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

Capacity Building of LSPs

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

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Abbreviations

BEE	Bureau of Energy Efficiency
CODISSIA	The Coimbatore District Small Industries Association
COFIOA	The Coimbatore Foundry & Industry Owners Association
COINDIA	Coimbatore Industrial Infrastructure Association
COSMAFAN	Coimbatore Tiny & Small Foundry Owners Association
EE	Energy Efficiency
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
SIEMA	The Southern Indian Engineering Manufacturers' Association
TANSTIA	Tamilnadu Small and Tiny Industries Association
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.

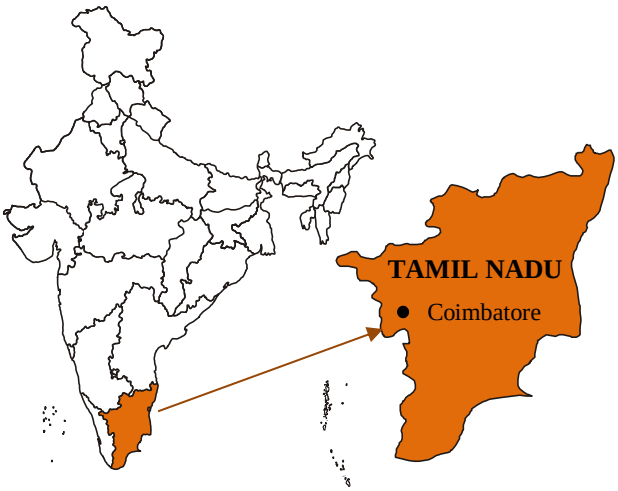
The following clusters were assigned to TERI under the project:

Foundry sector	Ceramic sector
Coimbatore	Thangadh
Belgaum	Morbi
Indore	Khurja

This is the comprehensive report on training needs assessment of LSPs in Coimbatore 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



Coimbatore, located in the state of Tamil Nadu, is an important industrial cluster in India. The industrial cluster developed in the 1930s, with the setting-up of many textiles and spinning units. Initially, the metal casting industry flourished in Coimbatore to cater to the needs of the local textile machinery manufacturers. In 1970s, the wet-grinder was developed in Coimbatore for grinding of rice and lentils used in local recipes. Subsequently, major automobile manufacturing units came up in surrounding areas. The setting-up of these automobile units created a great demand for castings as well. The growth of the agricultural sector resulted in a large demand for pumps to irrigate the land. Presently, Coimbatore is the largest cluster manufacturing 'pump-sets' in India.

The cluster is one of the largest clusters for the production of castings–both ferrous (steel, gray iron, SG iron) as well as non–ferrous (aluminum) in India. There are about 850 foundry units in Coimbatore. As per industry estimates, the cluster produces about 15,000 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 Coimbatore. The major industry associations are the following:

- COINDIA (Coimbatore Industrial Infrastructure Association)
- SIEMA (The Southern Indian Engineering Manufacturers' Association)
- IIF (The Institute of Indian Foundrymen)
- CODISSIA (The Coimbatore District Small Industries Association)

- TANSTIA (Tamilnadu Small and Tiny Industries Association)
- COSMAFAN (Coimbatore Tiny & Small Foundry Owners Association) &
- COFIOA (The Coimbatore Foundry & Industry Owners Association)

COINDIA 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, COINDIA 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 (51%), fabricators (20%), EE/RE system suppliers (14%), technicians (6%) and local consultants and auditors (9%). The largest number of LPSs surveyed was from two categories: technology providers and fabricators. 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.

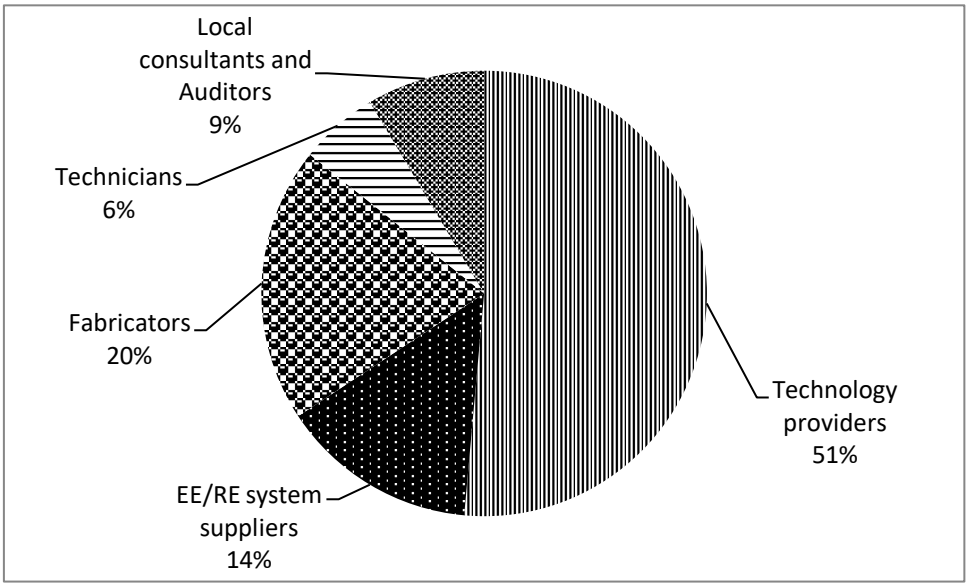


Figure 2.2.1a: Distribution of LSPs surveyed by categories

Nearly half of the LSPs surveyed (50%) had more than 20 number of employees. This was followed by LSPs having between 10 to 20 employees (40%) while relatively small (10%) of them had less than 10 employees.

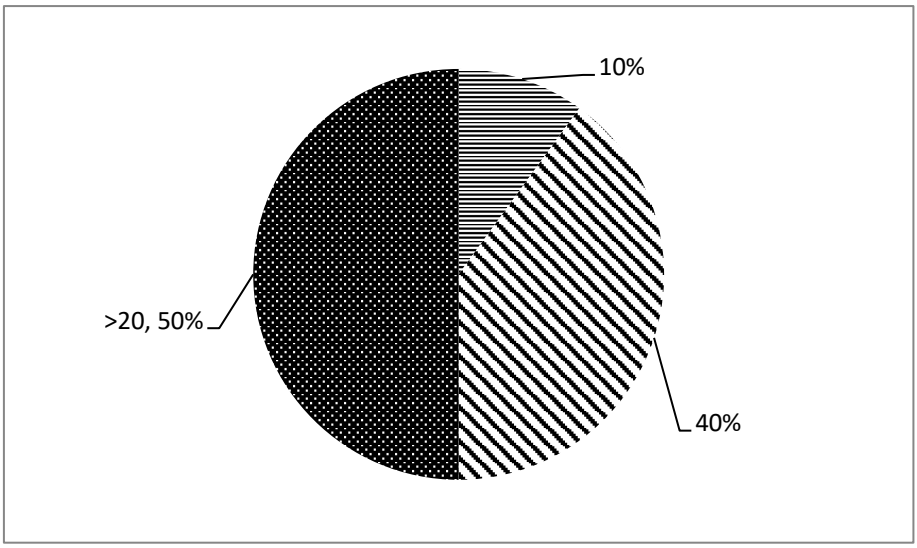


Figure 2.2.1b: Distribution of LSPs surveyed by number of people employed

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, moulding machines, and so on.

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, moulding machines and induction furnaces. Most small-scale units showed interest in enhancing their knowledge on operating practices improvement and lean manufacturing solutions. Hence they recommended TERI to devote more time on best/improved operating practices and lean manufacturing of key energy-intensive equipment under the capacity building programs.

2.2.2 Cluster need and requirements

Melting is the most energy-intensive operation in a foundry operation. Most of the foundries in the cluster use induction furnace for melting. However, 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 is SEC is primarily due to differences in operating practices. Hence, LSPs, especially these falling under the categories – fabricators & maintenance operators, technicians, and local consultants & energy auditors among others – expressed interest to learn about better operating practices of induction furnaces and adoption of lean manufacturing practices.

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 equipment are not part of the core plant and machinery of a foundry, their operation if often neglected. Hence there was a well felt need to among LSPs across all categories – technology providers, 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.

Mixers used in sand preparation and pneumatic jolt-squeeze moulding machines are widely used in Coimbatore foundry industry. Most of the foundries use conventional sand preparation and moulding equipment which are energy inefficient. The foundries also do not monitor the energy consumption of the sand preparation section and are not aware of the efficient equipment in this area. The survey showed that there was lack of awareness among LSPs about energy efficient sand preparation facilities. LSPs, especially in three categories – fabricators & maintenance operators, technicians and local consultants & energy auditors – expressed the need to capacity building on energy efficiency improvement in sand preparation and moulding area.

Various pollution control systems such as scrubbers, cyclones and bag filers 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, technicians 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 Coimbatore cluster

Present capacity	Strengths	Weaknesses	Training needs
LSP across different categories operate compressed air and cooling water without complete knowledge on best practices Inefficient operating practices are followed by most service providers leading to high wastage of resources and energy Fabricators, local consultants & energy auditors have limited knowledge on design and performance of pollution control systems Energy consumption of sand preparation area is neglected	LSPs for different equipment are available within the cluster High level of education among LSPs usually upto college/university level qualifications Cluster association (COINDIA) has good links with LSPs LSPs are keen to learn/ acquire new skills	Lack of exposure to new technologies/ operating practices related to EE/RE technologies Limited opportunities to upgrade skills/acquire knowledge on new EE/RE technologies and practices	Energy Conservation Lean Manufacturing Pollution Control Systems Sand preparation, moulding and regeneration

2.2.4 Areas of improvisation required for LSPs

The major energy consuming areas in a foundry are the following: induction melting furnace, compressed air system, cooling water system and sand preparation. 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:

- Energy Conservation
- Pollution Control Systems
- Lean Manufacturing
- Sand preparation, moulding and regeneration

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	Technicians	Local consultants and auditors
Energy Conservation	✔	✔	✔	✔	✔ ✔
Pollution Control Systems	✔	✔	✔ ✔	✕	✔
Lean Manufacturing	✔	✔	✕	✔	✕
Sand preparation, moulding and regeneration	✕	✕	✔	✔ ✔	✔

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 theme was discussed with the industry association and UNIDO-PMU. The idea received support and hence four training programmes 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.