

Comprehensive report on training need assessment of Local Service Providers (LSPs) Indore Foundry Cluster

Capacity Building of LSPs

GEF-UNIDO-BEE Project Promoting Energy Efficiency and Renewable Energy in selected MSME clusters in India

Prepared for:



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Abbreviations

BEE	Bureau of Energy Efficiency
EE	Energy Efficiency
FD fans	Forced draft fans
ID fans	Induced draft fans
IIF	The Institute of Indian Foundrymen
LSP	Local Service Provider
MSME	Micro, Small & Medium Enterprises
PMU	Project Management Unit
RE	Renewable Energy
SEC	Specific Energy Consumption
TERI	The Energy and Resources Institute
UNIDO	United Nations Industrial Development Organization

1.0 Introduction

Under the GEF-UNIDO-BEE Project 'Promoting Energy Efficiency (EE) and Renewable Energy (RE) in selected MSME clusters in India', The Energy and Resources Institute (TERI) had submitted a proposal for undertaking Capacity building of Local Service Providers (LSPs) to Bureau of Energy Efficiency (BEE). A contract for providing the consultancy services for the ceramic and foundry sectors was awarded to TERI by BEE in September 2017.

The following clusters were assigned to TERI under the project:

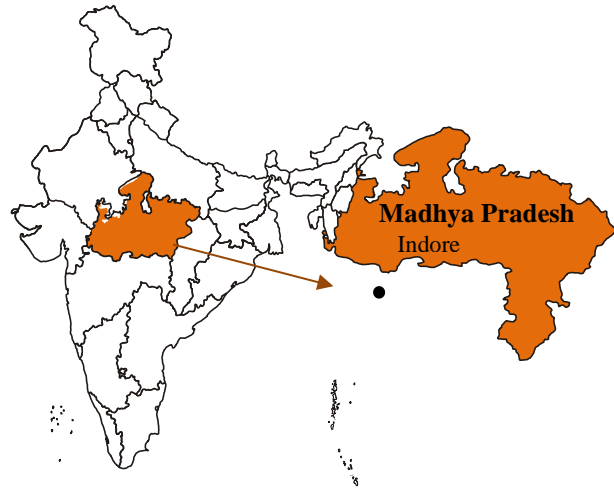
Foundry sector	Ceramic sector
Coimbatore	Thangadh
Belgaum	Morbi
Indore	Khurja

This is the comprehensive report on training needs assessment of LSPs in Indore foundry cluster. The report was prepared based on assessment of the training needs through sample survey of both MSMEs and LSPs in the cluster. This report should be read in conjunction with the LSPs mapping report on demand and supply needs of local industries, prepared by TERI under the project.

2.0 Assessment of the cluster

2.1 About the cluster

Indore located in the state of Madhya Pradesh, is an important industrial cluster. A large number of small and medium enterprises manufacturing components for the automobile, engineering, railway and infrastructure sectors are located in and around Indore. The foundry industry in Indore came up to cater to the textile machinery



manufacturing units which were required by the cotton mills in the area. Subsequently, the foundry units started catering to the demands of the automobile and engineering industries located in Indore and neighbouring districts.

There are about 25 foundry units in Indore cluster. The cluster is spread across Indore city, Pithampur, Devas and Ujjain. The foundries produce both gray iron and SG iron castings. As per industry estimates, the cluster produces about 3,000 tonnes per month of castings. The castings manufactured in the cluster are for different end-use applications.

There are a number of industry associations in Indore. The nodal industry association for foundry units in Indore is IIF (The Institute of Indian Foundrymen). There are separate industry associations for the major industrial areas like Pithampur and Sanwer Road.

IIF, Indore Chapter was the coordinating industry association in the cluster during project.

2.2 Assessment of LSPs

2.2.1 Assessment of their training needs through sample survey

Between September 2017 to January 2018, TERI conducted sample survey of the MSMEs and LSPs in the cluster.

The objective of the survey was to assess their training needs for selection of the training/capacity building programs topics.

The present capacities, strengths, weakness and training needs of the LSPs in the cluster were assessed. The assessment was based on one-on-one interactions with a number of LSPs and MSMEs as well as structured questionnaire surveys. Based on the assessment, areas of improvement and capacity building of the LSPs were identified.

Specific attention was paid to understand the existing skill sets of LSPs, their education level, nature of services/technologies provided in the cluster, availability of EE/RE technologies and cluster need and requirements.

The LSPs found in the cluster could be categorized into the following broad groups:

S. N.	Group	Remarks
1.	Technology providers	Process and utility equipment
2.	EE/RE system suppliers	Process and utility equipment
3.	Fabricators and maintenance operators	External fabricators are used, most MSMEs employ their own maintenance staff
4.	Technicians	Most MSMEs employ shop floor technicians to operate the process and utility equipment
5.	Others	Local consultants and energy auditors

It was found that there is a close interaction between MSMEs and LSPs in the cluster. During early interactions with the industry association in the cluster, it became evident that some of the technical service providers like maintenance operators and shop floor level technicians are dedicated service providers for one or few MSMEs. Hence, these could be termed as internal LSPs. MSMEs

usually depend upon external LSPs for providing new technologies and equipment. Location of LSP within the cluster is depicted in the LSP-MSME distribution matrix given in table 2.2.1.

Table 2.2.1: LSP-MSME distribution matrix

LSP Group	External LSPs (not dedicated to a particular MSME)	Internal LSPs (dedicated to a MSME)
Technology providers	✓	✗
EE/RE system suppliers	✓	✗
Fabricators and maintenance operators	✓	✓
Technicians	✓	✓
Others	✓	✓

It was evident that several LSPs especially falling under the categories – fabricators and maintenance operators and technicians – are dedicated to one MSME. Considering this, IIF, Indore Chapter recommended TERI to also include both LSP categories – external and internal – for the training, so that the cluster gets benefited overall, from the capacity building programs to be organized under the project.

Sample size

About twenty LSPs located in the cluster were randomly selected for the survey. Efforts were made to include LSPs from all the five groups. Interviews were then conducted with them through telephone as well as face-to-face meetings.

Study design

A qualitative approach was used to collect the information. The rationale was to profile the LSPs, identify their needs and quantify their demand for capacity building. The questionnaire designed for the survey was piloted among 2-3 LSPs initially. The difficulties identified during the pilot were used to modify the questionnaire for the rest of the survey. Structured questionnaire was used to capture their responses. Respondents ranged from relatively organized firms providing EE/RE technologies and systems to MSMEs to

relatively smaller partnership/ sole proprietorship firms of local consultants and energy auditors.

Results

The sectoral breakdown of LSPs surveyed was as follows: technology providers (37%), EE/RE system suppliers (20%), local consultants and auditors (20%), fabricators (12%) and technicians (11%). The largest number of LSPs surveyed was from three categories: technology providers, EE/RE system suppliers and local consultants and auditors. It was found that LSPs for almost all the major EE/RE technologies are present in the cluster. Their services ranged from efficient shot blasting machines to automation.

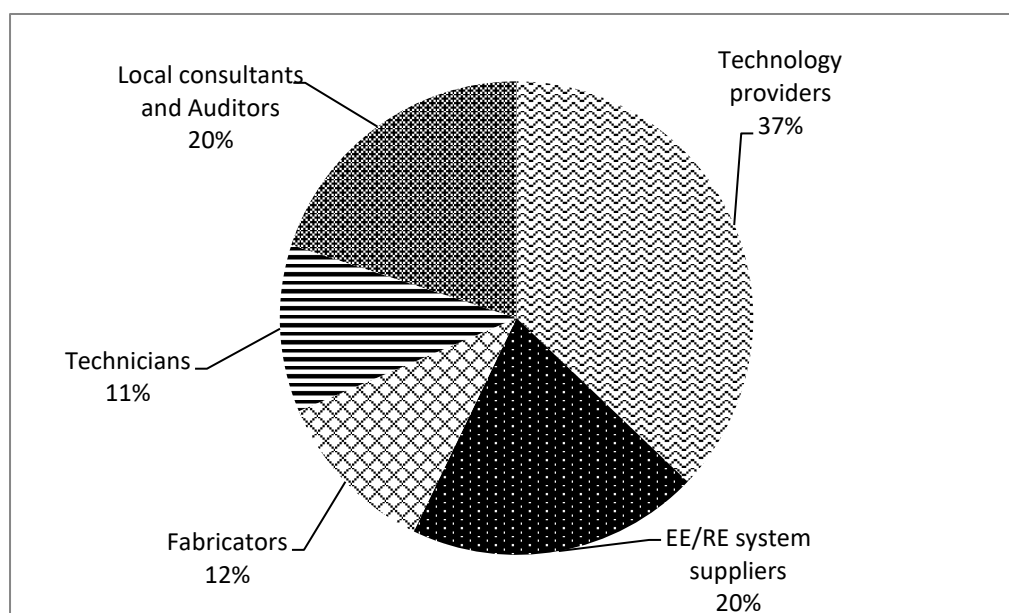


Figure 2.2.1a: Distribution of LSPs surveyed by categories

Nearly half of the LSPs surveyed (55%) had between 10 and 20 number of employees. This was followed by LSPs having more than 20 employees (35%) while a relatively small (10%) of LSPs had less than 10 employees.

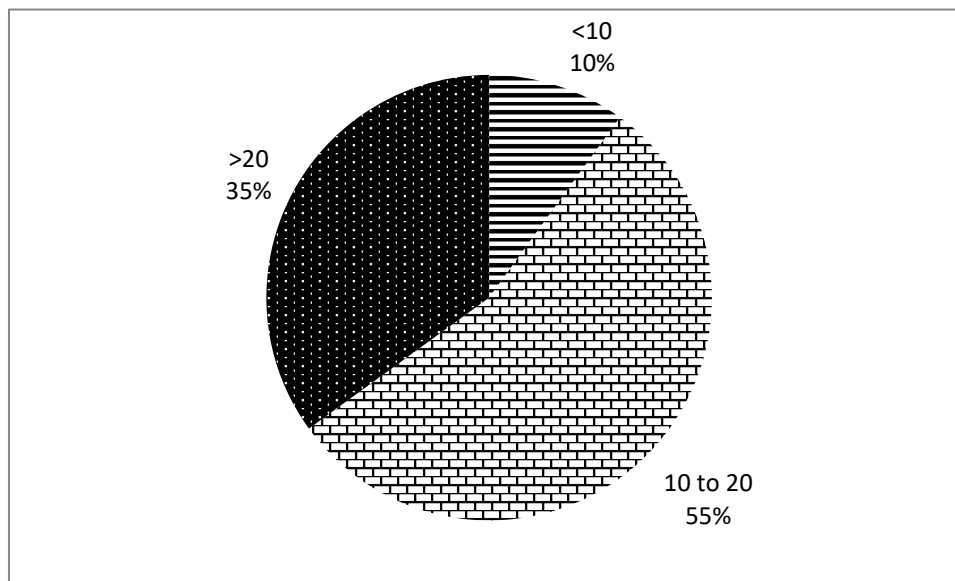


Figure 2.2.1b: Distribution of LSPs surveyed by number of people employed

Maintaining sustainable market linkages

The cluster level survey of LSPs, also revealed some of the common dissemination approaches adopted by LSPs to reach out to MSMEs and maintain sustainable market linkages. These approaches include the following:

- Awareness workshops/ training programs
- Stalls at national/regional level exhibitions/conferences
- Advertisements in trade magazines/journals/directory
- Newsletters/ product brochures/fliers/catalogues/video films
- Direct mailers/telephone calls
- One-to-one meetings
- Organizing group visits to demonstration plants

Interactions with MSMEs during the needs assessment provided insights into the major factors influencing the adoption of EE/RE technologies. These factors are listed below:

- Communication skills of the LSP
- Advantages like cost, energy savings, return on investment etc. of the EE/RE technology

- After sales maintenance/servicing aspects of the technology especially from a local source and
- Financing options available

Further, the specific needs of LSPs were assessed based on qualitative criterion such as the followings.

- Existing skill set
- Education level
- Type of service/technology
- Available EE/RE technologies
- Cluster need and requirements

The findings under each of the above mentioned criteria are discussed below.

Existing skill set

Majority of LSPs surveyed were having high level of skill sets in their core business domains which have been acquired over time through academic qualifications as well as on-the-job work experience. Although having high level of skill-sets in their trade, it was found that the LSPs were keen to acquire new knowledge especially on energy and environment related topics. All the LSPs we spoke to felt that energy and environment related issues are gaining importance because of the rising energy costs and stricter enforcement of environmental norms among foundries. Therefore, most of their clients discuss about new technologies and practices for reducing energy consumption and controlling pollution. The LSPs surveyed expressed interest in enhancing their capacities through training programs related to efficient operation and maintenance of energy intensive equipment like induction furnaces, air compressors, water pumps and pollution control system.

Education level

Owners/ senior managers of most LSPs were found to be highly educated. Almost all of them had undergone education at university/college level, with few having acquired engineering and advanced academic qualifications such as doctorate degrees.

Type of service/technology

Most of the MSMEs and LSPs surveyed said they were satisfied with the services/technology providers currently available/provided within the cluster. Hence there were no major requirements for any additional services in the cluster at present. A few of the MSMEs surveyed suggested additional services for business improvement like pouring automation and reliable environmental solutions provider mainly for design of pollution control systems. Some MSMEs felt that LSPs should also support them in proper operation & maintenance of the EE/RE equipment rather than only on selling new equipment which is the norm at present. Hence there is a good scope to build the capacity of the LSPs on best operating practices of energy intensive equipment as well, since this is usually a neglected area.

Available EE/RE technologies

When respondents were asked about the EE/RE technologies used by them, the most common response was EE lights (LED lamps). Most of the respondents showed interest in use of day lighting and rooftop solar power systems. Although LSPs are available, there is a knowledge gap among user MSMEs about EE technologies in energy intensive areas in a foundry like energy efficient air compressors, pumps and induction furnaces. Most small-scale units showed interest in enhancing their knowledge on selection and operation of energy intensive equipment as well as pollution control system. Hence they recommended TERI to devote more time on best/improved operating practices of key energy-intensive equipment under the capacity building programs.

2.2.2 Cluster need and requirements

Electric motors are widely used in foundry industry for different applications like water pumping, induced draft (ID)/ forced draft (FD) fans, sand plant, sand mixers and so on. Most of the electric motors being used by foundries are old and have been rewound several times. The foundries also do not maintain historical records of the number of times the motor has been rewound. The survey showed that there was lack of awareness among LSPs about the importance of proper motor rewinding practices for energy efficiency. LSPs,

particularly in five categories – technology providers, EE and RE system suppliers, fabricators & maintenance operators and technicians – felt that capacity building on improved rewinding practices of electric motors will be of use to them.

Compressed air and water pumping consume the second highest amount of energy, after induction furnace, in a typical induction route foundry unit. However, as these equipments are not part of the core plant and machinery of a foundry, their operation is often neglected. Hence there was a well felt need to among LSPs, mainly across four categories – EE and RE system suppliers, fabricators & maintenance operators, technicians and local consultants & energy auditors – for a capacity building program on energy conservation focusing on best operating practices in compressed air and cooling water systems.

Capacity building on energy conservation, particularly in melting was expressed by many LSPs. Melting is also the most energy-intensive operation in a foundry operation. Most of the foundries in the cluster use induction furnace for melting. There is large variation in the energy performance in terms of the specific energy consumption (SEC) achieved of the induction furnaces among foundries. The variation in SEC is primarily due to differences in operating practices. Hence, LSPs, under all the five categories – technology providers, EE and RE system suppliers, fabricators & maintenance operators, technicians, and local consultants & energy auditors – expressed interest to learn about energy conservation in melting furnaces.

Various pollution control systems such as scrubbers, cyclones and bag filters are used by the foundry units. These systems are usually designed by local fabricators who are not well versed with the design intricacies of such systems. Moreover, most of the fabricators and consultants interviewed have little knowledge of methods to reduce pollution at source in a foundry and on the selection of the right pollution control system for their application. Hence a dedicated training program on pollution control system was recommended by the LSPs from different categories like technology providers, EE and RE

system suppliers, fabricators & maintenance operators and local consultants & energy auditors.

2.2.3 Present capacity, strengths, weakness and training needs

The present capacity, strengths, weakness and training needs for the LSPs were assessed in depth. The objective of the exercise was to make an assessment of their expertise with regard to providing technical assistance and advice to MSMEs related to EE/RE technologies and maintaining sustainable market linkages.

A summary of the analysis is given in table 2.2.3.

Table 2.2.3: Summary of present capacity, strengths, weakness and training needs for the LSPs in Indore cluster

Present capacity	Strengths	Weaknesses	Training needs
Electrical technicians & maintenance operators adopt conventional motor rewinding practices	LSPs for different equipment are available within the cluster	Lack of exposure to new technologies/ operating practices related to EE/RE technologies	Good practices in motor rewinding & electrical maintenance
LSPs operate compressed air and cooling water without complete knowledge on best practices	High level of education among LSPs	Limited opportunities to upgrade skills/acquire knowledge on new EE/RE technologies and practices	Energy efficiency improvements in compressed air and cooling water systems
Technicians and other service providers operate melting furnaces to get molten metal without paying attention to energy implications	Cluster association (IIF) has good links with LSPs LSPs are keen to learn/ acquire new skills		Energy Conservation (with focus on melting)
Fabricators, local consultants & energy auditors have limited knowledge on design and performance of pollution control systems			Pollution Control System

2.2.4 Areas of improvisation required for LSPs

The major energy consuming areas in a foundry are the following: melting furnace, compressed air system, cooling water system and electric motor systems. Additionally, selection and operation of pollution control systems is a priority in the cluster.

Based on the assessment of the capacity, strengths, weakness and training needs for the LSPs, relevant topics for training were identified so that all the major energy consuming areas could be targeted.

Based on the needs assessment, the following four topics were hence shortlisted for training:

- Good practices in motor rewinding & electrical maintenance
- Energy efficiency improvements in compressed air and cooling water systems
- Energy conservation (with focus on melting)
- Pollution Control System

2.2.5 Inter-linkage between training topics and LSP categories

The inter-linkages between the identified training topics and the LSP categories are summarized in table 2.2.5.

Table 2.2.5: Training topics and LSP category inter linkage

LSP category → Training area ↓	Technology Providers	EE/RE system suppliers	Fabricators and maintenance operators	Tech-nicians	Local consultants and auditors
Good practices in motor rewinding & electrical maintenance	✓	✓	✓ ✓	✓	×
EE in compressed air and cooling water systems	×	✓	✓	✓	✓ ✓
Energy Conservation (with focus on melting)	✓	✓	✓	✓	✓ ✓
Pollution Control System	✓	✓	✓ ✓	×	✓

Legend

✓ ✓	Very high
✓	High
×	Low

As can be seen from the matrix, many of the topics identified for training are relevant to the different LSP categories.

Subsequently, customized training materials for each of the five LSP categories, keeping in view the topics relevant to them, were prepared.

TERI prepared five customized category-wise training modules. As some of the training topics were relevant across more than one LSP category, the idea of organizing the capacity building workshops around four broad themes was discussed with the industry association and UNIDO-PMU. The idea received support and hence four training programs were organized around four training themes.

3.0 Conclusions

Based on the training needs assessment, the training needs of key cluster actors were identified.

Figure 3.0 summarizes the training areas identified and anticipated outcomes.

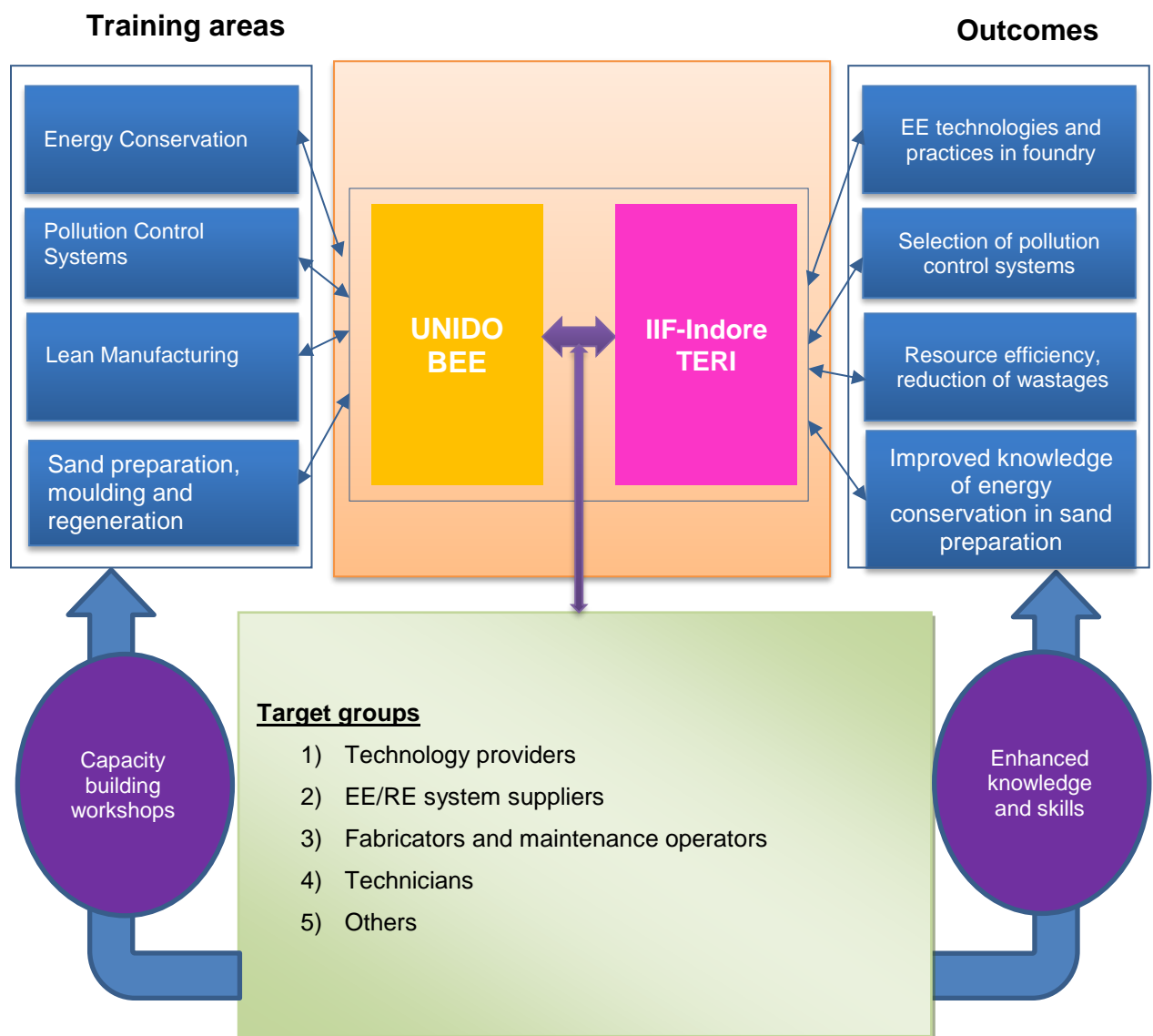


Figure 3.0: Schematic diagram of customized training programs to enhance skills and knowledge

MSMEs are keen to reduce their cost of operation and improve profitability through adoption of techno-economically viable new technologies and practices. The proposed training areas will build the capacities of LSPs in promoting EE/RE technologies among MSMEs and maintaining sustainable

market linkages with them. The capacity building programs will equip LSPs to communicate the cost-benefit of the new technologies through energy as well as resource savings in an effective manner.