



August 2018

**CAPACITY BUILDING OF LOCAL
SERVICE PROVIDERS (LSP) UNDER
GEF-UNIDO-BEE PROJECT
“PROMOTING EE/RE IN SELECTED
MSME CLUSTERS IN INDIA”
Final Closing Report
Sikkim Dairy 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
GCMMF	Sikkim Cooperative Milk Marketing Federation
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 be 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:

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 – “Sikkim Dairy Cluster” which is among the lowest milk producing states in India, with a total production of 0.067 Million Tonnes¹ of milk in 2015-16.

¹ <http://nddb.coop/information/stats/milkprodstate>

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:

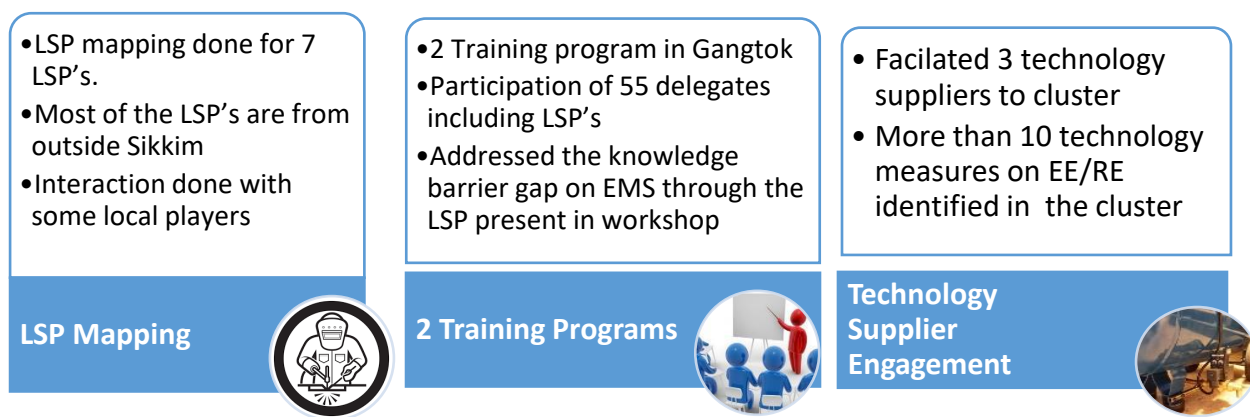
Table 1: Project Phases

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 Sikkim Dairy 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 Sikkim Dairy 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 Sikkim Dairy Cluster



LSP Mapping: The first key activity under the project was conducting LSP Mapping exercise for the cluster. The objective of the mapping was to identify the LSPs based on the demand and supply needs of dairy 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 dairy units.

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

Comprehensive LSP data was collected through meeting with service providers and through various interaction during stakeholder workshops. 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 7 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 7 LSPs and dairy 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: Two training programs were organized at Gangtok, Sikkim to train the local service providers, dairy units and other companies like pharma, food processing etc 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 various 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
11-May-18	Gangtok	Electrical & Utilities, Thermal Utilities, Refrigeration System & Renewable	7	55
25-May-18	Gangtok			

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

Project Closure Report

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 Sikkim Dairy cluster more than 7 technologies were identified and based on discussion with stakeholders, 10 DPR for 7 technologies in 2 units 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.

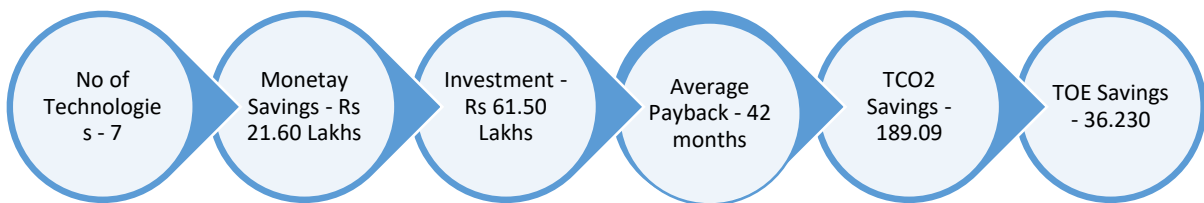


Figure 1: Summary of Technology Feasibility Studies

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, Sikkim
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 the Dairy cluster of Sikkim.

2. CLUSTER SCENARIO

Sikkim is among the lowest milk producing states in India, with a total production of 0.067 Million Tonnes² of milk in 2015-16. The graph below shows the increase of milk production during the last 5 years

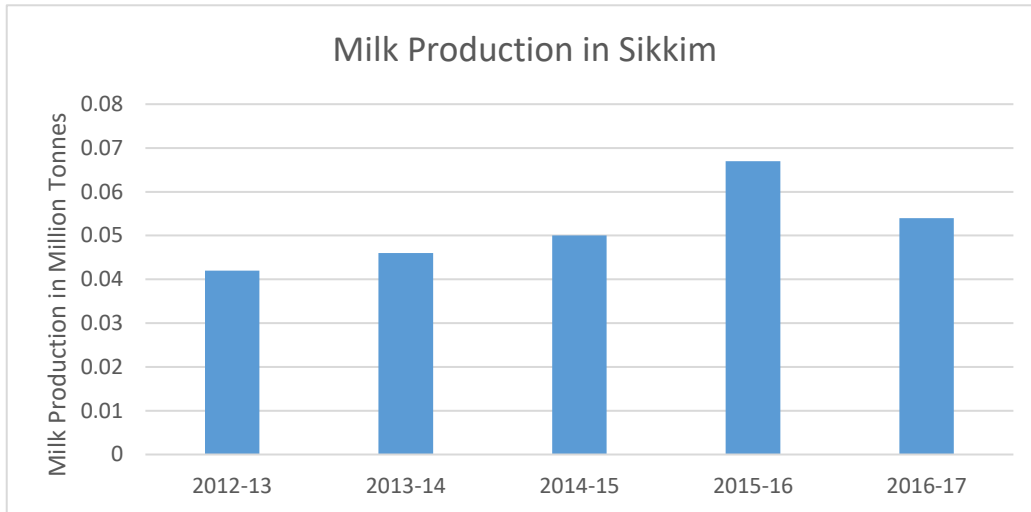


Figure 2 : Annual milk production last five year

There are mainly 2 dairies in Sikkim which are located in southern and eastern part of Sikkim. These dairies are the members of Sikkim Co-operative Milk Producers Union Limited which is the nodal agency for marketing the milk products in the state.

Typical energy use pattern is as shown,

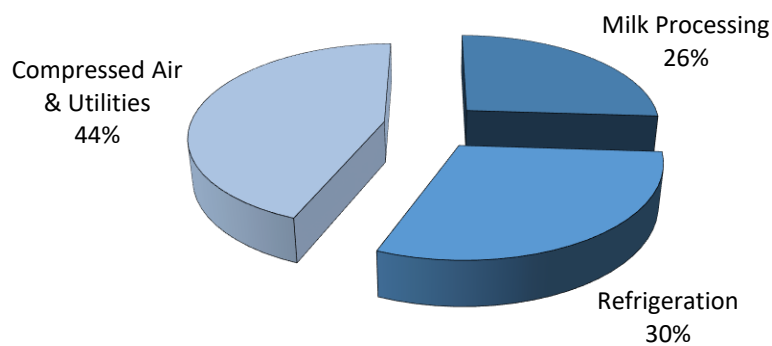


Figure 3: Energy consumption pattern

² <http://nddb.coop/information/stats/milkprodstate>

3. PROJECT ACTIVITIES

The project activities were initiated with the initial mapping of the stakeholders in the dairy cluster 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 each stakeholder is critical to undertake the activities of the project.

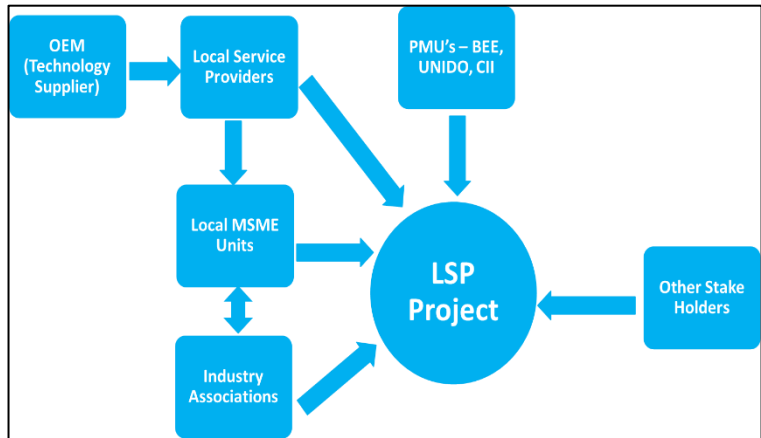


Figure 4: Stake holder mapping

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 5: 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 dairy units against available local service providers in the cluster and nearest locations. In Sikkim dairy cluster, dairy units are mainly dependent upon OEMs and service providers that are located in different parts of the country. However for small repair and maintenance activities the dairy union have hired some local contractors to undergo the regular service and operation. Since only two dairy plants are in the cluster, all the major Original Equipment Manufacturers (OEMs) and service providers are reluctant to establish their office in Sikkim due to lack of business opportunity.

The LSPs can be categorized as follows:

- All major OEMs directly provide services to dairy units which
- 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. The survey helped in analyzing various aspects of LSPs like:

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

Under Sikkim Milk Union Ltd only two dairies are there in the cluster ie. in Gangtok and Jorethang. Union have hired few contractors for doing the regular repair and maintenance activities. But majority of the major LSPs are located in different parts of the country. During the mapping process only 6 LSPs were interviewed in Gangtok and Jorethang . Most of the LSPs are single owned or maximum 3 to 4 employees. The educational and skill set of these LSPs are poor as they are small contractor working for these two plants over the last 5 to 10 years. These LSPs

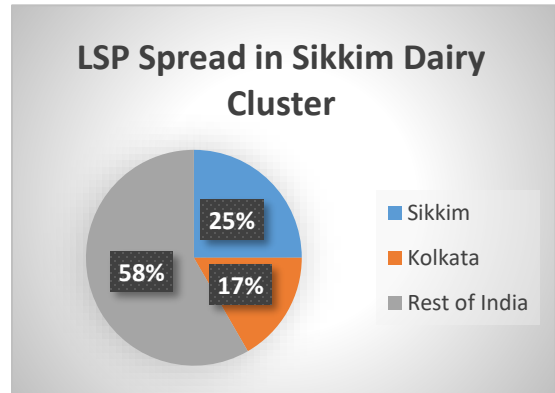


Figure 6: LSP spread in Sikkim Dairy Cluster

are unaware of the latest trends and developments in EE/RE technologies. All the major overhauling and maintenance activities of critical and major equipment's in process and utility are carried out by service engineers from all over India for different 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.

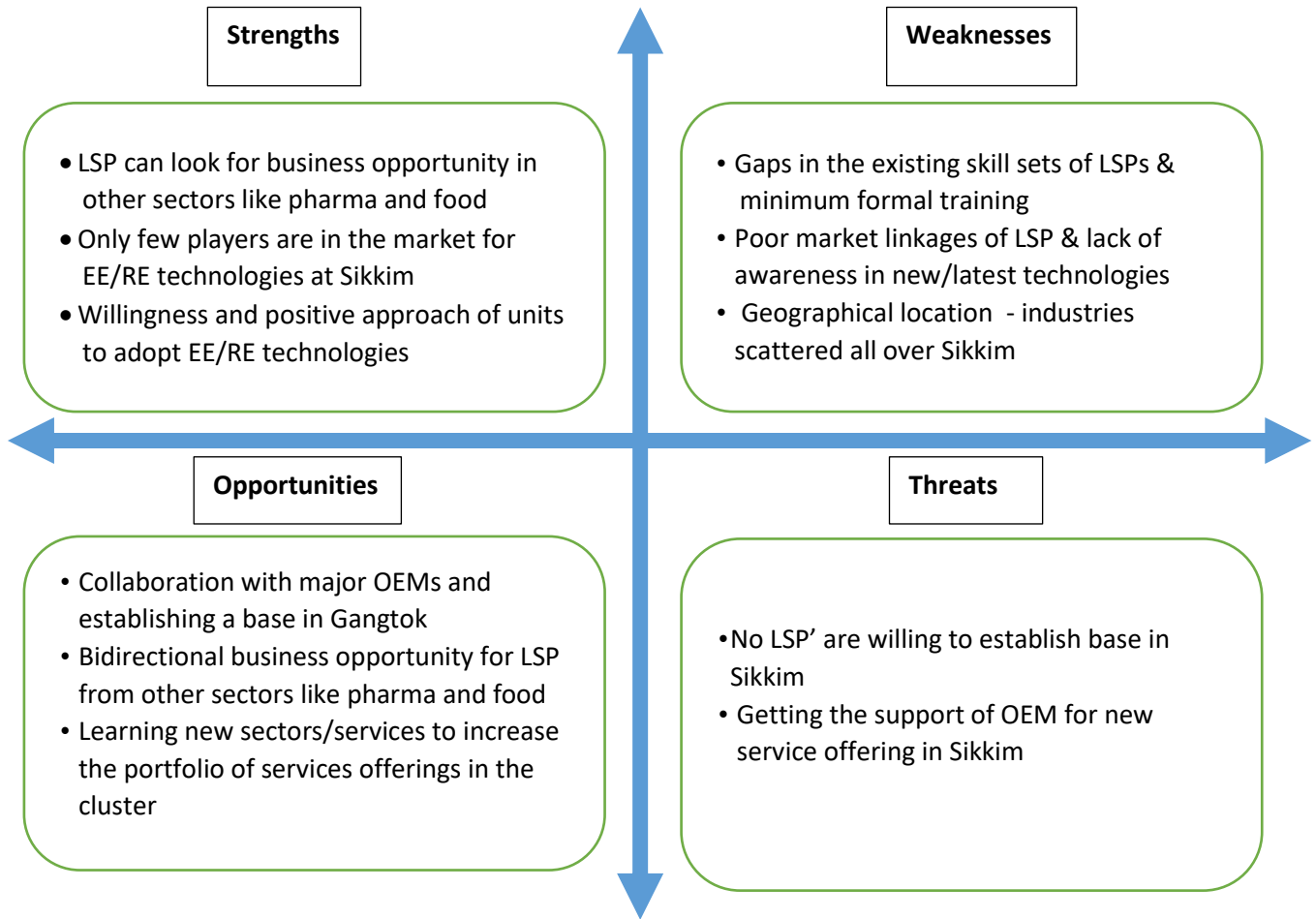
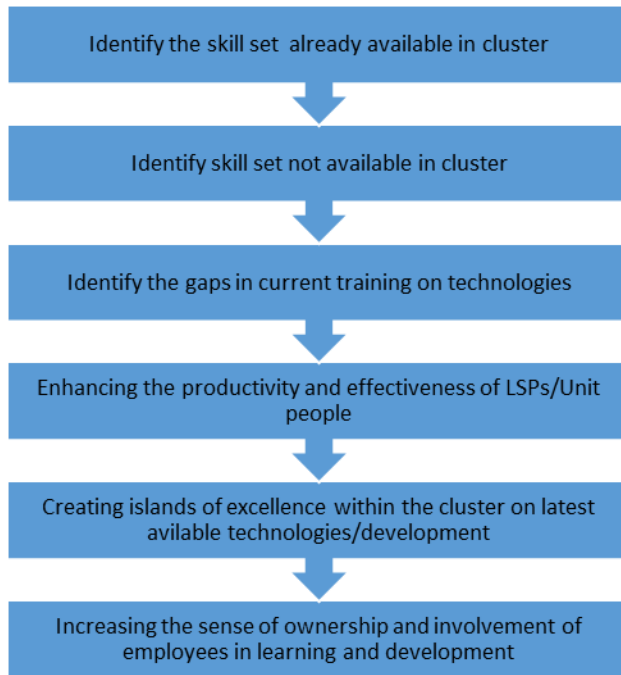


Figure 7: SWOT Analysis

5. TRAINING NEED ASSESSMENT

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



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 LSPs were done through structured survey and interviews.

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 8: Objective of Training Need Assessment

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 stakeholders in the cluster and based on the survey results some of the key topics identified are shown in Figure 9. Others include renewable energy, waste heat recovery, process optimization, evaporative condenser etc. The outcome of the training need assessment is given below:

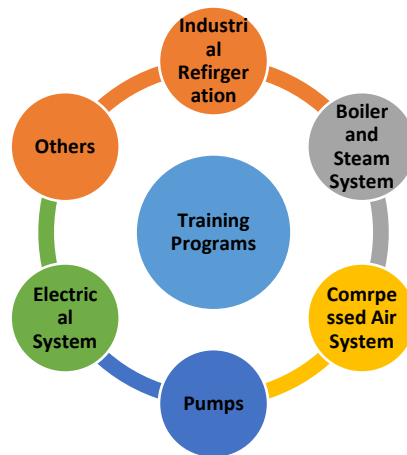


Figure 9: Identified training modules

- 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.

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- Only few LSPs are there in Sikkim for the regular maintenance activities, all the major overhauling and maintenance activities of critical equipment's in process and utility are carried out by service engineers from all over India
- Limited opportunities for LSPs and dairy units to attend training programs/ seminars on EE/RE. The training program will be designed in such a way it would cater the needs of other sectors like pharma, food processing etc.
- Detailed course content would cover relevant case studies and best operating practices that would benefit the various stakeholders in the cluster. Training should also focus on EE/RE technologies with practical sessions as well as on safety aspects related to Refrigeration and electrical.
- Survey results showed most of the stakeholders are interested in getting trained on Industrial Refrigeration, Boiler/Steam Systems and Electrical System

6. CAPACITY BUILDING WORKSHOPS

One day training programs were organized at Gangtok, Sikkim to train the local service providers and dairy 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 50+ 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 Sikkim Dairy cluster.

Table 4: Workshop summary

Dates	Location	Workshop Theme	No of LSPs/OEMs	Total No of Participants
11-May-18	Gangtok	Electrical & Utilities, Thermal Utilities, Refrigeration System & Renewable	7	55
25-May-18	Gangtok			

The two training programs organized in Sikkim Dairy Cluster helped in the capacity building of all the stake holders which include service providers, OEMs, dairy units, pharma and food processing 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 Sikkim dairy cluster.

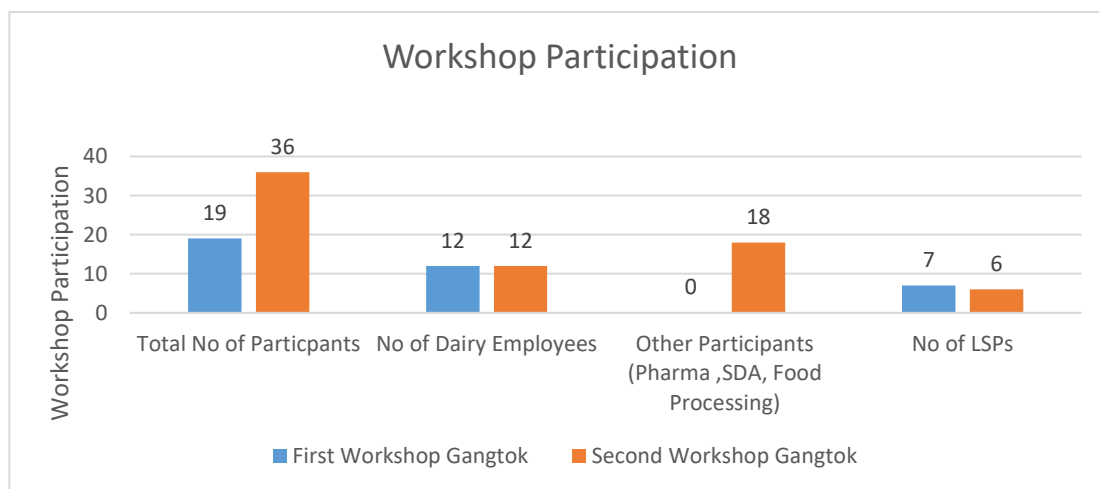


Figure 10: Workshop participation

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 Sikkim Dairy cluster more than 7 technologies were identified and based on discussion with stakeholders, 10 DPR for 7 technologies in 2 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 CO2 savings/year
			Rs Lakhs	Rs Lakhs	Months		
1	Condensate Recovery	Gangtok Dairy	2.89	6.55	27	3.92	11.58
2	Energy Efficient Pump	Gangtok Dairy	0.69	0.98	17	1.49	14.17
3	Waste Heat Recovery	Jorethang Dairy	2.04	5.19	30	2.77	8.18
4	Waste Heat Recovery	Gangtok Dairy	3.88	7.14	22	5.26	15.53
5	30kWp Solar Roof Top	Gangtok Dairy	1.84	17.32	113	3.96	37.71
6	20kWp Solar Roof Top	Jorethang Dairy	1.23	11.55	113	2.64	25.14
7	VFD for Chiller Compressor	Gangtok Dairy	1.24	3	29	2.66	25.39
8	VFD for Chiller Compressor	Jorethang Dairy	0.81	2.7	40	1.73	16.53
9	Heat pump for boiler feed water heating	Gangtok Dairy	4.43	3.54	10	7.48	22.1
10	Heat pump for boiler feed water heating	Jorethang Dairy	2.55	3.54	17	4.32	12.76
		Total	21.60	61.5	42	36.23	189.09

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

Table 6: Key highlights of technologies identified

SI No	Name of Technology	Benefits					Replication Potential	
		Energy Efficiency	Renewable Energy	Skill Improvement	Productivity	Environment	Dairy, Pharma	MC C
1	Condensate Recovery	√		√	√	√	√	
2	Energy Efficient Pump	√		√		√	√	
3	Waste Heat Recovery	√		√		√	√	
4	Waste Heat Recovery	√		√		√	√	
5	30kWp Solar Roof Top		√	√		√	√	√
6	20kWp Solar Roof Top		√	√		√	√	√
7	VFD for Chiller Compressor	√		√		√	√	
8	VFD for Chiller Compressor	√		√		√	√	
9	Heat pump for boiler feed water heating	√		√		√	√	
10	Heat pump for boiler feed water heating	√		√		√	√	

8. CONCLUSION AND WAY FORWARD

Local Service Providers are an important stakeholder in accelerating energy efficiency and renewable energy in Sikkim Dairy 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:

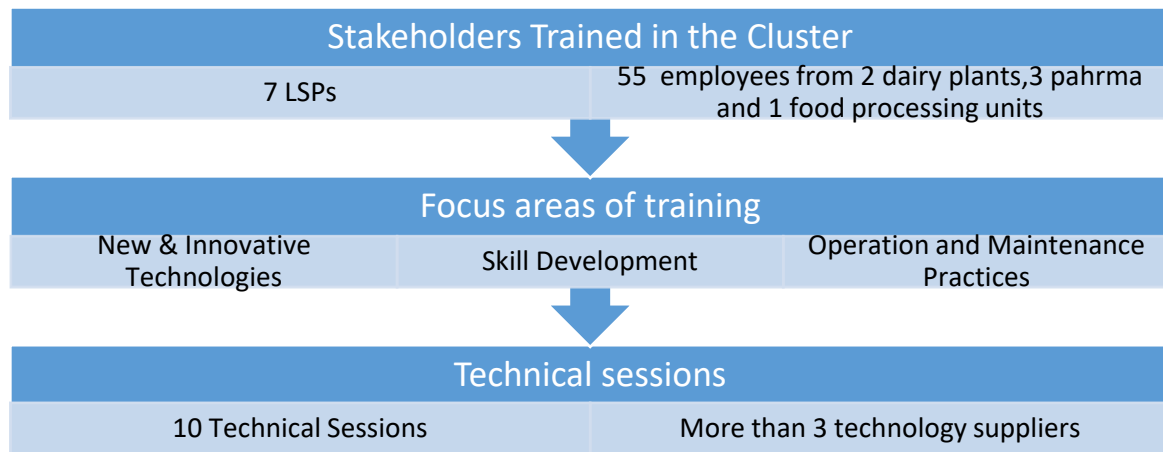


Figure 11: Summary of Capacity Building Workshops

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 diary units:

Table 7: Outcome of capacity building workshops

Focus Areas for Improvement	Capacity Development	OEM Interaction
Boiler and Steam System	√	
Electrical Motors - Operation & Maintenance	√	
Compressor - Best Practices	√	
Industrial Refrigeration	√	√
Pumping System - Best Practices	√	
Electrical Safety	√	
Energy Efficiency Financing	√	√

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 eg. Installation of evaporative condenser in place of conventional condenser would reduce energy requirement of chiller compressor but would also result in water conservation. 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 is shown below:

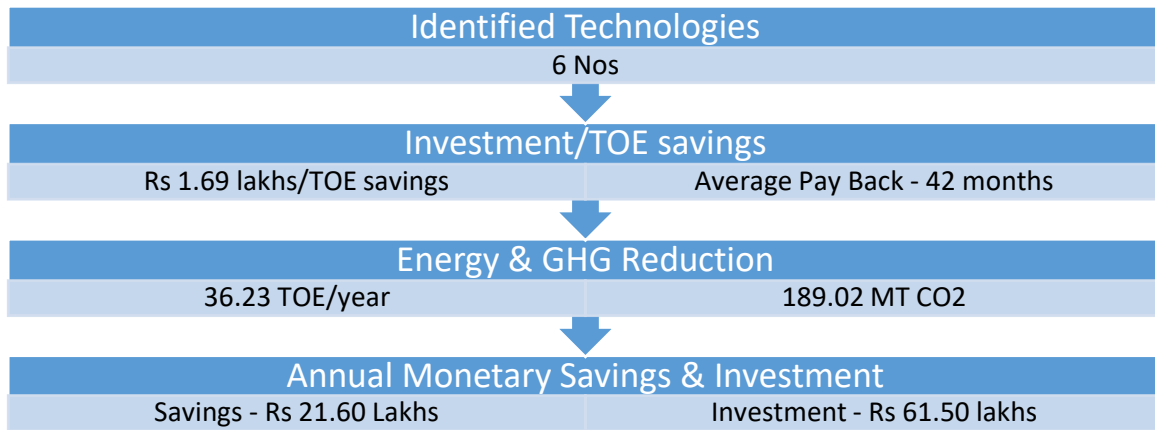


Figure 12: Key highlights of feasibility studies

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. There are several small and medium scale dairy units, pharma and food processing units in the cluster and the project can create much larger impact on overall environment management of the entire Sikkim cluster. 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
- Creating a vendor base in the cluster for new technologies
- Facilitating LSPs with major OEMs for implementation of technologies in the cluster