SAMEEEKSHA

SMALL AND MEDIUM ENTERPRISES: ENERGY EFFICIENCY KNOWLEDGE SHARING

Vol 3 • Issue 2 • June 2012

NEWSLETTER

A PLATFORM FOR PROMOTING ENERGY EFFICIENCY IN SMEs

In this issue...

Cluster profile – Surat textile cluster

Bridging technical and economic analysis: survey of chemical and textile SMEs in Gujarat

5th coordination committee meeting

National Summit on energy efficiency in MSMEs

Editorial

The results of the 'Rio+20' United Nations Conference on Sustainable Development, held in Rio de Janeiro, Brazil, from 20 to 22 June 2012, have been summarized in an Outcome Document titled '***The Future We Want***'. This outcome, which is the culmination of extensive debate and negotiations over several months -- often acrimonious -- affirms that "poverty eradication, changing unsustainable and promoting sustainable patterns of consumption and production and protecting and managing the natural resource base of economic and social development are the overarching objectives of and essential requirements for sustainable development." Recognizing the critical role that energy plays in the development process the document also highlighted the importance of energy access, the imperatives of improving energy efficiency and the need to increase the share of renewable energy and clean, energy efficient technologies in order to bring about sustainable development and address the challenge of climate change.

In India, these goals are particularly relevant for the Micro-Small-Medium Enterprise (MSME) sector which contributes over 8% to the country's GDP, but employs an estimated 70 million people. This sector offers considerable scope for introduction of clean, energy efficient technologies that could substantially reduce fossil fuel consumption, minimise environmental pollution at the local level as well as mitigate the emissions of carbon dioxide while at the same time improving productivity. Nearly 50% of the 26 million MSMEs in India are owned by disadvantaged groups of society. The primary needs of the MSME sector are: access to green technologies; easy availability of finance; enhanced worker skills; cluster-level support services for improved technologies; and access to clean fuels at affordable prices. These needs must be addressed in a concerted manner by relevant stakeholders at the level of the unit, a cluster of units and at the aggregate policy level.

Against this backdrop, TERI is organizing a 'National Summit on Energy Efficiency in MSMEs' during 30–31 July 2012 in order to facilitate interactions among the key MSME stakeholders and to help them evolve a concerted strategy to address the critical challenges of the Indian MSME sector. The deliberations at the Summit will be anchored around finding solutions to the concerns expressed by the 'voices from the ground', i.e. entrepreneurs, office bearers of cluster level industry associations, technology suppliers and local service providers. These insights from the 'ground' will provide direction for evolving suitable energy efficient technological solutions as well as developing effective policies, setting up suitable service mechanisms and financing schemes for their accelerated adoption.

It is hoped that the Summit will not only bring about the articulation of actions and strategies by which every unit and cluster benefits in this sector, but also provide a beacon light for industry as a whole in India for moving to a path of sustainable development.

R. K. Pachauri
Director General, TERI

ENERGY IS LIFE
BEE
CONSERVE IT

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Embassy of Switzerland in India

teri
The Energy and Resources Institute

MSME
MICRO, SMALL & MEDIUM ENTERPRISES

CLUSTER PROFILE

SURAT TEXTILE CLUSTER

Background

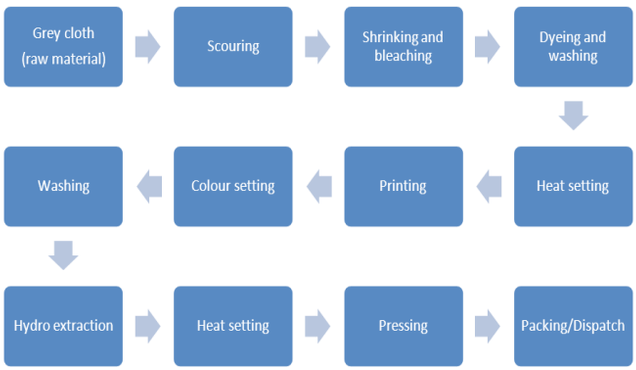
One of the largest textile manufacturing clusters in India is located in Surat (Gujarat).The Surat cluster accounts for over 18% of the total manmade (synthetic) fibre exports and 40% of manmade fibre production in the country. The products primarily comprise synthetic sarees & dress materials and cotton dress materials. There are about 400 textile processing units in the cluster, operating over 600,000 power looms and providing employment to around 12 lakh workers. Of the 400 units in the cluster, around 330 are integrated units with facilities for both dyeing and printing, while the remaining70-odd units have only dyeing facilities. The cluster units have formed an association—South Gujarat Textile Processors Association (SGTPA)—which addresses various issues of the units and provides a common platform for constructive and mutually beneficial interaction and decision making.

Profile of Surat textile cluster

Unit category	*Production capacity (metres/day)*	*Number of units*
Small	Less than 50,000	146
Medium	50,000–100,000	168
Large	Above 100,000	86
	Total	**400**

Technology status and energy use

The primary raw materials used in textile manufacture are grey cloth, polyester yarn, and various chemicals like soaps, caustics, and dyeing and bleaching agents. Grey cloth usually contains many coloured impurities like minerals, waxes, proteins, and so on, which are removed by scouring, bleaching and shrinking. The fabric is then dyed and printed to get the finished products. Scouring is usually carried out in 'soflina' machines, while bleaching and shrinking are carried out in drum washers. Dyeing is mainly carried out in jet dyeing machines and jigger machines. Printing is usually carried out by mechanized screen printing processes, i.e. flatbed printing or rotary printing. After printing, the fabric is passed through looping machines, hydro extractors and 'Stenter' machines that dry the fabric, enable the colours to set properly and restore the fabric's width.



Process flow in a typical textile unit

The units use both electricity and thermal energy in their processes. Electricity is primarily drawn from the grid, and used to operate pumps, fans, drives and for lighting. As grid electricity is relatively expensive, some units have installed natural gas based generators to meet part of their electricity needs. Thermal energy is mainly obtained from lignite, imported coal and natural gas which are readily available, given Surat's proximity to the port of Hazira (about 25 km away). Coal and lignite are primarily used as fuel in boilers for steam generation, and NG is used in machinery like Stenter machines (for heat setting) and loop machines. The energy cost represents about 12–15% of total manufacturing cost.

Annual energy consumption in Surat textile cluster			
Fuel	*Quantity*	*Energy consumption (toe)*	*Share (%)*
Coal/ lignite	2.3 million tonnes	943,400	73
Natural gas	315 million Sm^3	283,200	22
Electricity	726 million kWh	62,400	5
	Total	**1,289,000**	**100**

The total energy consumption of the Surat textile cluster is about 1.29 million tonnes of oil equivalent (mtoe). The average specific energy consumption (SEC) of the textile units in Surat cluster is 0.4 toe per 1000 metres.

Options for energy saving

There is significant scope for improving the energy performance of units. Some best operating practices include improved steam trap management system, improved insulation of steam, hot water and condensate lines. An energy saving potential of about 110,000 toe has been identified in the Surat textile cluster through the adoption of best operating practices and the best available technologies. Some of the energy efficiency options identified for Surat textile cluster are given below.

Energy efficient steam turbine

Options for energy efficiency in Surat textile cluster			
Energy efficiency option	*Investment (Rs lakhs)*	*Annual saving (Rs lakhs)*	*Payback period (years)*
Stenter machine – Adopt energy efficient systems	95	12.2	8.0
Stenter machine – Install variable frequency drives (VFD)	0.4	0.5	0.8
Jet machine – Incorporate waste heat recovery (WHR) system for hot water drain	6	10.2	0.5
Boiler – Include on-line flue gas monitoring system and control	5	5.5	1.0
Condensate recovery – install pressure powered pumping packaged unit	5	2.4	2.0
NG based cogeneration system	100	27.8	3.6
Steam based cogeneration system	350	78.7	4.4
Tri-generation using micro turbine technology	40	26.4	1.5

Compiled by TERI from the 'Manual on energy conservation measures in textile cluster, Surat, Gujarat' under the BEE-SME Programme, 2010-11

BRIDGING TECHNICAL AND ECONOMIC ANALYSIS: SURVEY OF CHEMICAL AND TEXTILE SMEs IN GUJARAT

J-PAL, TERI, Gujarat

BACKGROUND

Raising energy efficiency among SMEs is often not about advancing the technological frontier but rather increasing the take-up of existing technologies. In study after study, simple measures such as energy-efficient motors and improved process and utility insulation are projected to bring large savings with short payback periods—measured in months, not years. Yet take-up of such measures is still low in many energy-intensive clusters. Why is this so?

To find the answer, Abdul Latif Jameel Poverty Action Lab (J-PAL) South Asia and TERI are now undertaking a survey of over 400 chemical and textile SME units in Gujarat. Two aspects of this survey are remarkable and can advance our understanding of how SMEs make decisions about adopting more efficient technology. First, the survey will measure the outcomes of a randomized controlled trial of industrial energy audits in these units. This study design will give a clear answer on how much energy audits really save, which is a challenge given the rapidly changing conditions in the SME sector. Second, the survey will cover both economic and technical aspects of unit operations in depth. Connecting these two points of view can explain the reasons behind low adoption of efficiency investments.

The 'randomized study' design will solve the widespread problem that energy savings achieved vary with any number of changes in the plant, in addition to the measures in question. In SMEs, varying demand conditions and energy prices can cause big swings in capacity utilization and energy bills from month to month. This variability makes it hard to measure savings achieved due to the adoption of any particular measures.

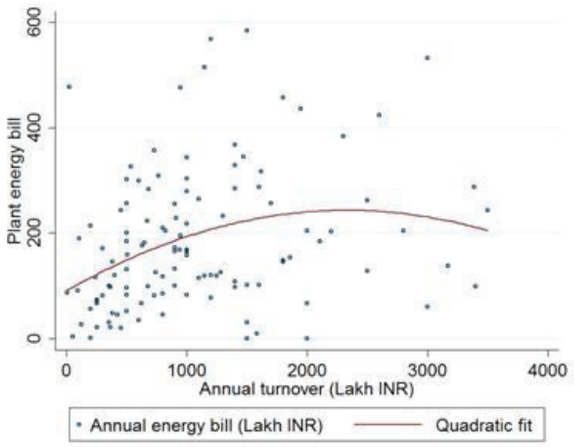
Proper sizing of fuel to improve combustion efficiency

In this study, energy audits are being conducted for a group of over 200 units while a comparison group of units are only being monitored on their energy use. Measuring energy savings achieved against this group allows the study to filter out any changes in demand or other factors to measure the effects of energy audits themselves.

Approach and results

The scope of the survey at each plant runs from detailed measurements of equipment efficiency to study of energy bills, energy price expectations and plant economic performance. Lagging efficiency is an economic puzzle. The figure is a scatter plot of energy bills, for fuel and electricity together, against turnover for a group of textile industries in the study. For plants with turnover around Rs 10 crores, energy bills range from Rs 1 crore to Rs 3 crores or more. This is a massive share of overall industry sales and costs, showing the energy intensity of textile processing in general. What is puzzling is how the

Insulating steam distribution lines to reduce heat losses



Wide range of energy use by plants with similar sales

industries with energy use at the upper end of this range compete. Why don't more efficient plants drive them out of business? In particular, larger plants, as shown in the figure, use little more energy than small plants. Even if small firms can survive, why would they not adopt more efficient technology to reduce costs and increase profit margins?

The integrated approach of this survey will enable the study to address the underlying reasons why plants may not adopt some efficient technologies. For example, the survey will cover how plant owners expect fuel and electricity prices to change. Rising fuel prices are strong encouragement to improve efficiency and owners that expect rising prices may adopt more measures suggested in audits. It will also cover how the *variability* of savings may affect adoption decisions. Having a more efficient plant pays off most when the plant is running full capacity—this is often not the case for SMEs with erratic demand. Efficiency may have a lower return if capacity utilization varies more widely. Measuring such underlying economic motives for technology adoption can help design better targeted and more sustainable efficiency programmes.

Vertical agitator driven reaction vessel

Mr Nicholas Ryan, PhD Candidate (Dept. of Economics) Massachusetts Institute of Technology, 30 Memorial Drive Building E60-256, Cambridge, MA 02142, USA, Email: nickryan@mit.edu

5TH COORDINATION COMMITTEE MEETING

The 5th Coordination Committee Meeting of SAMEEEKSHA was held in TERI on 3rd April 2012. The meeting was chaired by Dr Ajay Mathur, Director General, BEE. The participants included representatives from BEE, SDC, PCRA, SBI, SIDBI, JICA, DFID, AFD, ADEME, GIZ, KfW, UNIDO, MIT, and technical consultancy organizations.

Dr Mathur initiated a roundtable discussion on the structure of the two-day 'National Summit on Energy Efficiency in MSMEs' that is scheduled during 30–31 July 2012. The summit will focus on three main aspects related to energy efficiency among MSMEs: policy, technology and finance. The major highlight of the summit will be special breakaway sessions titled 'Voices from the Ground' that will have ground level stakeholders—entrepreneurs, local service providers, industry associations etc.— deliberate on how effective policies/programs can be evolved and access to finance improved so as to accelerate the adoption of EE technologies. The SAMEEEKSHA website too will be launched during the Summit. The outcomes of the round table discussion are summarized below.

- The purpose for organizing this MSME summit is to promote exchange of ideas on energy efficiency among key MSME stakeholders.
- The breakaway sessions will be allotted sufficient time to facilitate healthy discussions. Participants who have successfully implemented energy efficient projects could provide details in these sessions.
- TERI will make a theme presentation at the start to set the tone for the event. A short video collage of interviews from 'Voices from the ground' will be played during the summit to provide direction to the proceedings.
- GIZ will provide an introduction to the 'Energy Bus'.

Following the roundtable, Mr Jitendra Sood, Energy Economist, BEE outlined the proposed activities by BEE in SME sector in the 12th Five Year Plan. The focus now will be on technology up-gradation through implementation of DPRs prepared under the BEE SME program. Other major activities include energy mapping of targeted clusters and a proposed scheme for promoting SME product labeling.

Mr Hemant Verma, Senior Expert - Cluster Development, UNIDO highlighted the activities and achievements of UNIDO's SME Development Project in the Chennai footwear cluster. The project focuses on cluster twinning, technology assessment and capacity building on best practices.

A joint presentation on *Benchmarking and mapping of energy consumption in SME clusters* was delivered by Mr Robert Angioletti, Senior Energy Expert, AfD and Mr N Vasudevan, Senior Fellow, TERI. The objective of this study is to initiate the construction of an 'overall picture' of energy consumption in the MSME sector and benchmark specific energy consumption (SEC) for different MSMEs sub-sectors. It has been estimated that the total energy consumption of 36 clusters reviewed under the project is 7.3 million tonnes of oil equivalent (mtoe).

NATIONAL SUMMIT ON ENERGY EFFICIENCY IN MSMEs
30–31 JULY 2012, NEW DELHI

SAMEEEKSHA is hosting a first-of-its-kind 'National Summit on Energy Efficiency in MSMEs' with additional support from Agence Française de Développement (AfD), Energy Efficiency Services Limited (EESL), and German Development Agency (GIZ). The specific objectives of the Summit are:

- Seek the views of ground-level stakeholders on possible strategies to promote energy efficiency
- Promote experience sharing on on-going initiatives and explore possibilities of synergizing actions
- Identify future opportunities and actions required for promoting energy efficiency in the MSME sector

The Summit will also mark the inauguration of the SAMEEEKSHA platform's website http://www.sameeeksha.org. The website will serve as a warehouse of knowledge on promoting energy efficiency in MSMEs. It will have a set of detailed project reports on energy efficient technologies, cluster manuals and case studies on successful interventions in MSMEs by different organizations.

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 Upinder Singh Dhingra
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: upinder.dhingra@teri.res.in