Comprehensive report on training need assessment of Local Service Providers (LSPs)
Thangadh Ceramic 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
DPR	Detailed Project Report
EE	Energy Efficiency
ESCOs	Energy Service Companies
FD	Forced Draft
ID	Induced Draft
LSPs	Local Service Providers
MSMEs	Micro, Small & Medium Enterprises
PCAVT	Panchal Ceramic Association Vikas Trust
RE	Renewable Energy
SEC	Specific Energy Consumption
TERI	The Energy and Resources Institute
UNIDO	United Nations Industrial Development Organization
WHR	Waste Heat Recovery

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.

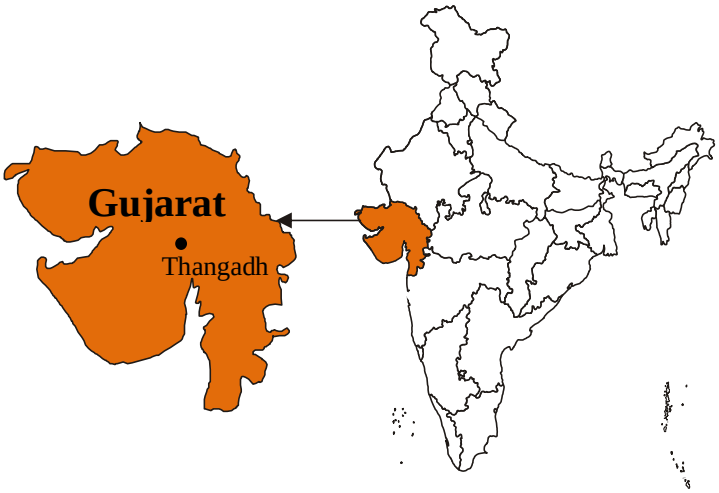
The following clusters were assigned to TERI under the project:

Foundry sector	Ceramic sector
Coimbatore	Thangadh
Belgaum	Morbi
Indore	Khurja

This is the comprehensive report on training needs assessment of LSPs in Thangadh sanitary ware 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



Thangadh is one of the large ceramic clusters located in Gujarat close to Morbi ceramic cluster. Thangadh is a Nagar Panchayat located in Chotila tehsil of Surendranagar district. It is located 22 km north of Chotila on District Road which further connects to Sara and Halvad in the north. The cluster is engaged in the production of sanitary wares. The basic raw material, fire clay, is locally available. Most of the wall and floor tile units established earlier in the cluster have now closed down but the sanitary-ware and refractory units are flourishing. There are about 225 ceramic units operating in the cluster engaged in the production of sanitary-ware, refractory, wall tile and art tile

The major industry association working for the development of the ceramic units in the cluster is Panchal Ceramic Association Vikas Trust (PCAVT). PCAVT 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, BFC 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: EE/RE system suppliers (38%), fabricators (14%), technology providers (29%), technicians (5%) and local consultants and auditors (14%). Largest number of LPSs surveyed was from two categories: EE/RE system suppliers and technology providers. It was found that majority of LSPs are present in the nearby clusters i.e. Rajkot and Morbi district. Their services include energy efficient electric motors, fans, PV solar system and Kiln fabrication.

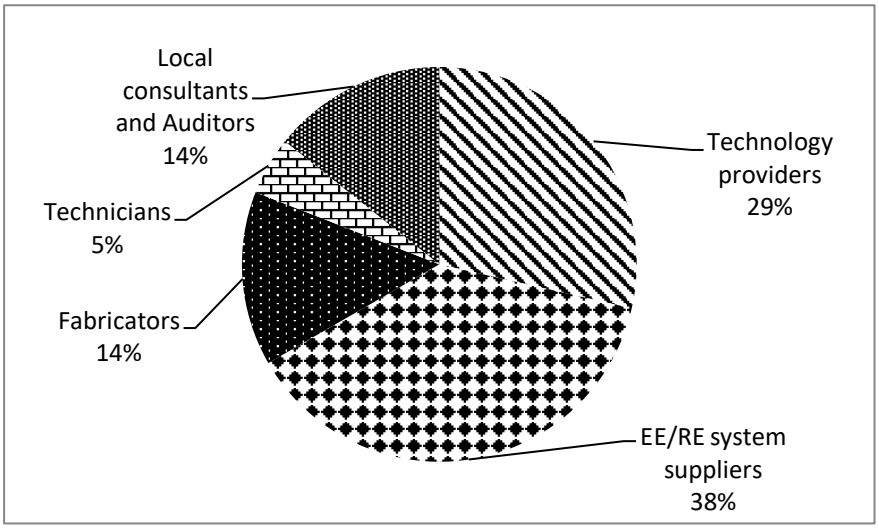


Figure 2.2.1a: Distribution of LSPs surveyed by categories

Nearly half of the LSPs surveyed (45%) had more than 20 number of employees. This was followed by LSPs having less than 10 employees (35%) while relatively small (20%) of them having between 10 to 20 employees.

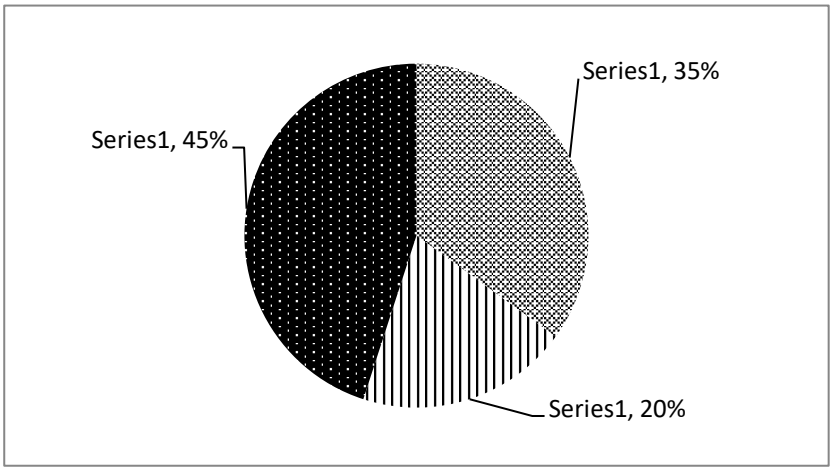


Figure 2.2.1b: Distribution of LSPs surveyed by number of people employed

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 vibrant ceramic and other 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 adequate 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 efficient technologies and best operating practices related issues are gaining importance because of the rising energy cost as well as competition in the similar field. Therefore, most of their clients discuss about new EE and RE technologies and practices for reducing energy consumption and maintenance free operation. The LSPs surveyed expressed interest in enhancing their capacities through training programs related to efficient operation and maintenance of energy intensive equipment like Kiln and associated system, electric motors, motor rewinding, compressed air distribution system and so on.

Education level

Owners/ senior managers of most LSPs were found to be adequate educated. Almost all of them had undergone education at university/college level, with few having acquired engineering and management qualifications such as MBA 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. However some of the MSME units felt that there is a need of process automation tools to optimize the operations in kiln associated system. Hence there were no major requirements for any other additional services in the cluster at present. A few of the MSMEs surveyed suggested additional services for business improvement like ESCOs and reliable environmental solutions provider mainly for disposal of their solid wastes. Some MSMEs felt that LSPs should also support them in proper operation & maintenance of the EE 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 solar PV systems. Although LSPs are available, there is a knowledge gap among user MSMEs about EE technologies in energy intensive areas in a ceramic industries like electric motors, energy efficient air compressors and kilns. Most small-scale units showed interest in enhancing their knowledge on best operating practices in Kilns and associated system as well as motor rewinding. 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

Kiln is the most energy-intensive operation in ceramic manufacturing. Most of the sanitary ware units in the cluster use tunnel kiln for melting. However, there is large variation in the energy performance in terms of the specific energy consumption (SEC) achieved among the units. 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 among others – expressed interest to learn about better operating practices of Kiln and associated system.

There exists a large technology up gradation potential among Sanitaryware manufacturing units. Some of the major processes/sections for technology up gradation include raw material preparation (high alumina grinding media, electric motors and mechanical power transmission), Kiln (EE burners, automation and productive management tools) and utility (fans, air compressors, etc.). Most of the MSME units are getting information through the existing vendors/suppliers of the technology. The survey showed that there is a lack of awareness from demand and supply side among LSPs on

EE and RE technologies used and available for sanitaryware industries. 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 Efficiency and Renewable Energy Technologies.

Electric motors are widely used in ceramic industry for different applications like raw material preparation (ball mill), mould drying (fans), induced draft (ID)/ forced draft (FD) fans (kiln) and so on. Most of the electric motors being used by sanitaryware industries are old and have been rewound several times. The units 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. The technology providers and technicians felt that capacity building on improved rewinding practices of electric motors will be of use to them.

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Ball mills, compressed air and fans consume the second highest amount of energy, after kiln in sanitaryware manufacturing, however, as these equipments are not part of the core plant and machinery and 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 best operating practices Energy efficient and Renewable Energy (EE/ RE) Technologies & BoPs.

Thermal energy, mainly in form of gas are used in drying application in pusher type tunnel kilns which is most common in sanitaryware units of Thangadh cluster. Often there is relatively less focus among LSPs on energy conservation in these applications. There are several energy efficient technologies like air-to-fuel ratio controller, waste heat recovery, low thermal mass kiln furniture, improved insulation and kiln cart automation which could be adopted in sanitaryware units. Hence a dedicated training program on Kiln (Burner, automation and waste heat recovery) was recommended by LSPs from different categories like 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 Thangadh cluster

Present capacity	Strengths	Weaknesses	Training needs
Fabricators and technician follows the conventional method of Kiln fabrication and operation based on previous installations. Electrical technicians & maintenance operators adopt	Large number of experienced fabricators and maintenance operators for kiln are available in the cluster	Lack of exposure to new technologies/ operating practices in EE/RE technologies Technical representatives of	Energy Efficiency and Renewable Energy Technologies Good practices in

Present capacity	Strengths	Weaknesses	Training needs
conventional motor rewinding practices System suppliers/ local consultants focus more towards capital cost of technology without paying attention to operating cost and energy implications	LSPs are active in promotion of services and willing to learn/ acquire new skills LSPs cater to a diverse range of products/processes among MSMEs	large process machinery suppliers are not present in the cluster. Only sales representatives are available Limited avenues to upgrade skills/acquire knowledge on new EE/RE technologies	motor rewinding Energy efficient and Renewable Energy (EE/ RE) Technologies & BoPs Kiln (Burner, automation and waste heat recovery)

2.2.4 Areas of improvisation required for LSPs

The major energy consuming areas in a sanitaryware manufacturing are the following: Kiln, ball mills, fans, compressed air system and electric motors.

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 Efficiency and Renewable Energy Technologies
- Good practices in motor rewinding
- Energy efficient and Renewable Energy (EE/ RE) Technologies & BoPs
- Kiln (Burner, automation and waste heat recovery)

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 Efficiency and Renewable Energy Technologies	✔	✔	✔	✔	✔
Good practices in motor rewinding	✔	✘	✘	✔ ✔	✘
Energy efficient and Renewable Energy (EE/ RE) Technologies & BoPs	✔	✔	✔	✔	✔
Kiln (Burner, automation and waste heat recovery)	✘	✔	✔ ✔	✔	✔

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 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.

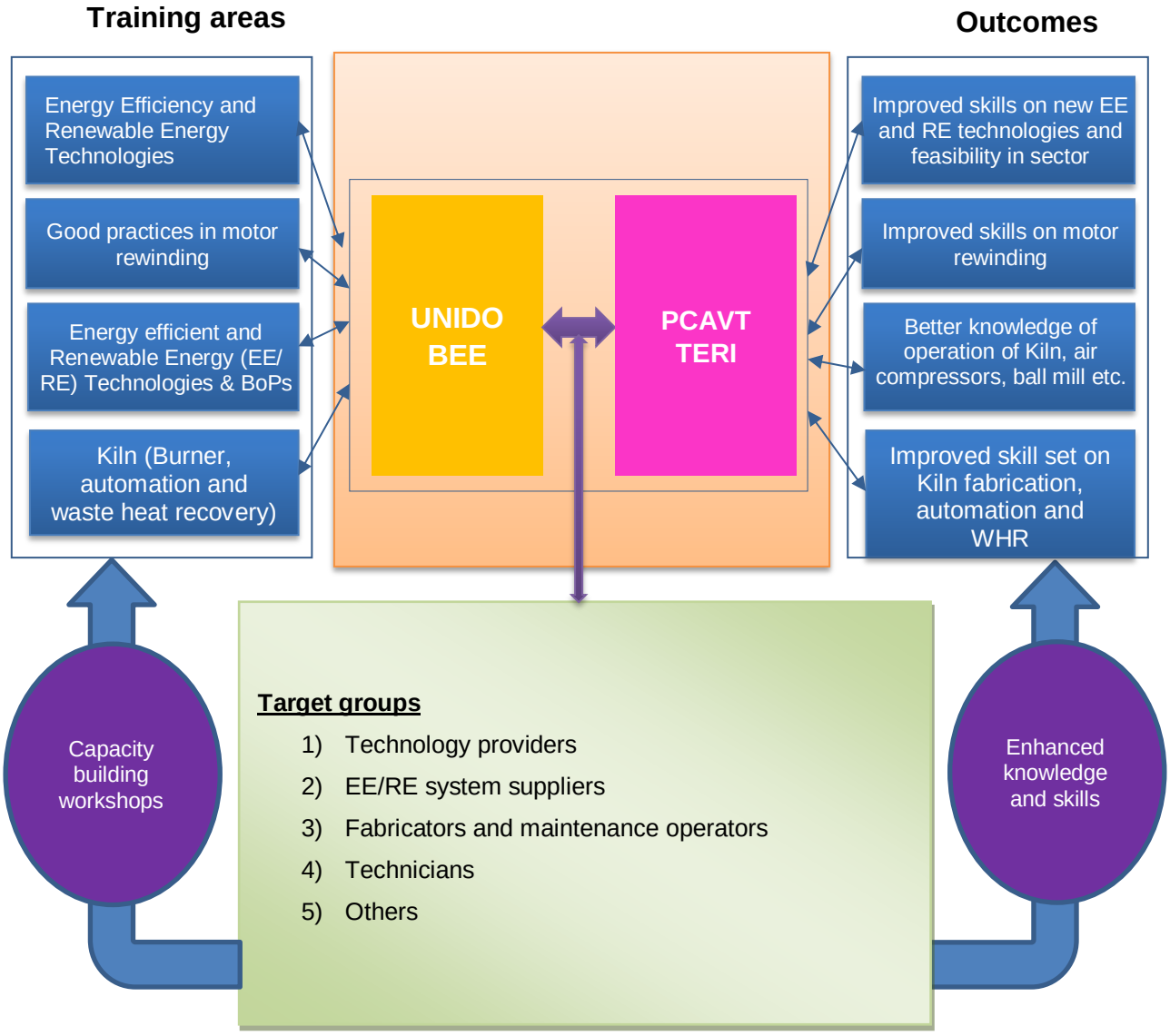

Figure 3.0: Schematic diagram of customized training programs to enhance skills and knowledge

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