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**CAPACITY BUILDING OF LOCAL
SERVICE PROVIDERS (LSP) UNDER
GEF-UNIDO-BEE PROJECT
“PROMOTING EE/RE IN SELECTED
MSME CLUSTERS IN INDIA”
Final Closing Report
Jalandhar Hand Tool Cluster**

Submitted to
(Prepared under GEF-UNIDO-BEE Project)



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List of Abbreviations

BEE	Bureau of Energy Efficiency
CO ₂	Carbon dioxide
DPR	Detailed Project Report
EE	Energy Efficiency
FI	Financial Institution
GEF	Global Environmental Facility
LSP	Local Service Provider
MSME	Micro and Medium Scale Industries
OEM	Original Equipment Manufacturer
RE	Renewable Energy
TOE	Tonnes of Oil Equivalent
UNIDO	United Nations Industrial Development Organisation

EXECUTIVE SUMMARY

Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India, in collaboration with United Nations Industrial Development Organization (UNIDO) is executing a Global Environment Facility (GEF) funded national project “Promoting energy efficiency and renewable energy in selected MSMEs clusters in India”.

The overall 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 12 selected energy-intensive MSMEs clusters across 5 sectors in India (with expansion to more clusters later). This will enable improvement in the productivity and competitiveness of units, as well as reduce overall carbon emissions and improve the local environment. The main objective of the project is to increase the capacity of suppliers of EE/RE product and service providers. It also aims at implementing the identified projects and technological practices by MSME’s.

The major focus areas of the project activities were:

- Capacity Development of Local Service Providers (LSP) in the cluster on aspects of energy efficiency. The capacity development activities were preceded by comprehensive LSP mapping exercise and training need assessment for LSPs.
- Identification of 10 technologies that can led to significant improvement in improving energy efficiency and these technologies are to supported by preparation of Detailed Project Report (DPR) which can be further considered for implementation by the MSME units.

Through the activities in the above area following were the expected outcomes of the project activities:

1. Creating a scope for energy savings, by increasing the level of end-use demand and implementation of energy efficiency and renewable energy technologies
2. Improving the productivity and competitiveness of units
3. Reducing overall carbon emissions and improving the local environment
4. Increasing the capacity of energy efficiency and renewable energy product suppliers,
5. Strengthening policy, institutional and decision-making frameworks
6. Scaling up of the project to a national level

One of the clusters under the project activity was – “Jalandhar Hand Tool Cluster” which is one of the major Hand Tool cluster in India.

Project Closure Report

The project was carried out by implementation of activities under 4 phases, the work packages were finalized in consultation with the project partners and key stakeholders. Following table highlights the activities and deliverables under each phase:

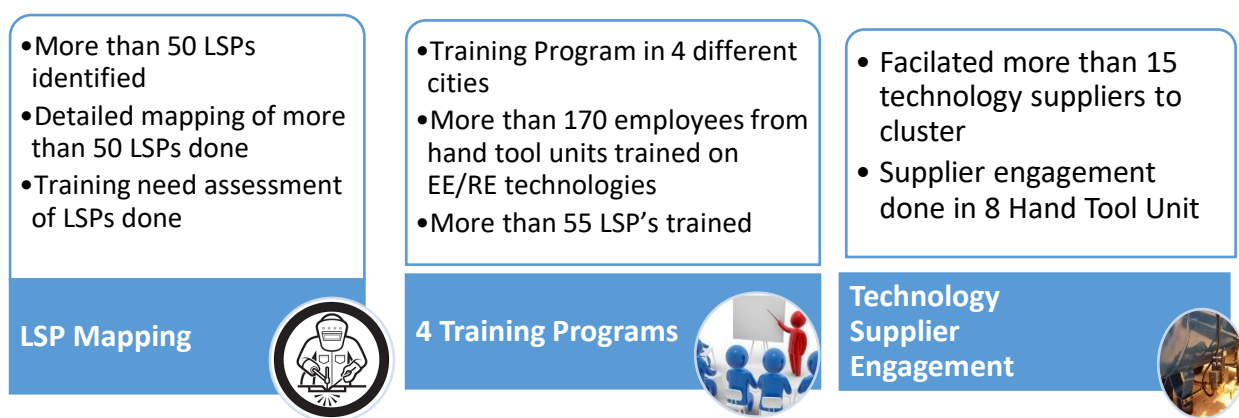
Table 1: Project Phases

Phases	Deliverables
Phase 1 - Stakeholder Consultation	<ul style="list-style-type: none"> • Inception Report • List of LSPs in each cluster
Phase 2 - LSP Mapping & LSP Training Need Assessment	<ul style="list-style-type: none"> • Comprehensive LSP mapping report • Comprehensive report on training need assessment of LSPs
Phase 3 - Targeted capacity development programs and augmenting capacity of LSP	<ul style="list-style-type: none"> • 5 Comprehensive category wise training materials per cluster • Proceedings of 4 training programs in each cluster • OEM and LSP Engagement
Phase 4 - Development of bankable DPR's for 10 technologies in each cluster	<ul style="list-style-type: none"> • 10 bankable DPRs in each cluster, with details of submission to banks for possible financing (max of 2 DPR for single technology)

Following are the key activities and outcomes at Jalandhar Hand Tool Cluster:

1. Cluster specific list of LSPs under various service categories
2. Comprehensive LSPs mapping based on demand and supply needs of local industries
3. Comprehensive training need assessment of LSPs
4. Comprehensive category wise training material for each cluster
5. Four training/capacity building workshops in various region of Cluster
6. Identification of high potential energy efficient technologies and preparation 10 bankable DPRs on those technologies

Following is the summary of the activities at Jalandhar Hand Tool Cluster



LSP Categories

LSP Mapping: The first key activity under the project was conducting LSP Mapping exercise for the Hand Tool Cluster. The objective of the mapping was to identify the LSPs based on the demand and supply needs of Tools units against available local service providers in the cluster and nearest locations. The LSPs were identified based on the major process and operations involved in the Hand Tool units.

Plant Level
Process Level
Equipment Level
Operator Level

Local service providers in the Hand Tool Cluster majorly comprises of maintenance operators, technicians, fabricators, energy auditors, engineering consultants, plant design engineers and other people who frequently provide their services to Hand Tool plants.

Comprehensive LSP data was collected through meeting with service providers and through various interaction with stakeholders. The LSP were analyzed based on existing skill sets, employee strength, years in service and possible area for improvement through training and capacity development. More than 75 LSPs were visited and interviewed and analysis and detailed outcome of the mapping exercise is provided in report.

LSP Training Need Assessment: One of the major activities of the LSP mapping exercise was also to assess the training requirement of LSPs to accelerate energy efficiency adoption in the cluster. The training need assessment was carried out by doing desk analysis followed by interviews and interaction with the stakeholders. These meetings helped us in understanding the perceptions of different stakeholders in terms of training needs, what are the areas of improvement, various gaps that exists in terms of technology/services. The survey was conducted for around 50 LSPs and some of the major hand tool units in the cluster. Based on the survey, the gaps were identified for incorporating energy efficiency consideration in their services and based on this the training programs modules were prepared for capacity development programs.

Capacity Development Programs: One day training programs were organized in Jalandhar Hand Tool Cluster to train the local service providers and hand tool units on best operating practices, latest technologies/innovations and to create awareness on importance of energy efficiency and renewable energy. The workshops provided a platform to interact with 170+ stakeholders in the cluster. Following are the key indicators for the workshops:

Table 2: Workshop key indicators

Dates	Location	Workshop Theme	No of LSPs/OEMs	Total No of Participants
09-May-18	Jalandhar	Electrical & Utilities, Thermal Utilities, Renewable Energy & Electroplating	59	170
12-Jun-18	Jalandhar			
26-Jun-18	Jalandhar			
10-Jul-18	Jalandhar			

Detailed Project Report on Energy Efficiency and Renewable Energy Technologies: In addition to the focus on LSP capacity development, one of the major activities under the project was to identify the high energy efficient technologies in the cluster that can be implemented by the industries. The detailed project report was prepared for energy efficient technologies considering the current technologies in use. The detailed project report covered the information on current system, evaluation of current energy use and on implementation of identified technologies what could be the possible energy savings and investment required for implementation. The DPR also covered various financial analysis for the technologies so it can be directly shared with Financial Institutions for debt financing if required. At Jalandhar Hand Tool Cluster more than 12 technologies were identified and based on discussion with stakeholders, 10 DPR for 7 technologies in 10 units including were prepared. The table shows summary of savings achieved in the cluster through the various technological feasibility studies and engagement of suppliers/OEMs in the cluster.

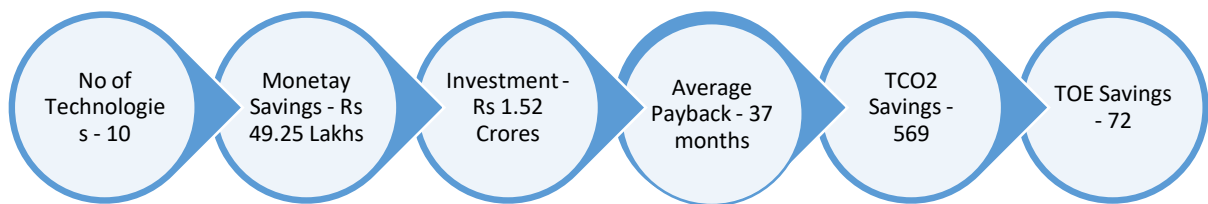


Figure 1: Summary of Technology Feasibility Studies

1. PROJECT BACKGROUND

Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India, in collaboration with United Nations Industrial Development Organization (UNIDO) is executing a Global Environment Facility (GEF) funded national project “Promoting energy efficiency and renewable energy in selected MSMEs clusters in India”.

The overall 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 12 selected energy-intensive MSMEs clusters across 5 sectors in India (with expansion to more clusters later). This will enable improvement in the productivity and competitiveness of units, as well as reduce overall carbon emissions and improve the local environment.

The details of the sectors and clusters identified is as below

Table 3 : List of clusters identified

Sector	Cluster
Brass	Jamnagar, Gujarat
Ceramics	Khurja, Uttar Pradesh
	Morbi, Gujarat
	Thangadh, Gujarat
Dairy	Gujarat
	Kerala
	Sikkim
Foundry	Belgaum, Karnataka
	Coimbatore, Tamil Nadu
	Indore, Madhya Pradesh
Hand tools	Jalandhar, Punjab
	Nagaur, Rajasthan

CONFEDERATION OF INDIAN INDUSTRY – CII Sohrabji Godrej Green Business Centre has been engaged by Bureau of Energy Efficiency to carry out the assignment on “Capacity building of Local service providers (LSPs) under GEF-UNIDO-BEE project **“Promoting Energy Efficiency and Renewable energy in selected MSME clusters in India”** for Jalandhar Hand Tool Cluster of Jalandhar.

2. CLUSTER SCENARIO

2.1 Jalandhar Hand Tool Sector

Hand tools are predominately produced in the small-scale sector in India. Jalandhar, in Punjab is one of the prominent hand tools clusters in the country. ¹The cluster came into existence around the time of Indian independence in 1947, when skilled laborers from Pakistan came and settled there and started manufacturing hand tools. Subsequently, the government of Punjab through Punjab State Industrial Development Corporation (PSIDC) set up an industrial estate on the outskirts of city which is today a hub of hand tools. A substantial quantity of the hand tools production is exported to countries like USA, UK, Germany, Italy, Australia and Russia.

There are around 950 units manufacturing hand tools in the cluster. Out of this, about 900 are in the micro and small-scale units and 50 units are in the medium scale. ² As per industry estimates, the cluster produces about 50,000 tons of hand tools per annum. Most of the units manufacture an array of hand tools like spanners, screw driver, pliers, bench vices, tire levers and

hammers. A medium scale unit produces around 50-70 tons of material per month. The production of the unit depends upon the number of hammers installed in the unit.

The production of the clusters is presently affected because of frequent power cuts, ranging from 4-6 hours in a day. The estimated turnover of the cluster is approximately Rs 1,000 crores (Rs 10 billion) per annum. The cluster employs about 60,000 direct employees.

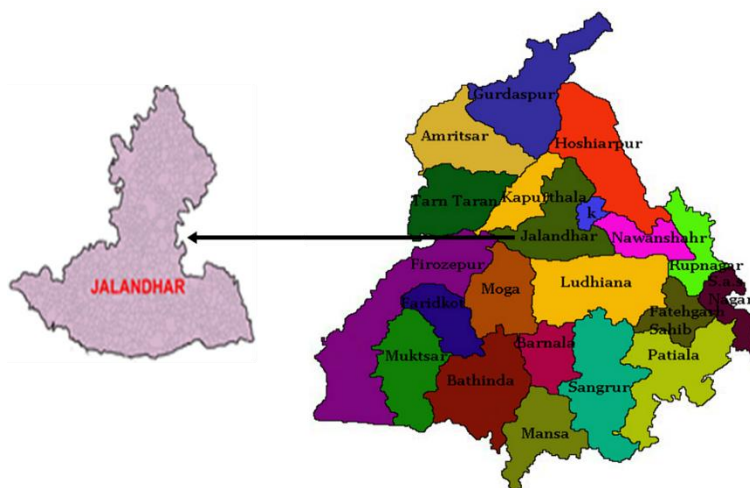


Figure 2: Jalandhar Hand Tool Cluster

¹ As per previous study done by UNIDO
(<http://sameeksha.org/pdf/clusterprofile/JalandharHandToolsClusterBrief.pdf>)

² As per previous study done by TERI
(<http://sameeksha.org/pdf/clusterprofile/JalandharHandToolsClusterBrief.pdf>)

3. PROJECT ACTIVITIES

The project activities were initiated with the initial mapping of the stakeholders in the hand tool clusters and understanding of roles, functions and other activities. The following figure provides an overview of the direct and indirect relationship with respect to energy efficiency activities under the project. The involvement of

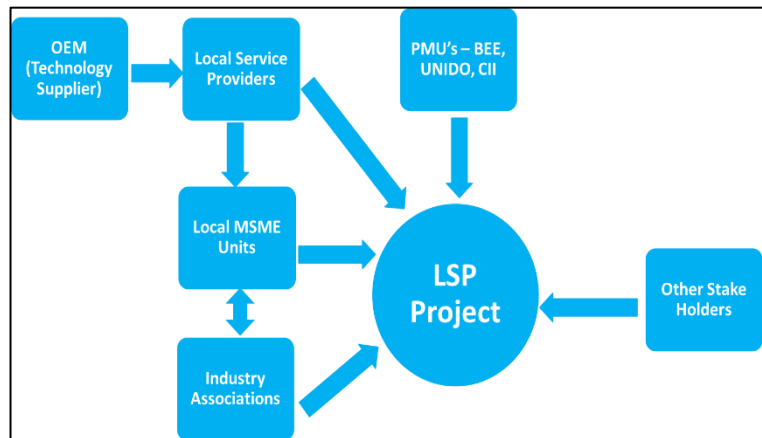


Figure 3: Stake holders' mapping

each stakeholder is critical to undertake the activities of the project.

The major focus areas of the project activities were:

1. Capacity Development of Local Service Providers (LSP) in the cluster on aspects of energy efficiency. The capacity development activities were preceded by comprehensive LSP mapping exercise and training need assessment for LSP
2. Identification of 10 technologies that can led to significant improvement in improving energy efficiency and these technologies are to be supported by preparation of Detailed Project Report (DPR) which can be further considered for implementation by the MSME units.

Following are the major activities undertaken for the project and are further covered in detail in subsequent sections of the report:

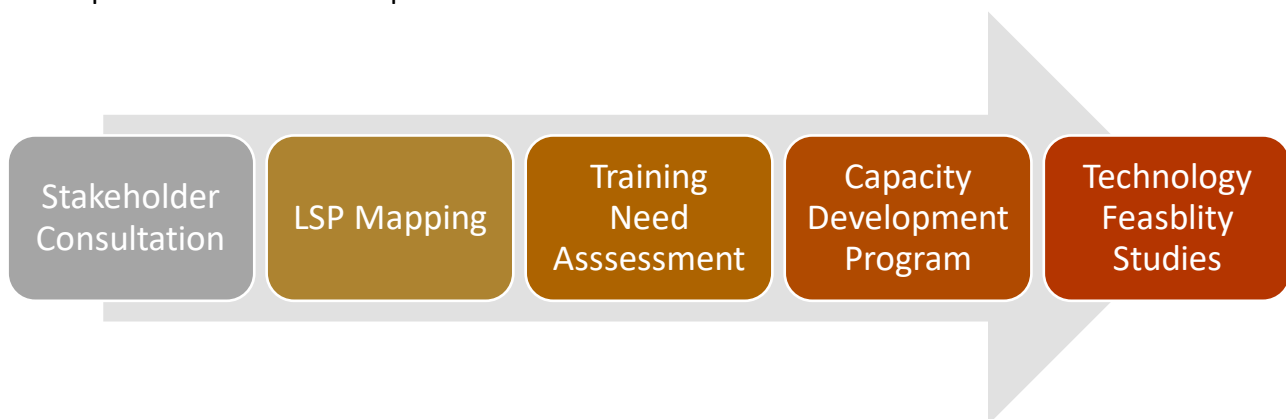


Figure 4: Major activities of the project

4. LSP MAPPING

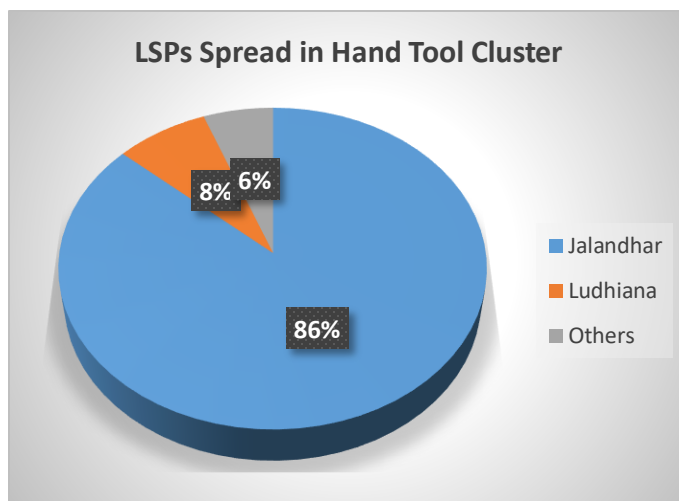
The objective of the mapping was to identify the LSPs based on the demand and supply needs of hand tool units against available local service providers in the cluster and nearest locations. The LSPs in Jalandhar hand tool cluster most of the units are mainly dependent upon Original Equipment Manufacturers (OEMs) for the services of equipment's like hammers, induction furnaces, cooling towers etc. Most of these OEM's are local manufacturer they have offices in different parts of Punjab, as a result they are easily accessible by the hand tool units. In addition to this in a typical hand tool unit most of the repair and maintenance activities are done by in-house technicians and maintenance operators. The LSPs can be categorized as follows:

- All major OEMs directly provide services to Jalandhar Hand Tool Units
- OEMs who provide service to the units through sub vendors
- Local technicians and operators who do the repair and maintenance activities

Comprehensive LSP data was collected through meeting with service providers and through various interaction during stakeholder workshops. This helped in analyzing various aspects of LSPs like:

- Existing skill sets
- Employee Strength
- Years of service
- Areas in which LSP need training

Geographic Location



Most of the LSP's catering to Jalandhar hand tool units are located in Jalandhar and nearby area like Phagwara, Ludhiana, and Hoshiarpur. For the major energy consuming equipment's like Furnace, air compressor, hammers etc. plants are directly depending upon on OEM's which are spread across the country.

Figure 5: Geographic Location of LSPs

Skill Set

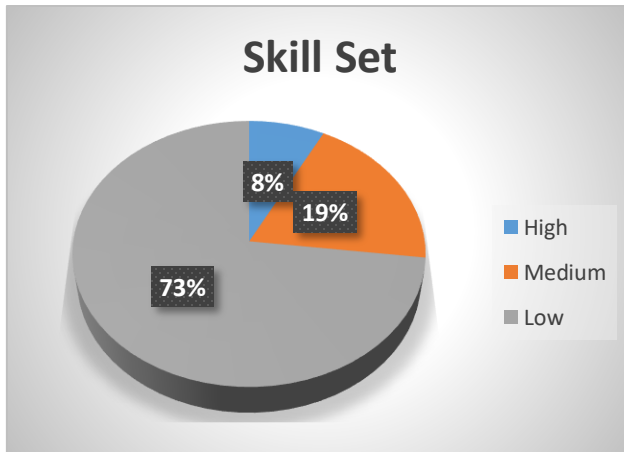


Figure 6: Skill Set of LSPs

In Jalandhar Cluster, the skill set of employees on existing technologies and operations is on lower side (73%). This is mainly due to fact that most of the LSP' are small in size. Also, during the field survey to hand tool units, almost all the maintenance related activities in the plant are carried out by diploma and hands on experience people. Only about 19% fall in medium category which includes few motor rewinders, mechanical repair and maintenance operators mainly for utilities.

Employee Strength

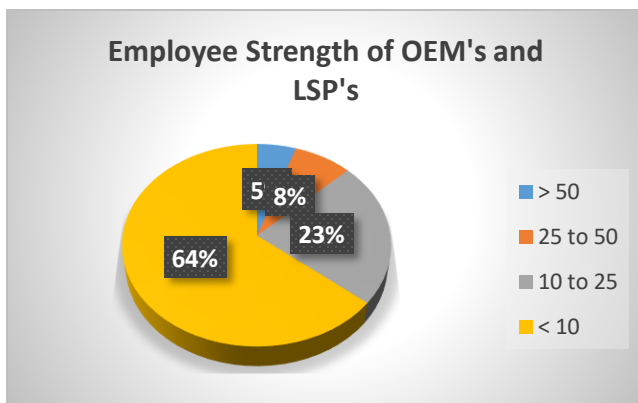


Figure 7: Employee Strength of LSPs

The graph clearly indicates that majority of the LSP's are small players with average number of employee's strength less than 10 people. Smaller LPSs include local motor service people, fabricators, local dealers etc. The role of OEMs in the cluster is also significant as all the major critical equipment's for process as well as for utilities are supplied directly by OEMs.

Educational Qualification

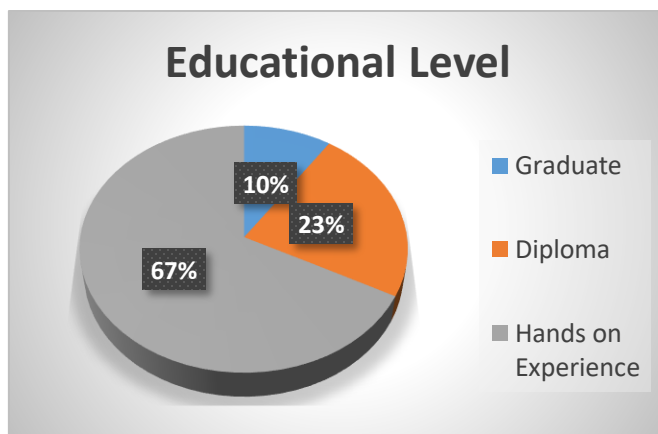


Figure 8: Educational Qualification of LSPs

Most of the stakeholders who participated in the survey fall in hands on experience without any educational background. Local service providers and hand tool units in the cluster have a mix of graduates, diploma holders and uneducated having practical hands on experience. Even though the education level is on lower side and they are well versed in their day to day operations, the survey helped in identifying various gap towards advancements in latest EE/RE technologies.

Based on the LSP data, strength and weakness of service providers were analyzed and also what are the opportunities and threats for them in the cluster were identified during the mapping process SWOT analysis was also done based on the demand supply need of the services in the cluster.

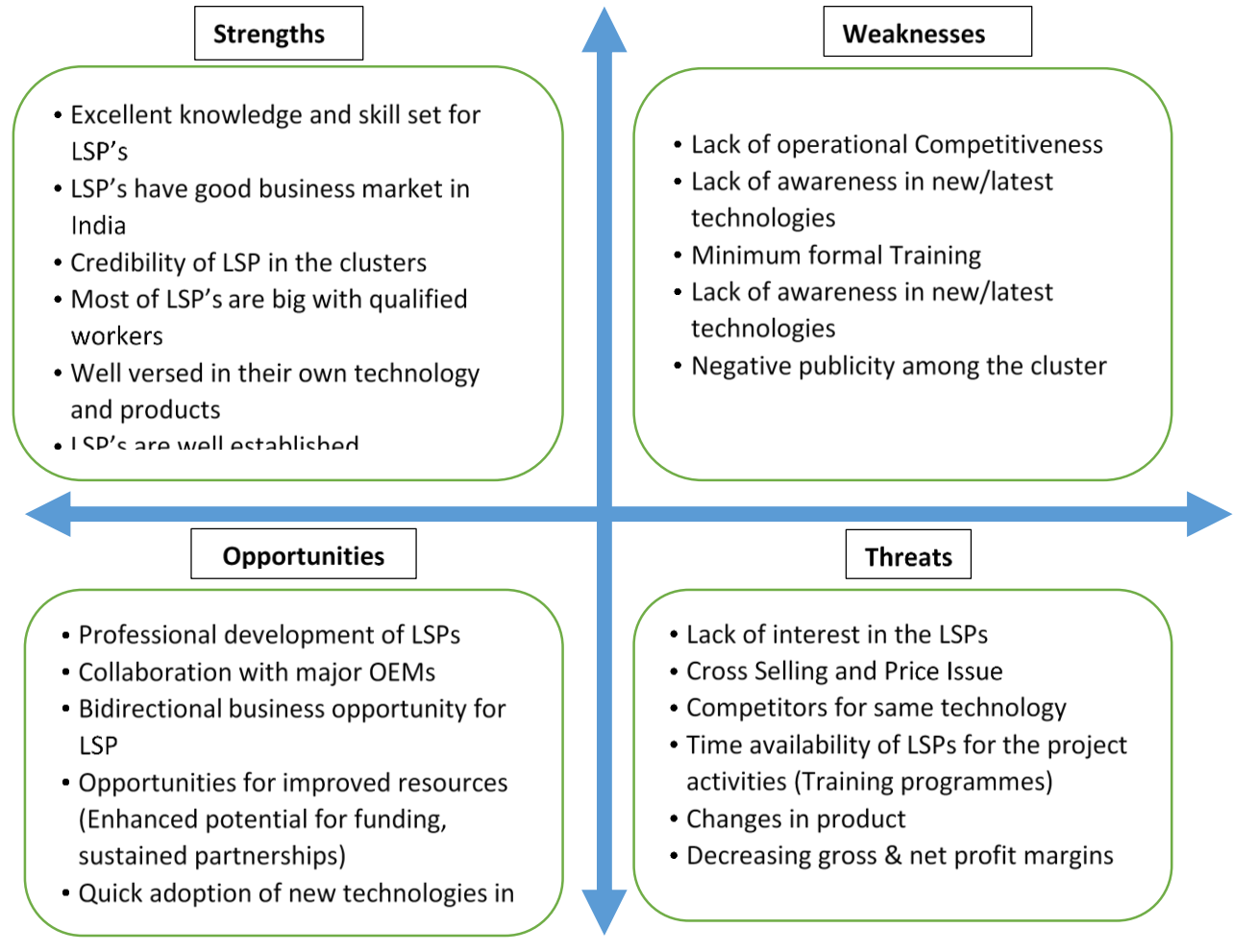


Figure 9: SWOT Analysis

5. TRAINING NEED ASSESSMENT

The LSP mapping exercise helped to understand the current skill and knowledge level of LSP and

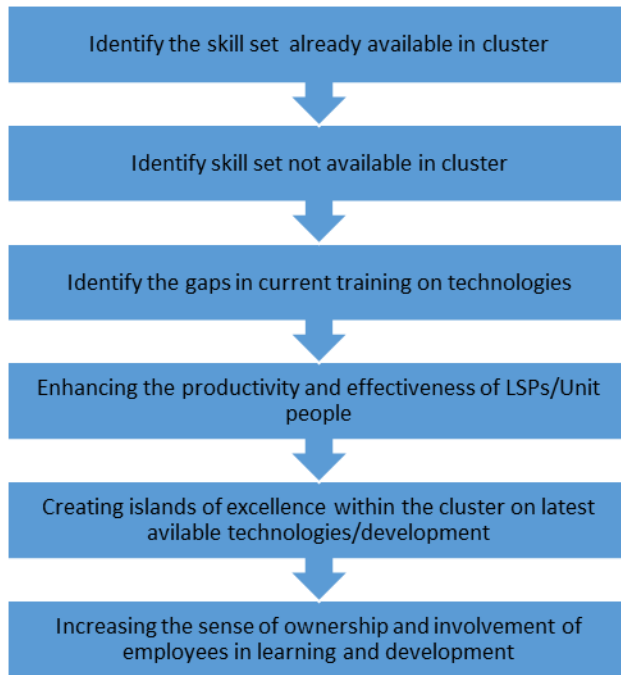


Figure 10: Objective of Training Need Assessment

also to understand the training requirement for accelerating energy efficiency in the cluster. As part of LSP mapping exercise, the training need assessment for the LSP was also conducted through structured survey and interviews and based on which the training and capacity development requirement were assessed and the training programs were prepared accordingly.

The main objective of this assessment was to identify the gaps of Local Service Providers in the cluster in terms of skill set, technical knowledge and organizational strength. The training need assessment helped to determine whether a training need exists and if it does, what type of training was required to fill the gap. The expectation of knowledge, skills sets

and abilities of officials at different levels was different so there training needs were also different.

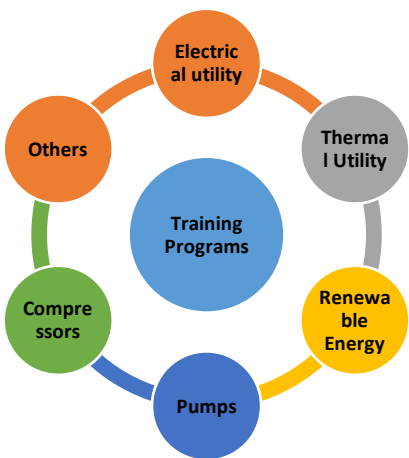


Figure 11: Identified training modules

After the identification of training needs, the topics for the programs were designed in such a way that the training plan catered the priorities of a wide range of stakeholder’s mainly local service providers and unit employees who are working at shop floor. After consultation with the main stake holders in the cluster and based on the survey results some of the key topics identified are shown in Figure 11. Others include energy efficient fuel fired furnaces, waste heat recovery, electroplating etc. The outcome of the training need assessment is given below:

- Training need analysis conducted for various stakeholders in the cluster helped in identifying the gaps and methods to bridge the same. It also identified various training needs and what model can be developed for preparation of cluster specific modules can be the appropriate modules for each target group.

Project Closure Report

- Stakeholders of Nagaur Hand Tool Cluster are highly skilled and have good educational background, so training modules should focus more on advancements in EE/RE technologies.
- There is a huge competition among various local service providers in the cluster to become technologically competitive. Market challenge and how to overcome the cross selling due to competitive price was one of the concerns shown by the local service providers in the cluster.
- Detailed course content would cover relevant case studies and best operating practices that would benefit the various stakeholders in the cluster.
- Survey results showed most of the stakeholders are interested in getting trained on energy efficient furnaces/thermal utility and electrical utility.

6. CAPACITY BUILDING WORKSHOPS

One day training programs were organized in Jalandhar Hand Tool Cluster to train the local service providers and hand tool units on best operating practices, latest technologies/innovations and to create awareness on importance of energy efficiency and renewable energy. The workshops provided a platform to interact with 170+ stakeholders in the cluster.

The venue and agenda for each workshop was decided based on the training need assessment done in the cluster. At each event, CII introduced the workshop, followed by UNIDO providing more details about the workshop. This was followed by presentations from technology suppliers on energy efficient technologies and services available in the market with open Q & A sessions after each presentation. Each workshop was attended by different stakeholders such as MSMEs, consultants, association, technology suppliers and subject experts. The following table shows the summary of workshops completed at Jalandhar Hand Tool Cluster

Table 4: Workshop summary

Dates	Location	Workshop Theme	No of LSPs/OEMs	Total No of Participants
09-May-18	Jalandhar	Electrical & Utilities, Thermal Utilities, Renewable Energy & Electroplating	59	170
12-Jun-18	Jalandhar			
26-Jun-18	Jalandhar			
10-Jul-18	Jalandhar			

The four training programs organized in Jalandhar Hand Tool Cluster helped in the capacity building of all the stake holders in Jalandhar Hand Tool Cluster which include service providers, OEMs and hand tool units. All the workshops had several discussions among the participants focusing on various energy efficient technologies, various technical challenges faced in implementing a new technology in the cluster and also on availability of local service providers for any technology. The graph below shows the workshop participation in Jalandhar Hand Tool Cluster.

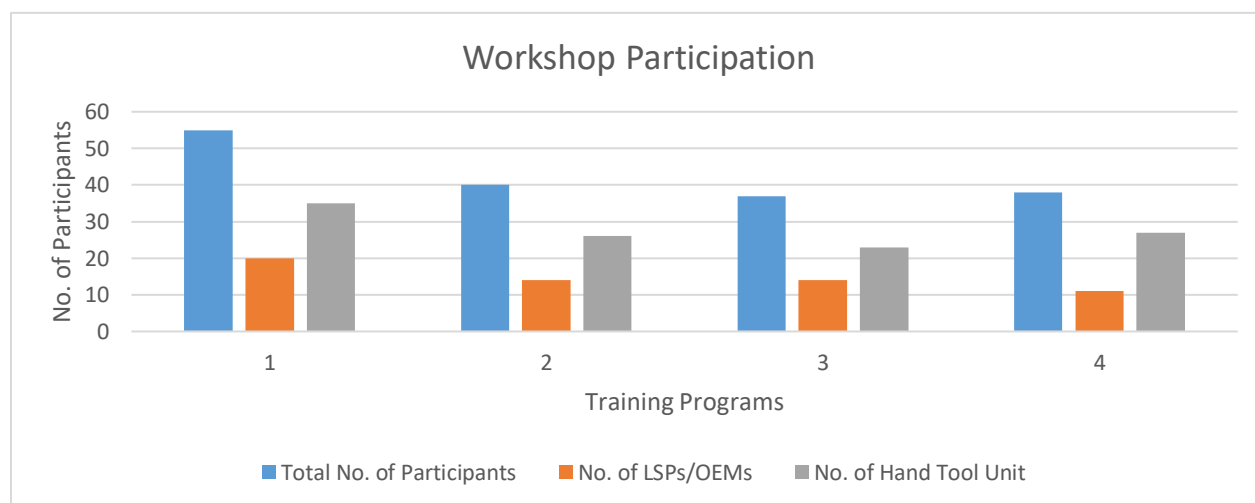


Figure 12: Workshop Participation

7. TECHNOLOGY FEASIBILITY STUDIES

In addition to the focus on LSP capacity development, one of the major activities under the project was to identify the high energy efficient technologies in the cluster that can be implemented by the industries. The detailed project report was prepared for energy efficient technologies considering the current technologies in use. The detailed project report covered the information on current system, evaluation of current energy use and on implementation of identified technologies what could be the possible energy savings and investment required for implementation. The DPR also covered various financial analysis for the technologies so it can be directly shared with Financial Institutions for debt financing if required. At Jalandhar Hand Tool Cluster more than 12 technologies were identified and based on discussion with stakeholders, 10 DPR for 7 technologies in 10 units were prepared. Following are the details on possible energy savings and cost savings that can be achieved by implementation of the identified technologies:

Table 5: Summary of Technologies Identified

SI No	Name of Technology	Plant Name	Monetary savings/year	Investment	Pay Back	TOE savings/year	T CO ₂ savings/year
			Rs Lakhs	Rs Lakhs	Months		
1	New Energy Efficient Furnace	Ajay Industries	6.18	5.72	11	17.07	50.41
2	Installation of Centralized Air Compressor	Gripwell Forgings & Tools	1.15	10.07	106	1.3	13.45
3	Thyristored Temperature Control System	HR International	5.64	18	38	6.93	66.1
4	Improve Efficiency by Installing VFD on Compressor	Vishal Tools	6.79	3.45	6	8.49	81
5	Solar PV System	Victor Forging	19.5	98.7	56	25.8	246
6	Installing VFD on Injection Moulding Machine	UNISON Engineering	0.41	0.91	27	0.43	42
7	Energy Efficient Pumps	AAA Forging 1	0.49	0.62	15	0.58	5.54
8	Improve Efficiency by Installing VFD on Compressor	Juneja Forging	3.22	3.07	11	3.41	39.7

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SI No	Name of Technology	Plant Name	Monetary savings/year	Investment	Pay Back	TOE savings/year	T CO ₂ savings/year
			Rs Lakhs	Rs Lakhs	Months		
9	Improve Power Factor BY RTPFC Panel	Hamco Ispat	2.86	6.55	27		
10	Energy Efficient Furnace	OAYKAY Forging	3.01	5.72	23	8.3	24.53
		Total	49.25	152.81	37	72.31	568.73

The identified technologies have high replication potential and can be implemented in majority of the hand tool units. Following table highlights the key benefits of the technologies identified in the cluster.

SI No	Name of Technology	Benefits						Replication Potential	
		EE	RE	SI	PR	WM	EN	Hand Tool	MCC
1	New Energy Efficient Furnace	√		√			√	√	
2	Installation of Centralized Air Compressor			√			√	√	
3	Thyristored Temperature Control System	√		√			√	√	
4	Improve Efficiency by Installing VFD on Compressor	√		√			√	√	
5	Solar PV System	√	√	√			√	√	
6	Installing VFD on Injection Moulding Machine	√		√			√	√	
7	Energy Efficient Pumps	√		√	√		√	√	
9	Improve Power Factor BY RTPFC Panel	√		√	√		√	√	

EE: Energy Efficiency; RE: Renewable Energy; SI: Skill Improvement; WM: Waste Management; EN: Environment

8. CONCLUSION AND WAY FORWARD

Local Service Providers are an important stakeholder in accelerating energy efficiency and renewable energy in Jalandhar Hand Tool Cluster. Many of the industries are now pursuing the energy efficiency in their operations as the benefits are well understood and many of the industries are implementing this measure. But with time sustenance of EE measure is also important and can be achieved by capacity development and skill upgradation of local service providers so they incorporate energy efficiency considerations in their services of also the suppliers/service providers are available. Key highlights of the capacity building activities of stakeholders in the cluster is shown below:

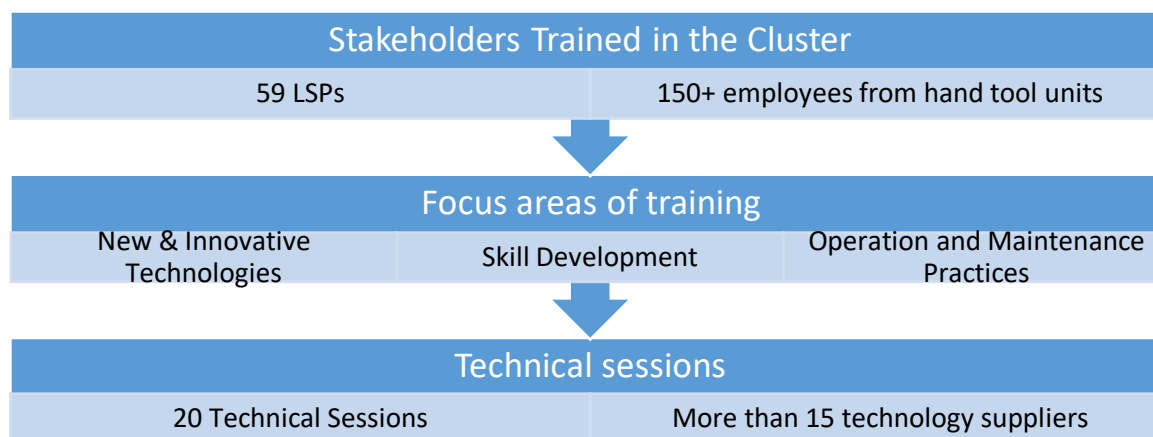


Figure 13: Summary of Capacity Building Workshops

The various training programs across the cluster not only developed the technical capability of LSPs in the cluster but also improved the skill and productivity of the various stake holders in the cluster. The training programs also provided a platform for the LSPs to interact with the OEMs and other stake holders. Following table summarize the outcome of the capacity building programs for LSP and hand tool units:

Table 6: Outcome of capacity building workshops

Focus Areas for Improvement	Capacity and Skill Development	OEM Interaction
Energy Efficient Electrical System	√	-
Electrical Motors - Operation & Maintenance	√	√
Power Factor & Power Quality Management	√	√
Energy Efficient Furnaces	√	√
Best Insulation Practices	√	√
Measuring & Monitoring of Furnaces through instrumentation	√	√
Energy Efficient Compressed Air System	√	√
Energy Efficient Pumping System	√	√
Energy Efficiencies in Electroplating System	√	√

The energy efficient practices if adopted can not only result in cost savings but also have other co-benefits such as improvement in safety, environment and work environment and in addition to co-benefits there also exists synergies among different EE aspects for an example the for e.g. Installation of induction billet heating system in place of conventional fuel fired furnace would reduce fuel consumption but would also result to improve working environment and productivity. The industries are to be made aware such co-benefits and synergies which exists between different aspects.

With the efforts to the implementation of Energy Efficiency/Renewable energy projects through the various detailed project reports indicates that there is a good potential for benefits – both low hanging and medium to high investments options. The industries implement the low hanging fruits (with lesser investment) faster as with minimum or no investments the saving can be achieved. However, for the high investment projects finance is a major hindrance and usually one of the major reasons for delay in implementation. Through this project some of the key technologies that are highly replicable in the cluster has been identified and for these technologies bankable DPRs were prepared. The report covers the possible options of financing from different banks and other various financial indicators to see the project is viable for implementation in the cluster or not. Key highlights of the identified technologies are shown below:

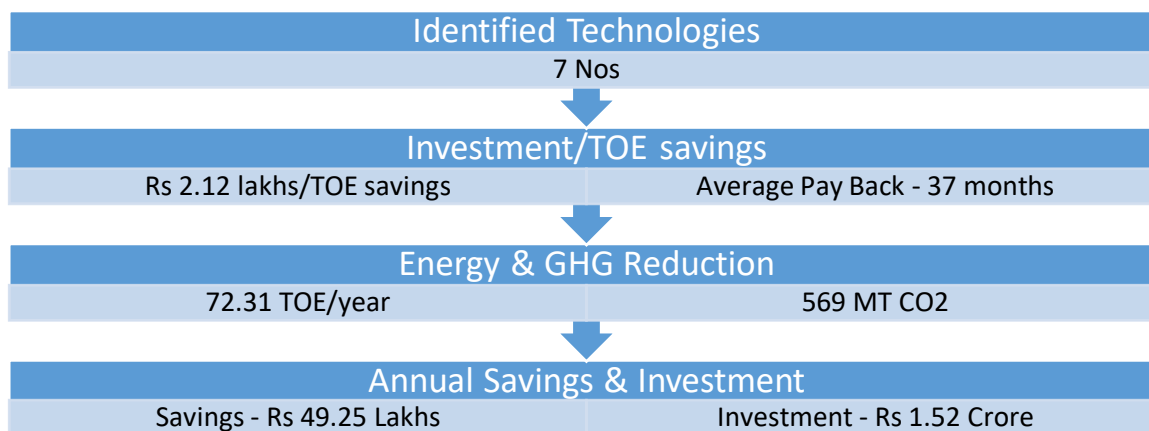


Figure 14: Key highlights of feasibility studies

Through this project, the efforts have been initiated for making industries and local service providers in the cluster aware about the benefits on pursuing energy efficiency and improving the competitiveness of the industries at the cluster. Many of the identified measures are highly replicable and the efforts initiated through the project would be continued after the period through more collaboration and cooperation activities among the stakeholders. The LSPs have been engaged with different stake holders throughout the project which helped them in their capacity development. Some of the initiatives which can be taken forward for their further development are

- National level skill program for LSPs on energy efficiency/renewable energy

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- Creating a vendor base in the cluster for new technologies
- Facilitating LSPs with major OEMs for implementation of technologies in the cluster