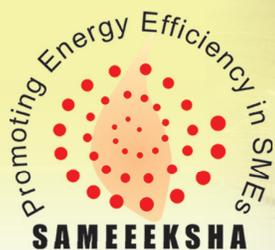


SAMEEKSHA

SMALL AND MEDIUM ENTERPRISES: ENERGY EFFICIENCY KNOWLEDGE SHARING

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NEWSLETTER



A PLATFORM FOR PROMOTING ENERGY EFFICIENCY IN SMEs

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Promoting BEE star labelling scheme in Rajkot pump industry



Editorial

Micro, Small and Medium Enterprises (MSMEs) play an important role in economic growth of our country. MSMEs contribute about 45% of manufacturing output and 40% of total exports of the country. The number of MSMEs in India is estimated to be over 26 million, providing employment to about 60 millions.

The various schemes/programmes being implemented by the Ministry of MSME facilitate support for Technology Upgradation and Modernization, Entrepreneurship Development, Skills Upgradation through appropriate training facilities, support for product development, design and packaging interventions, etc. To ensure healthy growth of MSME sector, the Ministry has recently launched the National Manufacturing Competitiveness Programme (NMCP).

Energy consumption in Indian MSME sector is substantially high and there is considerable scope for energy conservation in this sector. The Ministry has taken various initiatives for Technology Up-gradation and energy efficiency in MSME clusters. This includes Credit Linked Capital Subsidy Schemes (CLSS) and Technology and Quality Upgradation Support to MSMEs (TEQUP) for promoting energy efficient technologies. Under TEQUP scheme, which is one of the components of NMCP, Government is providing credit linked subsidy upto 25% of project cost (subject to maximum Rs.10.00 lakh) for implementing Energy Efficient Technology by MSMEs.

I am pleased that SAMEEKSHA initiative is promoting knowledge sharing on energy efficiency among MSME units. Ministry of MSME is one of the core members of SAMEEKSHA. I compliment the SAMEEKSHA Secretariat for bringing out this 4th quarterly newsletter. These newsletters highlight case studies on energy conservation and provide cluster profiles of energy-intensive MSME clusters.

I am confident that sharing of information among all the stakeholders would significantly contribute in increasing awareness on energy conservation and ultimately help Indian MSMEs in becoming more competitive.

With best wishes

Amarendra Sinha
Additional Secretary and Development Commissioner (MSME)
Government of India



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Embassy of Switzerland in India



The Energy and Resources Institute



CLUSTER PROFILE

BANGALORE MACHINE TOOL CLUSTER

Background

One of the important machine tool clusters in India is located in Bangalore. The Bangalore machine tools cluster accounts for about 60% of the country’s production in value terms. There are six large and 100 MSME machine tool units in the cluster. The units are located in Peenya, Abbigere and Bommasandra industrial estates. The cluster manufactures a variety of products, which may be categorized into four types:

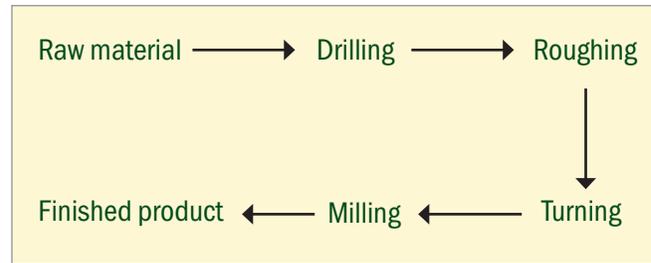
1. Components—aerospace, automobile, electrical and electronic
2. Machines—CNC and special purpose machines
3. Accessories—for conventional and CNC (computerized numerical control) machines
4. Heat treatment

The products manufactured include grinding machines, rotary tables, index tables, aerospace fixtures, CNC machine enclosures, etc. The products are custom-made to suit the requirements of large-scale clientele such as ISRO, HAL, BEML, MICO, BHEL, Kirloskar Electric, Bayforge Ltd, etc. The production capacities of the units range from 1.5–150 tonnes per annum (tpa), with about half of the units producing close to 50 tpa. The majority of the units are registered with Karnataka Small Scale Industries Association, Bangalore Machine Tool Manufacturer Association and Peenya Industrial Association. These industrial bodies keep the members updated on the latest developments in their relevant fields of interest along with necessary technical know-how.

Technology status and energy use

The average plant load factor is about 55%. The machine tool units use different processes as the end-products are different for each unit. Although there are variations in

the production processes, typically a machine tool unit covers the following unit operations.



Process flow in typical machine tools unit

The major raw material used in the cluster is steel. Other raw materials include cast iron and pig iron. Electrical energy is the major energy form used for various operations. The annual electricity consumption by the units varies from 6000 kWh to 1.6 million kWh. Almost the entire electricity requirement of the cluster is met through grid power (about 96%), while DG sets are used as backup. The total energy cost constitutes 5–8% of the total production cost.

Energy consumption pattern in typical units in different categories

Unit type	Total energy consumption	
	GJ/yr	toe/yr
Components	343	8
Accessories	442	10
Machines	148	3
Heat treatment	4109	98

The specific energy consumption (SEC) of different categories of units varies between 600 kWh per tonne (for machines) to 15057 kWh per tonne (for heat treatment).

Specific energy consumption in different categories of units

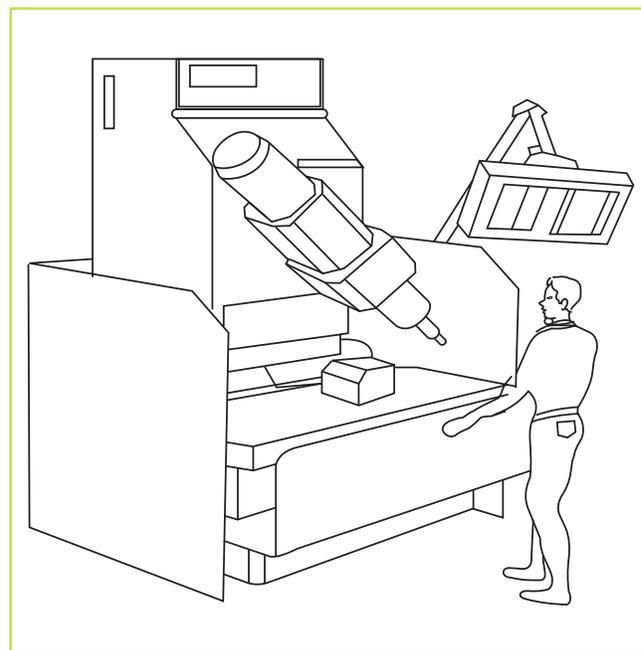
Unit type	Specific energy consumption	
	kWh/tonne	GJ/tonne
Components	6472	25
Accessories	5118	20
Machines	600	2
Heat treatment	15057	64

The total annual energy consumption of the cluster estimated during 2010 was 85,201 GJ (2038 toe). The heat treatment units alone accounted for about 67% of the total energy consumption in the cluster.

Options for energy saving

The energy consumption pattern in a typical manufacturing unit shows that process machines account for about 77% of total energy consumption and the utilities about 23%. Some of the energy conservation measures that have an attractive payback of less than two years are given below.

In addition, replacement of conventional machines with CNC machines also offer opportunities for energy conservation although the payback periods are relatively higher.



Machine tool working platform

Annual energy consumption of Bangalore machine tools cluster

Energy	Unit	Component	Accessories	Machines	Heat treatment	Total
Electricity	Million kWh	2.80	3.10	0.79	15.98	22.67
Diesel	kl	63.2	21.2	14.9	–	99.3
Total energy consumption	GJ	12419	11933	3420	57429	85201
	toe	297	285	82	1374	2038
	%	15%	14%	4%	67%	100%

Options for energy conservation in Bangalore machine tools cluster

Energy conservation measure	Investment (Rs lakh)	Annual monetary savings (Rs lakh)	Payback period
Replacement of inefficient motors with energy efficient motors	0.3–0.9	0.06–0.4	2–5 years
Replacement of reciprocating compressor with screw compressor	3	1.6	2 years
Optimization of contract demand and installation of maximum demand controller	0.22	0.75	4 months
Insulation improvement of furnaces	0.4–0.9	0.14–0.27	3 months

Compiled by TERI from the 'Manual on energy conservation measures in machine tools cluster, Bangalore' under the BEE-SME programme, 2010

BENCHMARKING AND MAPPING ENERGY CONSUMPTION IN MSME SECTOR

In general, MSMEs lag behind larger industry benchmarks in terms of energy efficiency, technology upgradation and productivity. There are many energy intensive MSME sub-sectors like grey iron foundry, brassware, brick, ceramics, glass, food products, dairy etc. that offer substantial scope for energy conservation through the adoption of improved, energy efficient technologies. In order to plan and implement energy efficiency initiatives in an entire MSME sub-sector, it is essential to have comprehensive and dependable baseline energy consumption data; for, only with such data can benchmarks be set for specific energy consumption (SEC) in the sub-sector, thereby providing a basis for assessing the scope for improving energy efficiency and identifying suitable technological options for the different clusters within that sub-sector.

BEE has initiated an analysis of energy consumption data in about 25 energy-intensive MSME

clusters under its 'SME Programme', and engaged a set of organizations to identify potential areas for energy conservation. Also, energy data has been gathered on a number of MSME clusters by agencies that have undertaken cluster-level energy efficiency initiatives like PCRA, SIDBI, UNIDO, UNDP, kFW, JPAL, APITCO, ITCOT, GITCO, TERI, etc. However, no specific study has so far been conducted to quantify and/or analyse the levels of energy consumption in different sub-sectors of the Indian MSME sector as a whole.

In this context, the Agence Francaise de Developpement (AFD), a bilateral agency, has initiated a project to map and benchmark the energy consumption in different MSME sub-sectors based on the data collated by different agencies. The overall purpose of the project is to provide a comprehensive database on energy use in different MSME sub-sectors, which

would enable the formulation of targeted energy efficiency interventions.

The study is being undertaken by TERI and is mainly based on secondary data that is available with different agencies. AFD-TERI invites the readers to share, with the project, energy details that they have related to any of the MSME clusters. The information can be provided to the SAMEEEKSHA Secretariat for inclusion in the database.



Paper production unit

Prepared by TERI

PROMOTING BEE STAR LABELLING SCHEME IN RAJKOT PUMP INDUSTRY

Partners: SIDBI, TERI, Rajkot Engineering Association
Duration: 2009–11

Background

Pump sets are widely used for pumping water in the agricultural, domestic, municipal and industrial sectors. The agricultural sector alone uses millions of pump sets for irrigation, which account for around 18% of the total electricity consumption in India (2007/08 estimates). While the demand for pump sets is increasing with the rapid depletion of water resources across the country, most of the pump sets in use have low energy efficiency. The energy saving potential in the pumps is between 20–40%. Thus, improving the energy efficiency of pump sets offers huge potential for electricity savings.

BIS standards for pump sets

The Bureau of Indian Standards (BIS) has specified minimum quality and performance standards for pump sets of different categories. Manufacturers interested in obtaining BIS certification for their pump set models

have to get them tested in BIS-approved laboratories. They are allowed to affix 'ISI marks' on pump set models that achieve the BIS standards. Although BIS certification is voluntary, state governments procuring agricultural pump sets in bulk for distribution to farmers usually specify that the pump sets should carry the ISI mark. This motivates pump set manufacturers to obtain ISI marks for their products. As the BIS scheme specifies only minimum quality and performance standards for pump sets, it allows scope for encouraging manufacturers to produce pump sets of higher energy efficiency.

BEE star labelling scheme for pump sets

To promote the manufacture and use of energy efficient pump sets, BEE formulated a voluntary 'Star Labelling Scheme' (BEE-SLS) for pump sets in May 2006 under its 'Standards and Labelling (S&L) Program' for different equipment/ appliances. The BEE-SLS introduces 1-star to 5-star labels based on energy



Pump sets from a manufacturing unit

efficiencies of the equipment, with 1-star denoting the lower level and 5-star the highest energy efficiency. BEE-SLS covers 3-phase pump sets of up to 15 kW in three categories:

1. Open well submersible pump sets
2. Submersible pump sets
3. Mono block pump sets.

Star labelling system for pump sets	
BEE-SLS star rating	Overall energy efficiency
★	≥ 1.0 and <1.05
★★	≥ 1.05 and <1.10
★★★	≥ 1.10 and <1.15
★★★★	≥ 1.15 and <1.20
★★★★★	≥ 1.20

Note: The overall energy efficiency of BIS level is taken as 1.

The minimum energy performance standards for pump sets under BEE-SLS are based on the existing BIS standards for the three categories of pump sets. Specifically, BEE-SLS has taken the BIS level of energy efficiency as the 'baseline' case for each category of pump set. Thus, the BEE-SLS complements and strengthens the existing BIS certification scheme, as the existing

BIS procedures for testing the performance of pump sets remain unchanged.

Context

The Rajkot engineering cluster is one of the largest pump set manufacturing clusters in India, with nearly 250 MSME units. These units cater to diverse clientele—ranging from bulk purchasers such as state government bodies to individual customers like urban households. As the needs vary widely, a pump set manufacturer produces a large number of models. Only around 40 Rajkot units have standardized, BIS-certified pump set models that are marketed across the country; the other 210 units are tiny in scale, and primarily engaged in assembling pump sets for local markets.

Till 2009, not even a single pump set model manufactured in Rajkot carried the BEE star label, nor did the cluster have any support services for BEE-SLS. In this backdrop, under a World Bank-DFID-SIDBI supported project to strengthen business development services (BDS) in selected MSME clusters, TERI intervened in Rajkot to build the capacities of local BDS providers for promoting BEE-SLS among the pump set manufacturers.

	Overall Efficiency of the Pump set* :		Manufacturers Logo if available	
SUBMERSIBLE PUMPSET				
TYPE <input type="text"/>	S.NO <input type="text"/>	Model No/ Year <input type="text"/>	kW/HP <input type="text"/>	
Del. SIZE mm <input type="text"/>	HEAD m <input type="text"/>	Dis. IPS <input type="text"/>	CAPACITY RANGE lps <input type="text"/>	IPkW <input type="text"/>
rpm <input type="text"/>	OVERALL EFF. % <input type="text"/>	Operating Head Range m <input type="text"/>		Min.Sub m: <input type="text"/>
V <input type="text"/>	+6% -15%	Hz <input type="text"/>	Min.Bore Size mm <input type="text"/>	No.of Stages <input type="text"/>
Max Current <input type="text"/>	DUTY <input type="text"/>	CONN <input type="text"/>	Phase <input type="text"/>	MONTH <input type="text"/>
YEAR <input type="text"/>				
Name of the manufacturer with complete address				
*Under test conditions when tested in accordance with relevant IS No., the actual energy Consumption will depend on how the equipment is being used				

BEE star label

Approach and results

TERI coordinated the project activities with Rajkot Engineering Association (REA), the leading industries association in the cluster, in order to engage closely with pump set entrepreneurs and other industry stakeholders. In 2009-10, the project organized awareness generation meets and visits to leading pump set manufacturing units to create awareness on BEE-SLS program. A competent local consultant (Mr Shailesh Goswami, Labh Consultancy) was identified during this process; the consultant had well-established ties with the Rajkot pump set industry, and was also keen on acquiring the knowledge and expertise required to promote BEE-SLS among the pump set manufacturers. TERI facilitated training for the consultant at BEE on various aspects of BEE-SLS like on-line application for star rating of submersible pump sets. Following this, he focused on promoting BEE-SLS among the larger, more well-known units in the cluster; the expectation was that once these units adopted the star labelling scheme, others would follow suit. TERI facilitated the consultant's efforts by highlighting the benefits of BEE-SLS during various interactions and events.

Thanks to these efforts, one of the leading pump manufacturers in Rajkot, Falcon Pumps, obtained star

labels for a number of pump set models with support from the consultant. This step by Falcon Pumps acted as a powerful catalyst for other pump set manufacturers in the cluster who availed of assistance from Labh Consultancy for BEE star labelling.

Till now, 13 pump set manufacturers have obtained BEE star labels covering 216 pump set models with support from Labh Consultancy. In addition, star labels for 120 more pump set models are awaited; processing of applications has been initiated for another 320 pump set models. Feedback from manufacturers indicates that star labelling of pump set models has greatly increased their sales.

Key lessons

The SIDBI-TERI intervention has succeeded as a pilot in Rajkot cluster to promote star labelling among the pump set manufacturers. Once a pump set unit obtains star rating, others are motivated to do so – thus setting in motion an industry-wide shift towards energy efficient pump sets. Adoption of BEE-SLS by pump set units can be facilitated at policy level—for instance, if the government agencies procure only star labelled pump sets, with a focus on 5–12.5 HP models which are generally procured for agriculture.

Prepared by TERI

NOTICE FOR READERS

The year 2011 marks the culmination of the latest phase of the ongoing 18-year long partnership between SDC and TERI in promoting energy efficiency and environment friendly technologies in the Indian MSME sector. TERI and SDC stand poised to enter a new era of cooperation in furthering the development of the MSME sector from 2012 onwards, Under the new phase of the TERI-SDC partnership titled 'Scaling up Energy Efficiency in Small Enterprises' (ESEE) which will extend between 2012–14, the project will deepen its engagement with the foundry industry as well as extend its activities to a few more energy intensive MSME sub-sectors like aluminium. Efforts will be made to strengthen linkages with larger programs of the government and multilateral agencies in the MSME sector, such as those of BEE, Ministry of MSME, UNIDO, World Bank and REEEP.

It is natural for the initiatives and learnings under the TERI-SDC partnership to synergize with the collaborative knowledge-sharing platform provided by SAMEEEKSHA. Accordingly, reports and updates on these initiatives will be provided in the SAMEEEKSHA newsletter from the next issue onwards. Henceforth, the 'COSMILE UPDATE' newsletter will no longer be published.

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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