tile unit

Electrical

- Use of energy efficient motors in polishing area;
- Replacement of smaller motors with a single large motor;
- Adopting energy efficient motors and variable frequency drives (VFD) in spray dryer, kiln blower, press, and compressor sections; and
- Use of energy efficient hydraulic pumps.

Contributed by SEE-Tech Solutions Pvt. Ltd (Nagpur) and TERI

PROMOTING ENERGY CONSERVATION
IN TEA PROCESSING UNITS IN SOUTHERN INDIA

Location: Southern India
Partners and collaborators: UNDP, TIDE and Tea Board
Duration: February 2008–January 2012

India is one of the largest tea producers in the world. In 2008, the country produced 980 million kilograms of tea, of which southern India contributed 246 million kilos (24%). Southern India is home to about 350 tea factories, of which 125 fall in the small-scale sector.

Tea production is an energy-intensive process, with energy costs constituting approximately 30% of the total cost. Tea factories use both electrical energy and thermal energy to process green tea leaves into the market-ready product. Almost all tea factories in southern India rely heavily on biomass—firewood or biomass briquettes—to meet their thermal energy needs. The capability of these units is mainly influenced by several factors including the quality of fuel and the efficiency of various energy-consuming equipments. Energy audits indicate an energy-saving potential as high as 20% in tea units through adoption of energy conservation measures. However, no major initiative has been undertaken in the past to exploit this potential.

Tea estate in southern India

UNDP project

The United Nations Development Program (UNDP) is supporting a four-year project (February 2008–January 2012) titled 'Energy conservation in small-scale tea processing units in southern India' along with Global Environment Facility (GEF). The United Planters Association of South India (UPASI) is a key partner in the project. The project aims to develop replicable strategies to promote energy efficiency and energy conservation measures in tea processing units in southern India. The agencies responsible for implementation of the project are:

- *Tea Board*: an institution established under the Ministry of Commerce, Government of India to implement policies related to the tea industry. The Tea Board provides on going guidance and support to the project.
- *Technology Informatics Design Endeavour (TIDE)*: an NGO coordinating project activities and providing infrastructural requirements, management capacities, and technical advice.

The project addresses the information, technology, and financial barriers that prevent the adoption of energy conservation measures in the small scale tea industry of southern India. The target is to establish energy efficiency measures in 30 tea factories during the project period, which would cumulatively save around 55,800 tonnes of CO_2 annually. Some of the project activities are:

- Till May 2010, energy efficiency and conservation measures had been adopted by 56 out of the 60 tea factories in which energy audits were conducted. It is estimated that these measures would result in direct CO_2 savings of about 40,000 tonnes during the project period. It may be noted that these expected CO_2 savings are based on estimates, and not on actual measurements.
- A database has been developed to provide the tea industry with information/ data on ongoing energy

Energy conservation measures implemented (as of May 2010)

Measure	*Number of factories*
Electrical	
Automatic power factor controller	52
Shaft-mounted blowers in withering section	29
Maximum demand controller	22
Using star connection of motors in sifting section	22
Flat belt drives for hot-air fan	13
Flat belt drives in CTC banks	9
Installing energy meters section-wise	12
Lighting load optimization	9
Energy-efficient motors	6
ID fan controller	21
Thermal	
Closed shed for fuel storage	18
Installing hot water generator	7

Source: EnCon Tea, June 2010 (Issue-9), TIDE, Bangalore

audits, as well as on suppliers of energy efficient equipment

- Agricultural residue biomass briquettes with high calorific value have been introduced in two tea factories. This measure has demonstrated a reduction in energy costs by about ₹2 per kilogram of tea. The use of such briquettes would also reduce the consumption of firewood.
- UPASI has agreed to set up an integrated energy laboratory and service centre for the benefit of the tea industry. As a first step, the project has assisted UPASI in establishing an energy service facility (UPASI-ESF) at its Krishi Vigyan Kendra premises in Coonoor, Nilgiri district, Tamil Nadu. UPASI-ESF can be used by 'bought leaf' tea factories, as well as estate tea factories in southern India for implementing energy audit recommendations, and for continuous monitoring of energy-conservation measures undertaken by the

Fuel testing facilities for tea factories

factories. The facility comprises (1) laboratory for testing fuels, (2) service centre for energy efficiency, and (3) knowledge centre for information sharing.

- Four fuel testing facilities (FTFs) have been set up to support the tea factories in southern India. These include (1) Valparai: BBTC Thaimudi factory, (2) Vandiperiyar: AVT Carady Goody, (3) Munnar: HML Surianalle, and (4) Wayanad: AVT Chulika.

Future activities planned under the project will focus on the following aspects:

- Thermal energy conservation through equipment retrofits and fuel shifts;
- Promoting renewable energy, especially small hydro;
- Fuel security for the sector by promoting energy plantations like high-yielding bamboo;
- Assessment of financing opportunities for high-value equipment, which would help reduce carbon foot print.

Contributed by TIDE, Bengaluru

THE TEQUP SCHEME

IMPROVING THE COMPETITIVENESS OF THE MSME SECTOR

Backdrop

Quality and technology upgradation are key elements in enhancing the competitiveness of any manufacturing industry. Large industries have adequate information about global markets as well as access to funds, and are hence able to undertake continual technology upgradation and improvements in product quality to meet both international standards and market demands. In contrast, MSMEs (Micro, Small and Medium Enterprises) generally have limited access to both information and funds, and find it hard to meet international standards in regard to product quality as well as technology. As a result, many Indian MSMEs are finding it increasingly hard to survive in today's highly competitive globalized market.

TEQUP

Recognizing the need to improve the competitiveness of the MSME sector, the Ministry of Micro, Small, and Medium Enterprises (MoMSME) has launched the National Manufacturing Competitiveness Program (NMCP), comprising 10 schemes that aim at increasing productivity, upgrading technology, and reducing energy consumption among MSMEs. Among these, the scheme titled 'Technology and Quality Upgradation Support to MSMEs' (TEQUP) focuses on improving the competitiveness of MSMEs by supporting activities in three broad thrust areas:

- Capacity building, in order to promote the adoption of energy efficient technologies (EET);
- Generating awareness among entrepreneurs on the benefits offered by the Clean Development Mechanism (CDM), and facilitating the process of availing of these benefits; and
- Encouraging MSMEs to acquire product certification and/or licenses from national/international bodies in order to enhance the marketability of their products.

The 'capacity building' component of TEQUP is of particular interest in the context of improving the energy efficiency of MSMEs. The activities that will be supported under this component are summarized below:

Activities

- *Awareness programmes* will be supported in select MSME clusters on the need for and advantages of EET, as well as on the benefits that could be availed of under CDM. The awareness programmes will be conducted through expert organizations like PCRA, BEE, TERI, IITs, NITs, and so on or through state agencies like MITCON, GEDA, and others. Each programme will normally be of one day's duration with the participation of at least 30 MSME units. In all, around 60 awareness programmes will be conducted in the selected MSME clusters.
- *Energy audits* will be supported in sample units in 30 energy-intensive clusters (three units in each cluster), in order to identify suitable EET options for typical production units.
- Support will be given for the preparation of *model detailed project reports* (DPRs) for the identified of EET options in these 30 clusters, covering a total of 90 MSME units (three in each cluster). Thereafter, support will be extended towards preparation of individual bankable DPRs for about 300 MSME units from these clusters/sectors, in order to facilitate the financing and uptake of EET projects.

For full details on the TEQUP scheme, please visit http://www.dcmsme.gov.in/schemes/TEQUPDetail.htm

GENESIS OF SAMEEEKSHA

Energy efficiency has become a crucial aspect of growth of Micro, Small and Medium Enterprises (MSME) in India. While many organizations are working for the benefit of the MSME sector in this field, there is a clear need to coordinate and synergize the activities of these organizations so as to improve the efficacy of their various initiatives and facilitate cross-learning between different stakeholders. Towards this goal, the Bureau of Energy Efficiency (BEE) organized two Coordination Committee meetings – the first during March 2009 and the second during November 2009 – involving various organizations working on energy efficiency improvements in the MSME sector. At these meetings, the Director General, BEE, Dr Ajay Mathur, as well as the representatives from various other organizations affirmed the need to set up a mechanism to ensure that the information and knowledge gathered by various agencies in different projects is shared for the benefit of the MSME sector as a whole. In essence, this mechanism would be a dynamic 'Platform' to facilitate sharing of knowledge and experiences among different agencies active in the MSME sector.

To carry forward this objective, a Secretariat was set up at TERI with the support from the Swiss Agency for Development and Cooperation (SDC) to facilitate sharing of information among various agencies active in the field of energy efficiency in the MSME sector. A Core Committee was subsequently formed comprising BEE (Mr Jitendra Sood), SDC (Dr Veena Joshi), Ministry of MSME (Mr Abhay Bakre) and TERI (Mr Girish Sethi) in order to guide the Secretariat on various activities during its initial stages.

The recommendations of the Core Committee were presented during the 3rd Coordination Committee meeting held on 23rd September 2010 and chaired by Dr Ajay Mathur. The participants included Dr Gerolf Weigel, Deputy Country Director, SDC; Mr Abhay Bakre, Joint Development Commissioner, Ministry of MSME; Mr Antonio Levissianos, Officer in Charge, UNIDO; and Mr Manoj Mittal, General Manager, SIDBI. The meeting was also attended by representatives from TERI, BEE, SDC, JICA, DFID, GTZ, KfW, industry associations, consultancy organizations, and NGOs.

Dr Mathur observed that the growing participation at the Platform meetings reflected the commonality in interest in promoting the development of the MSME sector through energy efficiency improvement. As the Platform is still in the process of evolution, it is important for the group to remain engaged, and for members to learn from each other so as to give proper shape to the Platform's structure and guide its activities.

The participants agreed on a working name for the Platform: 'SAMEEEKSHA', standing for 'Small And Medium Enterprises: Energy Efficiency Knowledge Sharing'. The participants discussed in detail about the membership, activities and operational aspects of *SAMEEEKSHA* with specific reference to its website and newsletter. It was agreed that the website should be as dynamic as possible and provide information on different energy intensive MSMEs – including cluster level activities by various agencies, best operating practices and case studies. One of the key activities of *SAMEEEKSHA* in the future will be to collect comprehensive data on energy consumption of the MSME sector, in particular, energy-intensive clusters.

ABOUT SAMEEEKSHA

SAMEEEKSHA is a collaborative platform aimed at pooling the knowledge and synergizing the efforts of various organizations and institutions—Indian and international, public and private—that are working towards the common goal of facilitating the development of the small and medium enterprise (SME) sector in India, through the promotion and adoption of clean, energy-efficient technologies and practices.

SAMEEEKSHA provides a unique forum where industry may interface with funding agencies, research and development (R&D) institutions, technology development specialists, government bodies, training institutes, and academia to facilitate this process.

ABOUT TERI

A dynamic and flexible not-for-profit organization with a global vision and a local focus, TERI is deeply committed to every aspect of sustainable development. From providing environment friendly solutions to rural energy problems to tackling issues of global climate change across many continents and advancing solutions to growing urban transport and air pollution problems, TERI's activities range from formulating local and national level strategies to suggesting global solutions to critical energy and environmental issues.

With staff of over 900 employees drawn from diverse disciplines, the institute's work is supported by ministries and departments of the government, various bilateral and multilateral organizations, and corporations of repute.

VISION OF SAMEEEKSHA

SAMEEEKSHA envisages a robust and competitive SME sector built on strong foundations of knowledge and capabilities in the development, application and promotion of energy-efficient and environment-friendly technologies.

FOR MORE DETAILS, PLEASE CONTACT

Mr I P Suresh Krishna
Secretary – SAMEEEKSHA
Industrial Energy Efficiency Division, TERI, Darbari Seth Block
IHC Complex, Lodhi Road, New Delhi – 110 003, India
Tel: +91 11 2468 2100, 2468 2111, Fax: +91 11 2468 2144, 2468 2145
Email: suresh.krishna@teri.res.in