# Comprehensive report on training needs assessment of Local Service Providers (LSPs) Morbi Ceramic Cluster

## Capacity Building of Local Service Providers (LSPs)

## GEF-UNIDO-BEE Project Promoting Energy Efficiency and Renewable

*Prepared for:*

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## Disclaimer

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# Abbreviations

| | |
|---|---|
| O&M | Operations and Maintenance |
| BEE | Bureau of Energy Efficiency |
| ITI | Industrial Training Institute |
| EE | Energy Efficiency |
| PMU | Project Management Unit |
| LSP | Local Service Provider |
| MSME | Micro, Small & Medium Enterprises |
| RE | Renewable Energy |
| TERI | The Energy and Resources Institute |
| UNIDO | United Nations Industrial Development Organization |
| ESCOs | Energy Service Companies |

# 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.

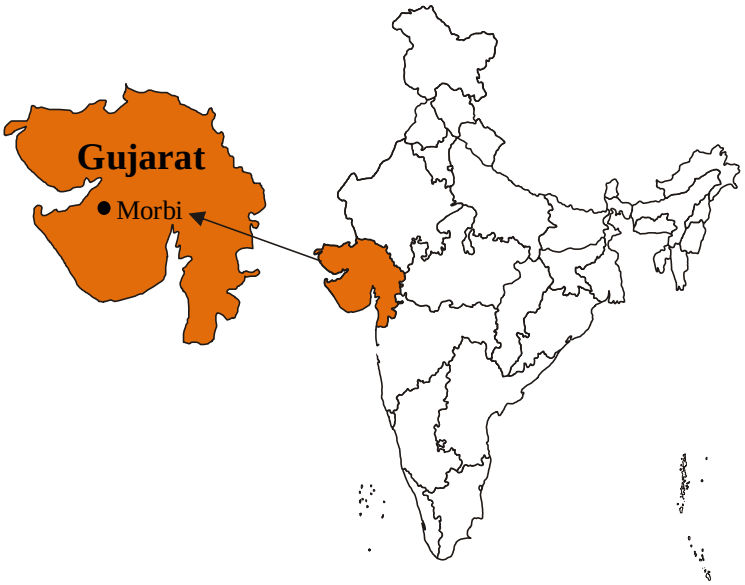
The following clusters were assigned to TERI under the project:

| Foundry sector | Ceramic sector |
|---|---|
| Coimbatore | Thangadh |
| Belgaum | Morbi |
| Indore | Khurja |

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




Morbi, located in the state of Gujarat, is the largest ceramic cluster in India. Morbi is 247 km away from Ahmadabad. National Highway no 8/A is flanked by ceramic factories and this cluster is spread up to Wankaner city. The Morbi ceramic cluster produces wall tiles, floor tiles, vitrified tiles, polished glazed vitrified tiles, twin charged tiles, multi-colour charged tiles in various formats starting from 20x30 cm to 120 x180 cm in a wide range of designs and colours. It also produces sanitary ware, industrial ceramics and technical ceramic products. The basic raw materials for manufacturing of tiles like red and black soil are available in surrounding areas of Morbi while lignite is procured from Kutch, not far away from Morbi.

There are about 459 units operating in the cluster. Out of these around 178 are wall tiles units, 52 are floor tiles units, 26 are vitrified tile units and 43 are sanitary ware units. There are about 40 units which manufacture spray dried mud which is supplier to the smaller units. In addition, there are about 120 units producing roofing tiles also but their production is seasonal units.

The industry association working for the development of various ceramic units in the cluster is the Morbi Ceramics Associations. This association is having four divisions i.e. wall tiles division, vitrified tiles division, floor tiles division and sanitary wares division.

The Morbi Ceramics Associations was the nodal association for the project activities in the cluster.

## 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, Morbi Ceramics Associations 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 (36%), technology providers (36%), local consultants and auditors (14%), fabricators (9%) and technicians (5%). 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 cluster as well as nearby district i.e. Rajkot. Their services include energy efficient kiln and ceramic machinery such as press, etc. and utility equipment like electric motors, fans, solar PV system and burner assembly.

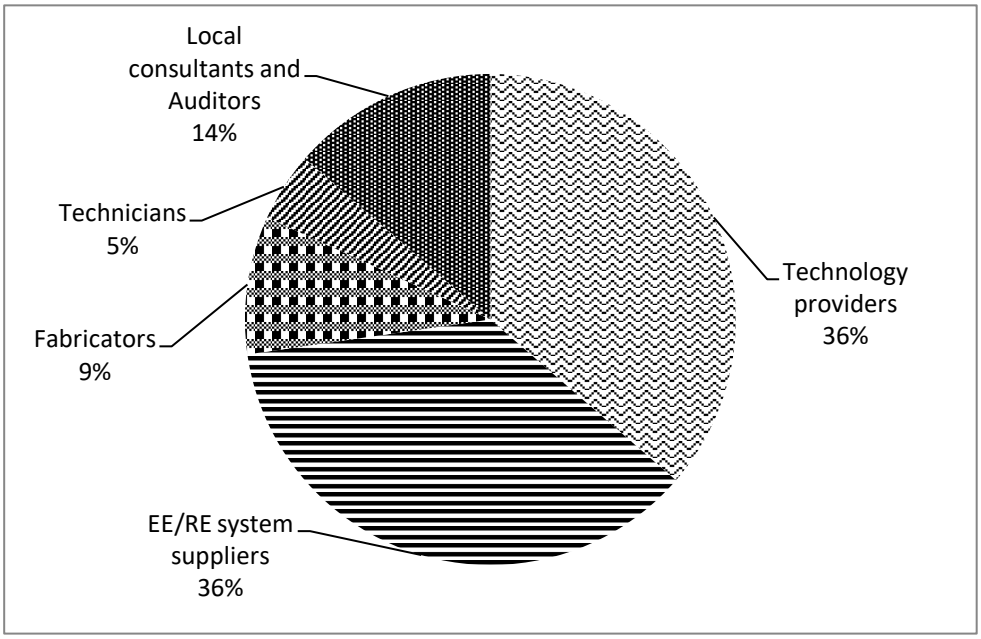



**Figure 2.2.1a: Distribution of LSPs surveyed by categories**

Nearly half of the LSPs surveyed having less than 10 employees (43%) followed by LSPs having more than 20 numbers of employees (38%). The LSPs having numbers of employees between 10 to 20 were relatively small (19%).

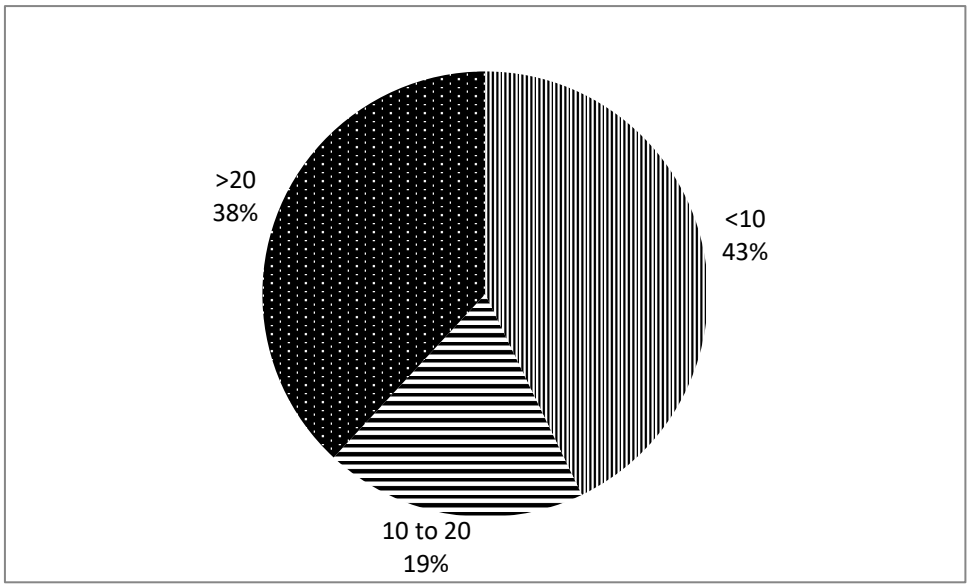



**Figure 2.2.1b: Distribution of LSPs surveyed by number of people employed**

### 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:

- Hoardings on national highway as most of the ceramic units located around the 8-A National Highway.
- Stalls at vibrant ceramic and other national/ regional level exhibitions/conferences
- Organizing group visits to demonstration plants in India and origin countries
- Advertisements in trade magazines/journals/directory
- Newsletters/ product brochures/fliers/catalogues/video films
- Direct mailers/telephone calls
- Awareness workshops/ training programs

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, spray dryers, 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 energy efficient kiln system, EE lights (LED lamps), IE3 motors, etc. Most of the respondents showed interest in EE compressor, energy optimization in raw material preparation. 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

Electric motors are widely used in ceramic industry for different applications like raw material preparation (ball mill), slurry drying (spray dryers), press machines, kilns, polishing machine and so on. Most of the electric motors being used by ceramic tile making 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 to maintain the design efficiency. Also, there is a need for better knowledge on operational efficiency improvements of electric motor driven systems. Three categories of LSPs - technology providers, fabricators & maintenance operators and technicians - felt that capacity building on improved rewinding practices of electric motors and electrical maintenance would be useful to them.

There is a significant scope for adoption of EE & RE technologies in some of the processes/sections. Some of the example discussed during the survey are optimization of specific power consumption, premium efficiency class motors, and mechanical power transmission (raw material preparation), optimization of hot air temperature and flow rate to maintain the drying efficiency (spray dryers), EE burners, insulation, automation and productive management tools (Kiln) and utility (fans, air compressors, etc.). The survey showed that there is a lack of awareness from demand and supply side among LSPs on EE and RE technologies. 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 (EE/RE) Technologies.

Kiln is the most energy-intensive operation in ceramic manufacturing. Most of the ceramic units in the cluster use tunnel kiln. However, there is large variation in the energy performance in terms of the specific energy consumption (SEC) achieved in the existing kilns. The variation is SEC is primarily due to differences in technology employed and operating practices.

Hence, LSPs, especially these falling under all categories – technology providers, EE and RE system suppliers, fabricators & maintenance operators, technicians and local consultants & energy auditors – expressed interest to learn about EE technologies and better operating practices of Kiln and associated system.

The auxiliaries such as ball mills, air compressors and fans consume the second highest amount of energy, after kilns in tile manufacturing. Since, these equipments are not part of the core plant and machinery, their operation is often neglected. Hence there was a well felt need among LSPs across four categories – EE and RE system suppliers, fabricators & maintenance operators, technicians and local consultants & energy auditors – for a capacity building program on best operating practices and O&M in ceramic industries.

### 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 Morbi ceramic cluster**

| Present capacity | Strengths | Weaknesses | Training needs |
|---|---|---|---|
| Servicing staff, electrical technicians & maintenance operators adopt conventional motor rewinding practices<br><br>Most of the LPSs focus more towards minimising 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<br><br>LSPs cater to a diverse range of products/processes among MSMEs | Lack of exposure to new technologies/ operating practices in EE/RE technologies<br><br>Only sales representatives are available in the cluster. Technical | Good practices in motor rewinding<br><br>Energy Efficiency and Renewable Energy Technologies |

| Present capacity | Strengths | Weaknesses | Training needs |
|---|---|---|---|
| A mix of modern and conventional kiln technologies can be seen in the cluster. Units operating modern kilns are still working with existing technicians and operators who have not gone through training to handle the new technologies. Fabricators and technician follows the conventional method of Kiln fabrication and operation based on previous installations. | Large numbers of service providers (fabricators and maintenance operators) for kiln are available in the cluster. | representatives of large process machinery suppliers are available on need base or during the commissioning of project. Limited avenues to upgrade skills/acquire knowledge on new EE/RE technologies. The ITI in the cluster offers limited courses on ceramic process. | Energy efficiency in Kiln and associated systems<br><br>Best operating practices and O&M in ceramic industries |

### 2.2.4 Areas of improvisation required for LSPs

The major energy consuming areas in ceramic industries are the following: Kiln and associated auxiliaries, spray dryers, ball mills, compressed air systems 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:

- Good practices in motor rewinding & electrical maintenance
- Energy efficient and Renewable Energy (EE/RE) technologies
- Energy efficiency in Kiln and associated systems
- Best operating practices and O&M in ceramic industries

## 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 |
|---|---|---|---|---|---|
| Good practices in motor rewinding & electrical maintenance | ✔ | ✘ | ✔ | ✔ ✔ | ✘ |
| Energy efficient and Renewable Energy (EE/RE) technologies | ✔ | ✔ | ✔ | ✔ | ✔ |
| Energy efficiency in Kiln and associated systems | ✔ | ✔ | ✔ ✔ | ✔ | ✔ |
| Best operating practices and O&M in ceramic industries | ✘ | ✔ | ✔ ✔ | ✔ ✔ | ✔ |

| 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.

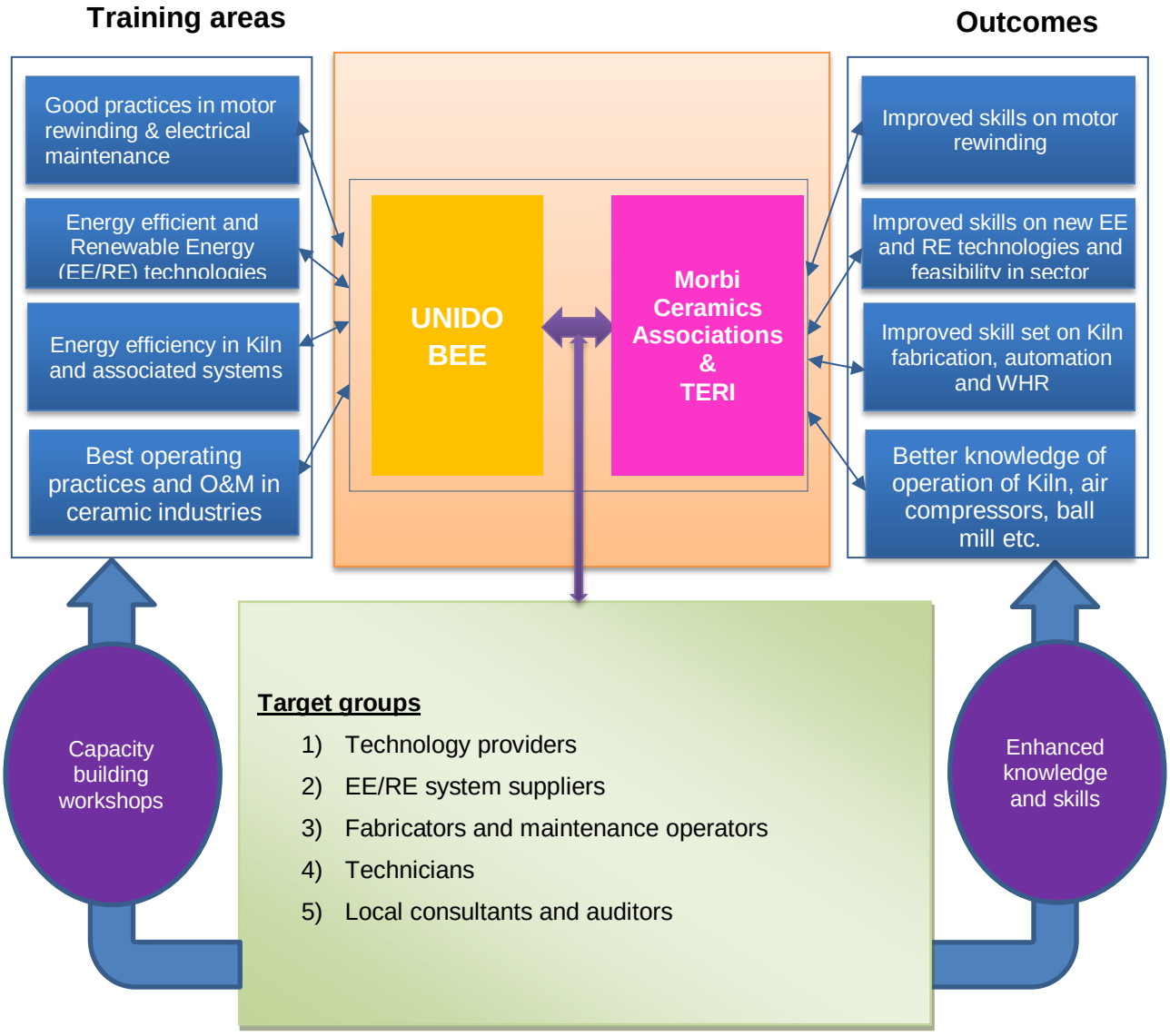



**Figure 3.0: Schematic diagram of customized training programs to enhance skills and knowledge**

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.