

Energy Efficiency Programs for Small and Medium Enterprises (SMEs) by Bureau of Energy Efficiency

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Overall Scenario of MSMEs in India

- The MSME (micro, small & medium enterprises) sector accounts for about **8% of the GDP, 45% of manufacturing output and 40% of total exports** of the country.
- **180 out of about 400 clusters are characterized as energy intensive** where energy consumption is 40% of the total energy consumption of SMEs.
- The sector **growth rate is projected to be 6% annually** and energy consumption is expected to be **68 million toe by 2017**.
- With studies conducted in 25 MSME clusters during the XI Five Year Plan, some key number presented below highlight the potential of the sector.
 - ***Saving Potential:*** Basis the assessment of 25 MSME clusters, there exists a savings potential of 0.6 million toe (15% of total energy consumption in the 25 clusters)
 - ***Avoided capacity addition:*** Basis the assessment of 25 MSME clusters, adoption of EE measures would lead to 131 MW of avoided capacity addition.
 - ***Net Monetary benefits:*** Basis the assessment of 25 MSME clusters, adoption of EE measures would lead to INR 1400 crore cost savings.
 - ***Investments required:*** Basis the assessment of 25 MSME clusters, INR 3388 Cr is estimated to achieve the above savings.

BEE's initiatives in SME sector

BEE-SME program

EE Technology Demonstration
through direct back ended
subsidies to units
(25 +5)

Demonstration
/Capacity
Building/replications

Energy Mapping
Performance
Banchmarks

GEF-UNIDO-BEE

Promoting energy efficiency
and renewable energy in
selected MSME clusters in
India
(12 SME Clusters)

Increase capacity &
Demand of EE –Product
and Services

Strengthening policy,
institutional and decision
making frameworks in the
country

GEF-WB –BEE

Increase demand for EE
investment in targeted clusters ,
Build their capacity to access
commercial finance.
(10 Clusters)

**Building Capacity &
Awareness**

**Increased Investment in
Energy Efficiency**

Knowledge Management

BEE - SME Program

XII Plan Activities

1. Implementation of Technology demonstration projects

- ❖ Demonstration of 10 best identified technologies of selected 5 energy intensive sectors
- ❖ 100 technology demonstration in 5 sectors.

2. Technical Assistance and Capacity Building

- ❖ Sharing of the BoP and BAT
- ❖ Development of case studies , print materials and audio visual of BATs& BOPs
- ❖ Capacity building in clusters through SDAs, National level workshops for stakeholders.

3. Mapping of the SMEs on pan India basis.

- ❖ Development of Pan India level Sector specific reports and policy plans .
- ❖ Launch of National Policy Document on Energy Efficiency in SMEs.

1. Committee Chaired by AS and DC, MoMSME to explore ways of aligning the activities of BEE with those of MoMSME in the XII plan under its SME scheme.
2. AS & DC suggested BEE to target following clusters :
 - a. **Food (Indore) ,**
 - b. **Kochi (Seafood, Kerala)**
 - c. **Forging (Ludhiana, Punjab)**
 - d. **Brick (Varanasi, UP)**
 - e. **Textile (Pali, Rajasthan)**
3. MSME-DI to support BEE in its SME initiatives and BEE to promote the TEQUP scheme in its workshops

Implementation Framework

Step .1

Constitution of cluster level steering committee

- a) Director, MSME-DI of the cluster,
- b) BEE is (convener)
- c) President, cluster Association

Shortlisting of units and oversee implementation of EE Demos

Step.2

Open invite for participation to SME units for the implementation of Demonstration projects

+

Invitation for empanelment of LSP and Technology Providers

Step. 5

Base line audits in the selected 20 units of the cluster by BEE- IA

Step.4

Signing of MoU with each of the twenty units of the cluster.

Step.3

Physical verification of units by BEE agency to select 20 units on the recommendation of committee

Step.6

1. Implement Demos in the 20 units.
2. Preparation of DPRs and audio visual recordings, Case

Step.7

Post Audits steering committee approves release of subsidy to units upon satisfaction of completion

Step. 8

Direct release of subsidy through e-transfer in the account of unit owner on the receipt of original bills from the units and proformas indicating completion of demos from IA .

Ludhiana - Forging Cluster

- More than 1500 Small and Medium Enterprise (SME) forging units operating in the various industrial pockets in and around Ludhiana, manufacturing products suitable for automotive, industrial and agricultural sector.
- Two technologies identified to enhance energy efficiency of forging units in the cluster – Induction Heating Furnace & Special Purpose Machines
- Baseline audits were completed in all the 20 forging units
- Seven units implemented the suggested technologies – realized energy savings 20 to 40%
- Post implementation audit is completed
- Conducted 5 awareness workshops each in region of Moga, Phagwara, Jalandhar and Ludhiana.



Glimpses of technologies Implemented



Induction heater installed at
C-Forge (India)



Induction heater installed at
Global exports



SPM - turning installed at
NN Products



Induction heater installed at
Soga toka Industries



SPM - turning installed at
Bharat International



SPM - turning installed at
Khalon International



SPM - turning installed at
Mehram Industries



SPM - drilling installed at
Bharat International



Indore – Food Cluster



- ➔ More than 200 (Dal + Poha) processing units in Indore and Ujjain industrial area
- ➔ Baseline audits were completed in 14 units and implementation is in progress
- ➔ **Identified Technologies – (average energy saving potential is 25 to 30%)**
 - Replacing old and inefficient motors with EE motors
 - Installing Oxygen Sensor, fuel control and damper control
 - Installation of VFDs
 - Replacement of existing compressor with energy efficient compressor system
 - Substitution of fuel - saw dust based to gas based burner
- Seven units (6 Poha and 1 Dal Unit) have already implemented the suggested technologies – realized energy savings 15 to 30%
- Post implementation audit is completed

Glimpses of technologies Implemented



**Pakka Counter motor at
Nanak Overseas**



**Emery Roll Motors at
Nanak Overseas**



**Roaster Motor at
J P Hansraj**



**Flacker Motor at
Hira Industries**



**Poha Machine motor at
Dharmesh Industries**



**Dhan Elevator motor at
Dharmesh Industries**



**Flacker motor at Bindal
Process**



**Poha Machine motor at
Abhishek Industries**

Varanasi – Brick Cluster



- About 300 brick manufacturing units in the cluster
- Zig-zag technology is one of the technology options identified to enhance energy efficiency of brick making units in the cluster
- Local industry association (Int Nirmata Parishad) and individual brick kiln entrepreneurs
- TERI, New Delhi is engaged to carry out various planned activities in the cluster
- ***Baseline audits were completed in all the brick kiln units***
- ***Two of the units have already converted their existing kilns into zig-zag design***

Pali – Textile Cluster



- ➔ More than 350 Textile Dyeing and Finishing units with production capacity of 5.5 million meter per day
- ➔ Local industrial bodies
 - ▶ District Industrial Center, Pali
 - ▶ Rajasthan Textile and Hand Processors Association (RTHPA), Pali
- ➔ Baseline audits were completed in 11 textile units
- ➔ **Identified Technologies**
 - Economizer in Thermic fluid heater,
 - Air-preheater (APH) in steam boiler,
 - Waste heat recovery (WHR) with kier boiling unit,
 - Temperature Monitoring & Control in Jigger Machines Advanced Float Trap systems
 - Condensate Recovery System (CRS) in Jet Dyeing Machine,
 - Oxygen based automation and control system in boiler,
 - Installation of VFD for blowers of thermopac & boiler
 - New energy efficient boiler

Kochi – Sea Food Cluster



- More than 65 units in Kochi sea food cluster
- Baseline audits were completed in 8 units
- **Identified Technologies – (average energy saving potential is 15 to 20%)**
 - Replacement of reciprocating compressor with Screw compressor with VFD
 - Replacement of water cooled condenser with Evaporative condenser
 - Installation of variable frequency drive for condenser water pumps
 - Installation of THERMOSHIPON SYSTEM (GAS COOLING) for Compressor.
 - Automation of refrigeration plant by using PLC controller

Key Achievements

➤ **Unleashing the Large Potential in SME sector**

- 63 units out of the 100 industry units agreed to implement the EE measures and adopt energy efficiency technologies.
- Post implementation audits at **7 units of Forging Cluster** in Ludhiana, **7 units of Food Cluster** in Indore and **1 unit of Brick Manufacturing cluster** in Varanasi.
- Post implementation audit of these 15 verified units has yielded **Energy Savings of about 305 toe per annum**, **Cost Savings of about INR 1.5 crore per annum** and **GHG reductions of about 750 tCO₂ per annum**.

➤ **Increased Awareness among the unit owners on the new EE technology**

- Five Workshops for replication of technologies at Forging Cluster

➤ **Identification of Local Service Providers and Suppliers**

- **70 local service providers** have been identified for offering services and supplies of various identified EE technologies.

Barriers towards adoption of EE in MSMEs

- **Lack of capacities among MSME unit owners and financial institutions (FIs)**
 - MSME unit owners lack technical expertise on energy efficient technologies
 - Financial Institutions and private investors perceive energy efficiency investments as “**high risk**” investments
- **Less priority of MSME unit owners towards energy efficiency**
 - Less awareness among the MSME unit owners on energy efficiency measures and technologies
 - Lack of knowledge on potential benefits of energy efficiency among unit owners
 - Lack of local EE experts to guide the unit owners in undertaking projects
- **Lack of institutional capacity towards fulfilment of documentation requirements for the program.**

Future road map for SME sector

Driving nation wide awareness and capacity building programs

- Workshops and training sessions for MSME unit owners to facilitate better understanding through demonstration projects
- Workshops demonstrating financial aspects of EE projects to FIs

Constitution of technology specific forums

- Constitution of technology specific forums to promote already identified EE technologies under the 11th and 12th FYP (example - Waste Heat Recovery Alliance)
- A platform to discuss the challenges and success stories, and also deliberate on effective awareness mechanisms, business models to drive down technology costs

Promoting participation by financial institutions from project genesis

- Engaging the banks and other financial institutions (FIs) from the genesis of the EE project in order to gain their confidence.
- Key initiatives such as project risk analysis, capacity building of bankers and development of technology specific ready reckoners.
- Increased confidence among industry units and FIs

Promoting Energy Efficiency and Technology Up-gradation in SMEs through ESCO route

- ESCO Company will identify the EE technologies and implement the demonstration projects in the selected clusters.
- ESCO will recover its costs through the savings made by the industry unit under a savings model mutually accepted by the unit and ESCO.
- BEE could support ESCO by providing upfront financial assistance to minimize its investment risks.

GEF-BEE-UNIDO Program

Promoting Energy Efficiency and Renewable energy in selected MSME clusters

Title: Promoting energy efficiency and renewable energy in selected micro, small and medium enterprises (MSME) clusters in India

Objective: The aim of the project is to develop and promote a market environment for introducing energy efficiency and enhanced use of renewable energy technologies in process applications in the 12 selected energy-intensive MSME clusters in India with expansion to more clusters later. This is in order to improve the productivity and competitiveness of the units, as well as, to reduce their overall carbon emissions and improve the local environment.

Components: The project will work at cluster levels, as well as, policy level to achieve its aim. It has the following components:

- Increased capacity of suppliers of energy efficiency/renewable energy product suppliers/ service providers/ finance providers.
- Increasing the level of end-use demand and implementation of energy efficiency and renewable energy technologies and practices by MSMEs.
- Scaling up of the project to a national level.
- Strengthening policy, institutional and decision-making frameworks

Sectors and Clusters:

Foundry

- Coimbatore
- Belgaum
- Indore

Brass

- Jamnagar

Ceramic

- Khurja
- Thangadh
- Morbi*

Hand tools

- Nagaur
- Jalandhar

Dairy

- Gujarat
- Sikkim*
- Maharashtra*

* Discussions are in final stage

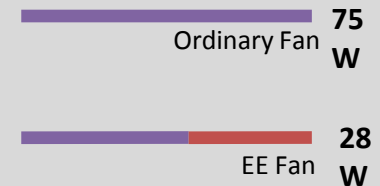
Achievements

- 250 units were surveyed in 9 clusters
- 54 energy audits have been completed
- 100 Case studies prepared
- 27 workshops completed on best operating practices
- 9 energy management cells were established at 9 clusters
- 4 demo projects implemented at Belgaum, Coimbatore, Indore and Gujarat clusters
- More than 150 projects are implemented by SME units with the help of project
- More than 500 experts, engineers, and staff were trained on various aspects of EE and RE initiatives in MSME
- Three international study tours were organized
- Around 1500 MTOE were saved per annum
- Monetary savings worth of 8 crores were achieved

Demand Aggregation for EE 28W Ceiling Fans



- Energy Efficient BLDC Motor
- 65 % savings in electricity



- 3 years manufacturing warranty
- Service value better than BEE five star rated fan
- Power factor is more than 0.94

Thangadh Ceramic Cluster

- Project facilitated implementation of 28W EE ceiling fans
- Around 7500 EE fans are currently installed in the cluster
- Electricity savings of 14 lakh units and 1400 tonnes of GHG emission per year
- Discussions are in final stage to implement the another 2000 EE fans

Jalandhar Hand tool Cluster

- As a demo, 5 fans were already installed at different plants by EE fan manufacturer
- Around 500 EE fans are currently installed in the cluster
- Discussions were in final stage to implement 1000 EE fans



Energy Management Centers (EMC)

➤ Setting up of 9 Energy Management Centers

- *Procurement of Energy Audit Instruments worth of around 1 crore completed*
- *EMC setup is completed at 9 clusters*

“If you want to control somethings, you should be able to measure it”





Energy Management Centre for foundries opened

SPECIAL CORRESPONDENT
COIMBATORE

Foundries that need support in energy management can now approach the energy management centre set up here under the UNIDO-BEE-GEF project.

B. P. Pandey, Director General of Bureau of Energy Efficiency (BEE), inaugurated the centre here on Friday at a function organised by COINDIA.

While COINDIA has provided space for the centre and will manage it too, the equipment were provided under the project.

Set up at a cost of ₹. 15 lakh, the foundry cluster members can hire equipment from the centre at a

lower cost, go in for energy audits, identify potential energy saving areas, get consultancy on best operating practices, and guidance on latest technologies.

According to a press release, the "Energy Efficiency and Renewable Energy in MSMEs" project was launched for the foundries here in 2013 and will go on for three more years.

About 60 units of COINDIA are covered under the project. The aim is to develop and promote a energy efficiency among micro, small and medium-scale units and enhance the use of renewable energy.

Workshops, trainings, energy audits, and capacity

building exercises are taken up. Detailed Project Reports are prepared for several energy-related issues.

Several innovative projects were taken up at the foundries.

This included installing harmonics filters and going in for energy conservation in cupola furnace.

Three more demonstration projects are under consideration for future implementation in three of the 12 clusters where the project is being implemented in the country.

Mahendra Ramdass, president of COINDIA, said at the meeting that the project encourages MSMEs to go in for renewable energy.

Small Scale Implementations

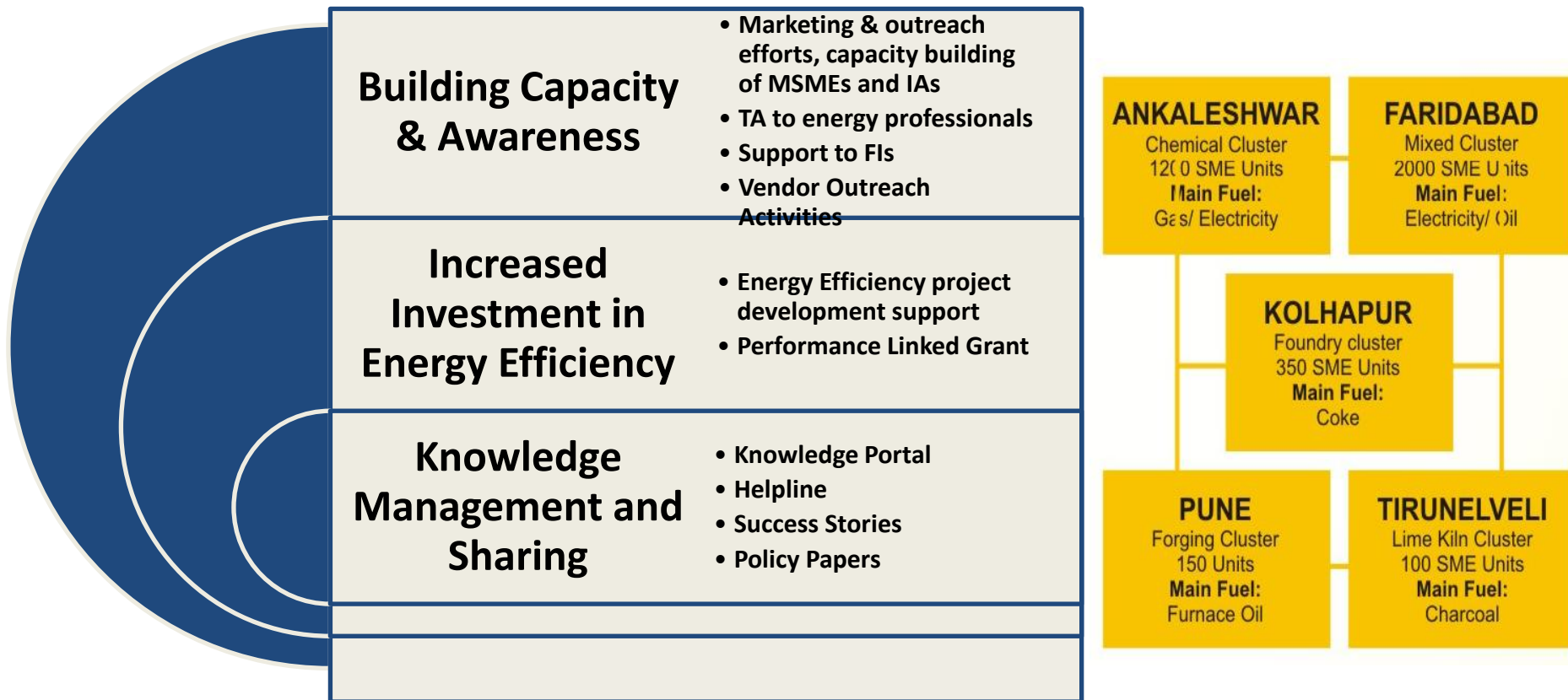
Cluster Name	Small Scale Projects	Energy Savings (MTOE)	CO ₂ Reduction (Tonnes)	Monetary Savings (Lakh ₹)	Investment (Lakh ₹)
Jalandhar	22	338.75	1170.25	72.38	30.23
Coimbatore	20	134.28	1325.83	39.49	19.83
Nagaur	11	13.15	130.21	8.73	4.72
Jamnagar	14	116.50	177.28	91.65	42.54
Khurja	10	85.86	207.12	39.51	8.05
Indore	12	12.27	121.71	9.94	4.20
Gujarat	19	562.51	4063.13	393.22	168.66
Belgaum	25	138.36	249.59	33.59	22.59
Thangadh	17	133.39	1287.33	116.33	137.50
Total	150	1535.07	8732.45	804.84	438.32

Above savings includes replacement of 5500 ceiling fans in various MSME units in Thangadh ceramic cluster with 28W EE ceiling fans and discussions were in progress for another 2000 EE ceiling fans in Thangadh and 1000 EE ceiling fans in Jalandhar.

GEF-BEE-WB Program

Financing Energy Efficiency at MSME

- ❖ The objective is to increase demand for energy efficiency investment in targeted MSME clusters and to build their capacity to access commercial finance.



Major Updates

- Launch of Knowledge Management Portal
www.indiasavesenergy.in
- Toll free helpline 1800 2009 250
- Establishment of KM centre for Motors Efficiency at Faridabad
- Cross cluster KM activities
 - Awareness and Capacity building of Brick manufacturers on Zig-Zag technology and other best practices
 - Foundry clusters across India
- Awareness creation on Energy Management System among MSMEs

Thank You

Initiatives under XII five year plan

- **Sector specific approach for energy efficiency and technology up-gradation through facilitation for implementation of DPRs**
 - Conduction of Walk Through Audits in select industry units to identify the best and most replicable technologies
 - Steering committee to finalize the technologies for demonstration projects
 - Baseline energy Audits to be carried out in the industry units to evaluate the saving potential
- **Technical Assistance and Capacity Building**
 - Conducting workshops in the clusters to disseminate the information on demonstrated technologies and achievements made by the implementation of identified measures
 - Collaborating with technology consultants and experts for sharing the Best Available Technologies (BAT) and Best Operating Practices (BOPs) for these technologies
 - Development of modules and audio-visuals on the various Best Operating Practices (BOPs) to support operators and technicians with easy understanding
- **Project Management through knowledge sharing and coordination mechanism**
 - Carrying out Monitoring and Verification of implemented measures to gauge the actual savings