SAMEEEKSHA

SMALL AND MEDIUM ENTERPRISES: ENERGY EFFICIENCY KNOWLEDGE SHARING

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NEWSLETTER

A PLATFORM FOR PROMOTING ENERGY EFFICIENCY IN SMEs

In this issue...

Editorial

The majority of Indian foundries are in the MSME (Micro, Small and Medium Enterprises) sector. The MSME sector has a proud legacy as a major contributor to the Indian economy, accounting for about 45 per cent of manufacturing output and 40 per cent of exports. As per the annual report of Ministry of MSME, Government of India for the year 2010–11, there are an estimated 28.9 million MSME units that generate and provide employment to 69.5 million people. The fixed investment in these MSMEs in 2009–10 was ₹6938 billion and their output generation was ₹9829 billion, which is about 8.72 per cent of India's GDP.

The BEE (Bureau of Energy Efficiency) survey in 2007 in 35 energy intensive clusters estimated the total energy consumption in these clusters to be around 4.9 million tones of oil equivalent (MTOE). Coal/ coke/ lignite accounted for 86 per cent of total energy usage, while the consumption of oil & natural gas, biomass and electricity were 7 per cent, 4 per cent and 3 per cent respectively. The study and subsequent energy audits conducted by BEE revealed that a potential of 15–30% energy savings is possible in these energy-intensive MSME clusters.

I am very sure that in foundries the potential/ scope of energy saving is easily around 15 per cent to 30 per cent. Several organizations like BEE, SDC, Ministry of MSME, World Bank, SIDBI, REEEP and TERI are undertaking programmes to improve the energy efficiency of foundries. Initiatives like SAMEEEKSHA will help to pool the knowledge and experiences of different institutions working in the MSME sector. I urge the readers to proactively participate in these initiatives which will go a long way in conserving energy and improving the environment.

I wish you all a very happy and prosperous new year.

H Sundara Murthy
Chairman, Energy Saving Commission
World Foundry Organization

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MSME

CLUSTER PROFILE

MUZAFFARNAGAR PAPER CLUSTER

Background

The Indian paper industry accounts for about 1.6% of the world's production of paper and paper board, with 568 operating units having a total installed capacity of about 7.4 million tonnes per annum (tpa). About 38% of total paper production is based on recycled (waste) paper; 30% on agro residues; and the remaining 32% on wood. The industry is highly fragmented: while the large scale paper producers account for over 90% of installed capacity, there are a large number of small and medium sized paper units as well. Most of the small-scale units depend on outmoded technologies, and must identify ways to adopt improved and energy efficient technological options in the face of intense international competition, increasing demands for high quality products, and mounting pressure to meet environmental norms.

One of the important paper manufacturing clusters in India is located in the industrial town of Muzaffarnagar, in western Uttar Pradesh. There are 29 small and medium sized paper units in the cluster. Most of the units produce kraft paper; other products from the cluster include printing paper, filter paper, gray board, and hard tissue paper. The units vary in capacity from 1750 tonnes per annum (tpa) to 87500 tpa. The total installed capacity of the Muzaffarnagar units is about 542000 tpa.

Profile of Muzaffarnagar paper units	
Characteristic	*No. of units*
Capacity (tpa)	
– Up to 10,000	13
– 10,000 to 30,000	11
– Above 30,000	5
Raw materials used	
– Agro waste-cum-waste paper	12
– Waste paper	16
– Agro waste	1

Raw materials for recycled paper production

The Muzaffarnagar paper units have formed an association, the 'UP Paper Mills Association', which provides a forum to share experiences and find solutions to various issues in the industry.

Technology status and energy use

Process

Paper is made from cellulose fibres that are found in wood and agro residues, usually bound together by a material called lignin. In addition to wood and agro residues, waste paper provides an important source of fibres for paper production. The Muzaffarnagar paper units use agro residues (like bagasse and wood chips) and recovered paper (waste paper in the form of tightly compressed bales) for paper production. The paper manufacturing process involves three broad stages: pulping, paper making and finishing. The raw material is first reduced to pulp form so that its individual fibres are separated from one another. After separation, the fibres are washed and screened to remove any remaining

Inside a paper mill

fibre bundles. The pulp is then used directly to make unbleached paper, or bleached for white paper.

The agro residues are pulped by cooking with chemicals in a digester. Waste paper is pulped by two processes: washing and flotation. After removal of ink, adhesives and other impurities, the pulp—known as 'paper stock'—is forwarded to the paper machine where more water and chemicals are added to produce a very thin suspension of fibres. The mixture is squirted through a thin, horizontal slit across the full width of the paper machine (typically, 2–6 metres) on to a moving, 'endless' wire mesh. As the paper stock flows along the wire mesh, water is removed gradually through a combination of gravity and suction, and the fibres spread and consolidate into a thin, moist mat. The mat is pressed, dried and smoothened to give a sheet of paper. Finishing processes like cutting, rolling and coating are carried out to enhance the characteristics, appearance and properties of the paper as required.

Energy use

The paper units use electricity as well as coal and biomass (mainly rice husk, pith and bagasse) to meet their energy requirements. Most of the units have installed biomass/coal-based cogeneration systems to meet their demands for steam as well as power simultaneously. The cumulative power generation capacity of the cluster units is estimated at about 68 MW. The total annual energy consumption of the cluster is about 103100 tonnes of oil equivalent (toe). The specific energy consumption (SEC) of the units varies from 10.1 GJ/tonne to 18.2 GJ/tonne.

Annual energy consumption in Muzaffarnagar paper cluster

Energy source	*Energy consumption (toe)*	Share (%)
Coal and biomass	87800	85
Electricity*	15300	15
Total	103100	100

*All units with capacities of 30000 tpa and above have cogeneration system to meet their entire electricity requirements. As such, their entire energy consumption is represented in terms of coal and biomass fuels

Options for energy saving

The total energy saving potential identified in the cluster is about 10000 toe (about 10% of total energy consumption). Some of the energy savings options identified for the paper mills in the Muzaffarnagar cluster are mentioned below. The payback periods on investments range from 1 to 4 years.

Options for energy efficiency in Muzaffarnagar paper cluster

Pulping process	• Flash steam recovery from agro residues digester system • Screw press for replacing twin drum washing machine in agro based mills • High consistency pulper to improve paper quality
Paper machine	• Install flash steam recovery system from condensate • Install thermo compressor to recover steam • Efficient condensate evacuation from dryers • Install pressurized head box in place of conventional head box
Boilers	• Optimization of excess air using oxygen controller • Feed water pressure drop reduction • Install high efficiency boiler feed water pumps • Replace inefficient FD fans with efficient ones
Process pumps	• Replacement of low efficiency process pumps with energy efficient pumps

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

WORLD BANK–GEF PROJECT: FINANCING ENERGY EFFICIENCY IN MSMEs

Location: India
Duration: 4 years (2010–2014)
Funding agency: Global Environment Facility (GEF)
Implementing agencies: Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency (BEE)

Background

The Indian MSME sector is facing high and rising energy costs, unlike certain other sectors of the economy such as agriculture that benefit from subsidized energy prices. Also, export-oriented MSMEs are facing increased global competition. Investments in cost-effective energy efficient (EE) measures would improve their productivity and bottom-line profits.

A central barrier to the adoption of EE measures by MSMEs is the current gap in understanding between energy auditors and EE practitioners who prepare technical proposals for MSME clients, and the local banks who evaluate loan proposals as opposed to technical studies. EE investments usually do not generate additional revenues, but rather contribute to bottom-line earnings through a reduction in energy expenditures. This can make it difficult for banks to identify and capture cash flows from such projects, to assess their delivery risks, and to treat energy savings as assets of sufficient market value to justify a loan, despite the overall benefits which would accrue to the borrower if implemented. There is also a lack of information among banking sector stakeholders on the potential market for lending, and on the portfolio benefits in terms of improving asset quality which can be achieved by increasing their own lending for EE to existing clients. MSME units too remain generally unfamiliar with the performance of readily available EE equipment in Indian conditions. Finally, top tier vendors of EE equipment frequently give lower attention to individual MSMEs due to their small size and the perceived difficulties in working with this customer class.

In order to address these barriers, the World Bank, with support from the Global Environment Facility (GEF), has designed the Micro Small and Medium Enterprise Energy Efficiency (MSME EE) project as part of the GEF Programmatic Framework project for Energy Efficiency in India. The objective of this project is *"to increase demand for energy–efficiency investments in target MSME clusters and to build their capacity to access commercial finance."* The GEF implementing agency for this project is the World Bank and the executing agencies are Small Industries Development Bank of India (SIDBI) and the Bureau of Energy Efficiency (BEE). The five MSME clusters targeted under this project are listed below along with indicative information.

Chemical unit, Ankleshwar cluster

MSME clusters targeted under the project

No.	*Cluster*	*Industrial activity*	*Main fuel*
1	Ankleshwar	Chemical	Gas/electricity
2	Faridabad	Mixed	Electricity/oil
3	Kolhapur	Foundry	Coke
4	Pune	Forging	Furnace oil
5	Tirunelveli	Lime kiln	Charcoal

Objectives

- To create increased demand for EE investments by adopting a cluster approach to facilitate the development of customized EE products and financing solutions in five targeted industry clusters, and to build the capacity of identified apex organizations to assist the MSME units in identifying additional EE projects in the future, thereby aiding in widespread replication
- To raise the quality of EE investment proposals from a technical and commercial perspective, and thus to increase the capacity of both project developers and bank loan officers/branch managers to help shrink the gap between project identification and successful delivery of commercial finance
- To expand the uses of existing guarantee mechanisms for better risk management by banks, to catalyse additional commercial finance for energy efficiency
- To establish a monitoring and evaluation system for the targeted clusters

Components

Building capacity and awareness on energy efficiency

- Marketing and outreach efforts among clusters; capacity building of MSMEs/industry associations on energy efficiency, environmental and social aspects; measurement & verification (M&V) on the EE measures implemented
- Training of energy auditors/energy professionals
- Specialized support to financial intermediaries
- Unit-level support to MSMEs in accessing finance
- Vendor outreach (enlistment and support) activities, and engagement of a Regional Energy Efficiency Centre of Excellence for specialized technical capacity building activities in the area of furnace optimization

Increasing investment in energy efficiency

- Conducting walk-through/detailed energy audits; preparation of Investment Grade Detailed Project Reports (IGDPRs) for MSMEs in the five targeted clusters

Forging unit, Pune cluster

- Performance-linked grant for demonstration of EE technologies to the early adopters participating in the project

Knowledge management and sharing

This component consists of broad programmatic EE knowledge management efforts, which include monitoring and evaluation, identification and dissemination of best operating practices, and policy development functions with the goal of ensuring effective implementation and replications. The knowledge management element will provide key cross-cutting inputs to assist policy making by the government, and implementation of the entire GEF programmatic effort on improving EE in India.

Partner organizations

The key organizations executing the project activities include: Cluster Pulse, Ankleshwar; Confederation of Indian Industry (Avantha Centre); Development Environergy Services Ltd (formerly Dalkia Energy Services Ltd); IAMSME of India (FSIA, Faridabad); MITCON; PricewaterhouseCoopers (PwC); SEE-Tech Solutions; TERI; and Zenith Energy.

Contributed by Energy Efficiency Centre, SIDBI, New Delhi

UPSCALING ENERGY EFFICIENCY IN FOUNDRY INDUSTRY: CAPACITY BUILDING OF OPERATORS AND SUPERVISORS

India is the second largest producer of metal castings in the world, with production of over 9 million tonnes per annum. Most of the 5000-odd metal casting (foundry) units are MSMEs, located in geographical clusters. There are around 20 well-known foundry clusters in the country like Howrah, Kolhapur, Coimbatore, Rajkot, Ahmedabad etc. The metal casting industry is highly energy intensive and offers good scope for energy savings and reduction in CO_2 emissions through the promotion of energy efficiency measures.

TERI, with the support of Swiss Agency for Development and Corporation (SDC), is working on energy and environment improvement of the foundry sector since 1994. The TERI–SDC Partnership has focused on demonstration and dissemination of the energy efficient melting technology called divided blast cupola (DBC). At present, the focus of the partnership is on establishing and strengthening of local delivery systems for the DBC in selected foundry clusters.

The potential to improve the energy efficiency of units in the metal casting sector has attracted interest from other funding organizations like REEEP (Renewable Energy and Energy Efficiency Partnership). A two year project on 'Upscaling energy efficiency in metal casting in Southern India' is being implemented by TERI with REEEP support. The project focuses on creating an enabling policy and institutional environment for the widespread adoption of energy efficient technologies by metal casting units in South India.

Training programme at Kolhapur

Training programme at Sangli

During December 2012, TERI conducted three training programs on best operating practices (BOP) in cupola furnace at Belgaum (Karnataka) and Kolhapur & Sangli (Maharashtra). The training programs focussed on building the capacities of shop-floor level staff from foundry units in the areas of proper refractory lining, start-up, operation and trouble-shooting of the cupola furnaces. The programs witnessed an enthusiastic response from local industry, as there is a renewed interest in cupola melting compared to electric induction furnaces due to the recent hike in electricity prices in the state of Maharashtra.

SAMEEEKSHA goes online!

In order to facilitate the sharing of knowledge and experiences among stakeholders in the Indian MSME sector, a dynamic website has been created under the SAMEEEKSHA platform: *http://sameeeksha.org*. The website hosts content under three broad themes of energy efficiency, renewable energy and environmental protection in order to assist in disseminating knowledge on new projects, technologies and operating practices for improving energy performance in the MSME sector. It lists and provides links to key organizations working in the MSME sector; carries case studies and success stories on interventions by different agencies in the sector; and also hosts a set of detailed project reports (DPRs) on energy efficient technologies.

An essential function of the website will be to provide comprehensive and dependable data on energy consumption by MSME clusters in India. Such data is not readily available for most clusters, due to their geographical dispersion and in the absence of formal mechanisms for data collection and analyses. Preliminary data on energy consumption has already been collated and hosted on the website in regard to 36 MSME clusters covered under the BEE-SME Program and the TERI–SDC Partnership. The aim is to strengthen this database to cover energy data on 100 MSME clusters by the end of 2014.

The effectiveness of the SAMEEEKSHA website, and its utility, depends entirely on active participation by the stakeholders in the MSME sector. Hence, we urge entrepreneurs, industry associations, technology providers, consultants, R&D institutions and academia, donor organizations, government agencies and other stakeholders to visit the website and share their knowledge and experiences in areas like technology development, demonstration and dissemination; awareness generation, capacity building and training; financial and technical support; and so on. Your contributions can be in the form of unit/cluster-level case studies, cluster profiles, project briefs, and resources like books, brochures, audio-visual documentation, and other publications. These may be sent directly to the SAMEEEKSHA Secretariat.

SAMEEEKSHA looks forward to your enthusiastic participation in strengthening the Indian MSME sector!

SAMEEEKSHA website snapshot

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

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