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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  
Gujarat Dairy Cluster**

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



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## List of Abbreviations

BEE	Bureau of Energy Efficiency
CO <sub>2</sub>	Carbon dioxide
DPR	Detailed Project Report
EE	Energy Efficiency
FI	Financial Institution
GCMMF	Gujarat Cooperative Milk Marketing Federation
GEF	Global Environmental Facility
LSP	Local Service Provider
MSME	Micro and Medium Scale Industries
MCC	Milk Chilling Center
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 – “Gujarat Dairy Cluster” which is one of the major dairy cluster in India with yearly production of more 12.56 million Tones (2015-16).

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

Following are the key activities and outcomes at Gujarat 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 Gujarat 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 Gujarat Dairy Cluster

<ul style="list-style-type: none"> <li>• More than 60 LSPs identified</li> <li>• Detailed mapping of more than 20 LSPs done</li> <li>• Training need assessment of LSPs done</li> </ul>	<ul style="list-style-type: none"> <li>• Training Program in 4 different cities</li> <li>• More than 120 employees from 12 dairy plants trained on EE/RE technologies</li> <li>• More than 70 LSP's trained</li> </ul>	<ul style="list-style-type: none"> <li>• Facilitated more than 12 technology suppliers to cluster</li> <li>• Supplier engagement done in 8 Dairy unit</li> </ul>
<p><b>LSP Mapping</b></p> 	<p><b>4 Training Programs</b></p> 	<p><b>Technology Supplier Engagement</b></p> 

**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 20 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 20 LSPs and some of the major 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:** One day training programs were organized at four different cities in Gujarat dairy cluster 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 150+ 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
9-Apr-18	Rajkot	Electrical & Utilities, Thermal Utilities, Refrigeration System & Renewable	70	192
19-Apr-18	Surat			
26-Apr-18	Banas			
30-Apr-18	Ahmedabad			

**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 Gujarat Dairy cluster more than 10 technologies were identified and based on discussion with stakeholders, 10 DPR for 9 technologies in 7 units including two milk chilling centers 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.

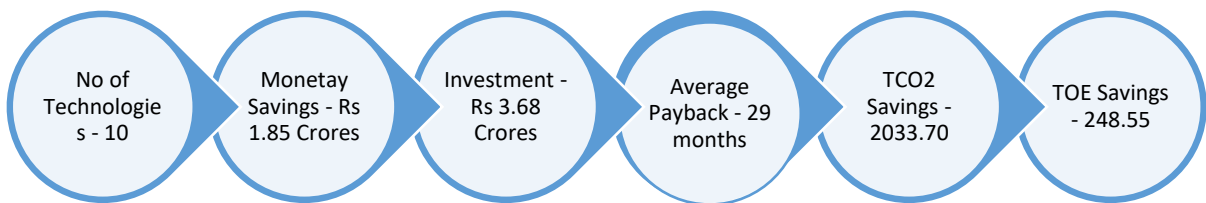


Figure 1: Summary of Technology Feasibility Studies



## 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 the Dairy cluster of Gujarat.

## 2. CLUSTER SCENARIO

Gujarat is now the third largest milk producing state in India, following Uttar Pradesh and Rajasthan with a total production of 12.262 Million Tonnes<sup>1</sup> of milk in 2015-16. The graph below shows the increase of milk production during the last 5 years.

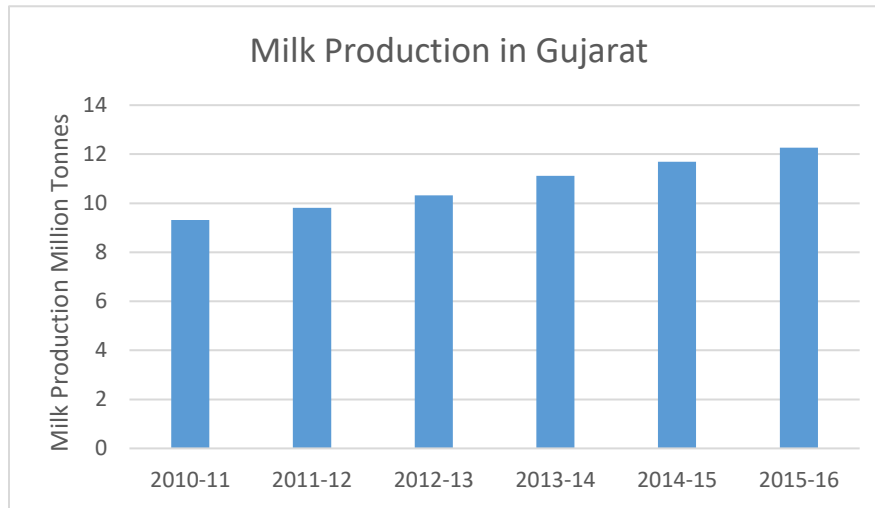


Figure 2 : Annual milk production last five year

There are 19 dairies under the membership of Gujarat Cooperative Milk Marketing Federation (GCMMF) which are scattered over Gujarat. GCMMF is the nodal agency for marketing the milk products manufactured by different milk cooperative member societies in the state. The distribution of major dairies in Gujarat is shown in the figure below:-

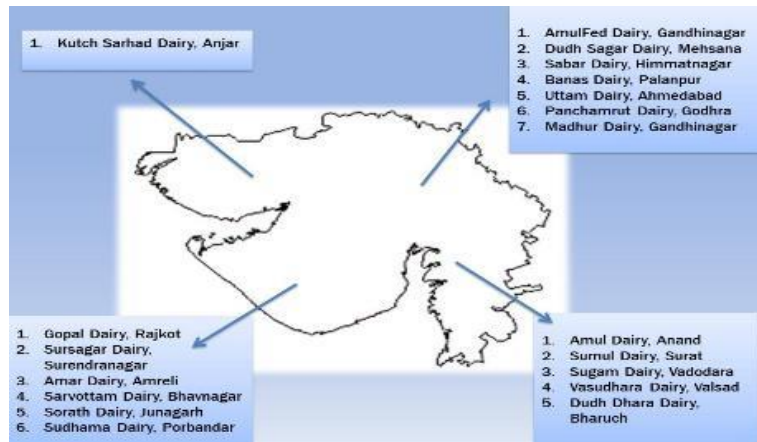


Figure 3: Major dairies in Gujarat

<sup>1</sup> <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.

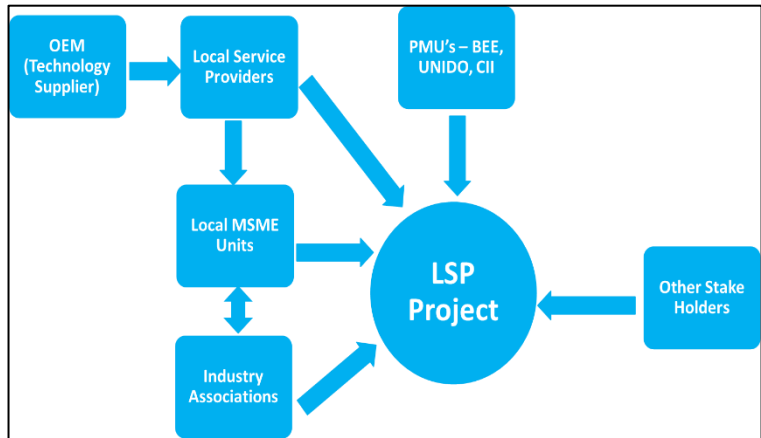


Figure 4: Stake holders mapping

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:

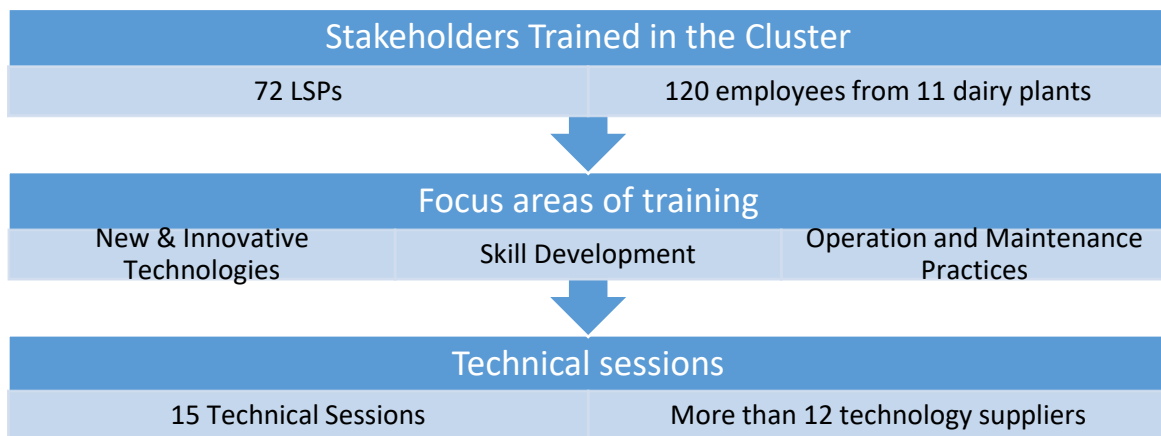




Figure 5: Major activities of the project

## 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. The LSPs in Gujarat dairy cluster are mainly dependent upon Original Equipment Manufacturers (OEMs) for the services of equipment's like chiller, boiler, pumps etc. These OEMs have offices in different parts of Gujarat, as a result they are easily accessible by the dairy units. In addition to this in a typical dairy 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 dairy units which
- 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

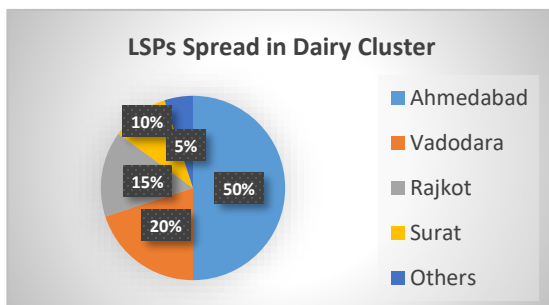


Figure 6: Geographic Location of LSPs

Ahmedabad and Gandhinagar are the two major locations where most of the LSPs in Gujarat operate from. For the major energy consuming equipment's like chillers, boiler, air compressor etc, plants are directly depending upon on OEM's which are spread across the country. Most of the LSPs related to utilities are located in Rajkot and Surat as it is an industrial belt

### Skill Set

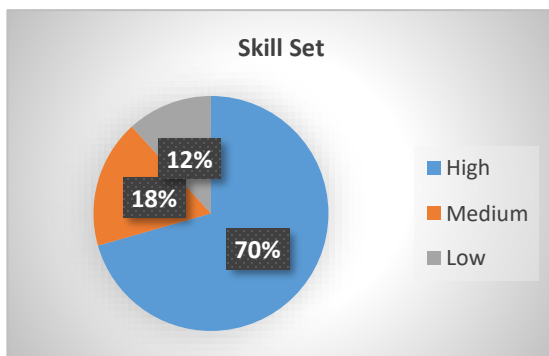


Figure 7: Skill Set of LSPs

The existing skill set of LSPs in Gujarat Dairy cluster is high as most of them are bigger OEMs and service providers and are equipped latest technologies and services. However there are some smaller LSPs in the cluster which do the repair and maintenance activities fall in the low and medium skill category. These LSPs need to get trained by the bigger OEMs such that there service can be used by the units in a productive way.

**Employee Strength**

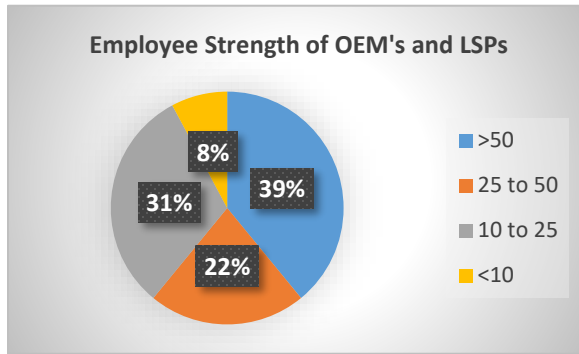


Figure 8: Employee Strength of LSPs

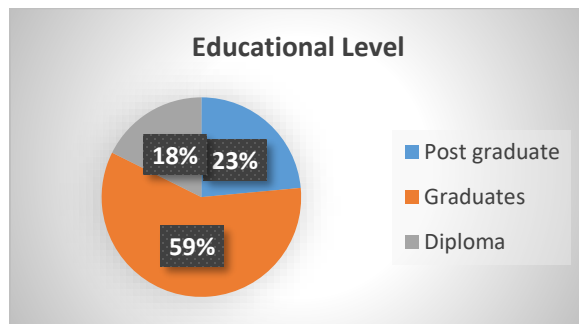


Figure 9: Educational Qualification of LSPs

LSPs in dairy cluster are big and employee strength of these service providers is more than 25. Some of them major OEMS which operate from different parts of the country have more than 75 people as their employees. However there are some smaller LSPs in the cluster which include local fabricators, technicians, maintenance workers etc which are either single owned or have less than 10 employees with them.

**Educational Qualification**

Most of the stakeholders who participated in the survey are highly qualified. Local service providers and all the employees of dairy units in the cluster have a mix of post graduates, graduates and diploma holders. Even though the skill set of LSPs are high in the cluster, the survey helped in identifying various gaps regarding awareness about 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.

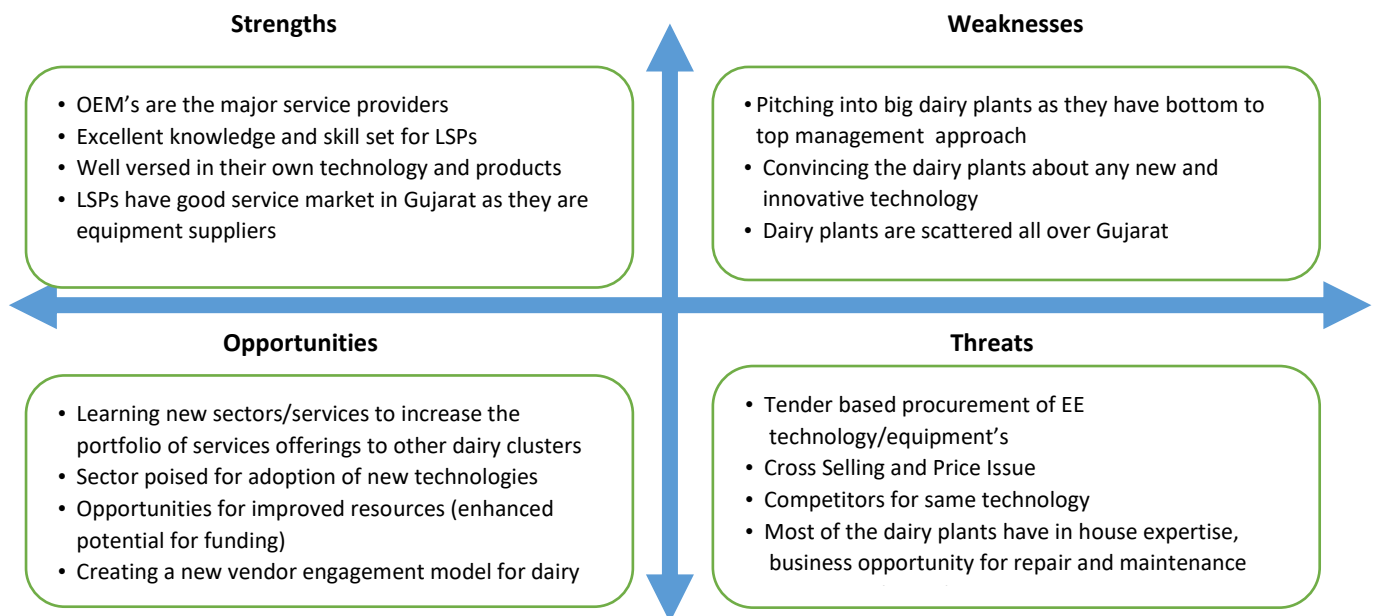
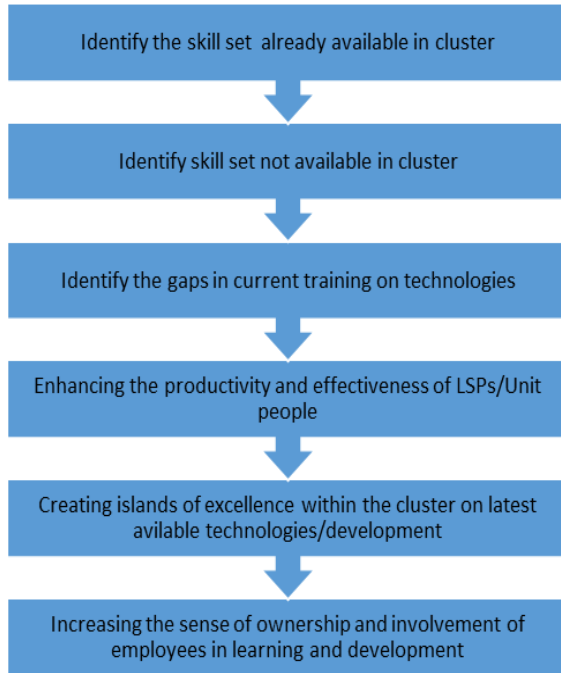


Figure 10: SWOT Analysis

## 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 11: 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 stake holders in the cluster and based on the survey results some of the key topics identified are shown in Figure 12. Others include renewable energy, waste heat recovery, process optimization, evaporative condenser etc.

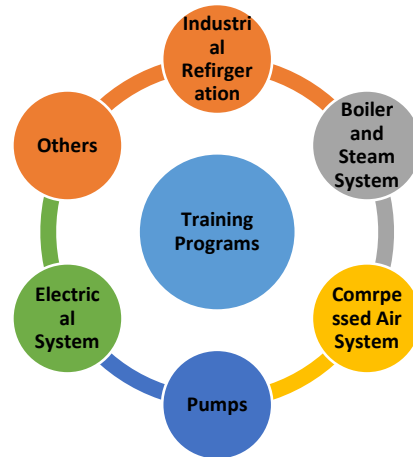


Figure 12: Identified training modules

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.

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- Stakeholders of Gujarat Dairy 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 concern 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 Industrial Refrigeration and Boiler/Steam Systems.



## 6. CAPACITY BUILDING WORKSHOPS

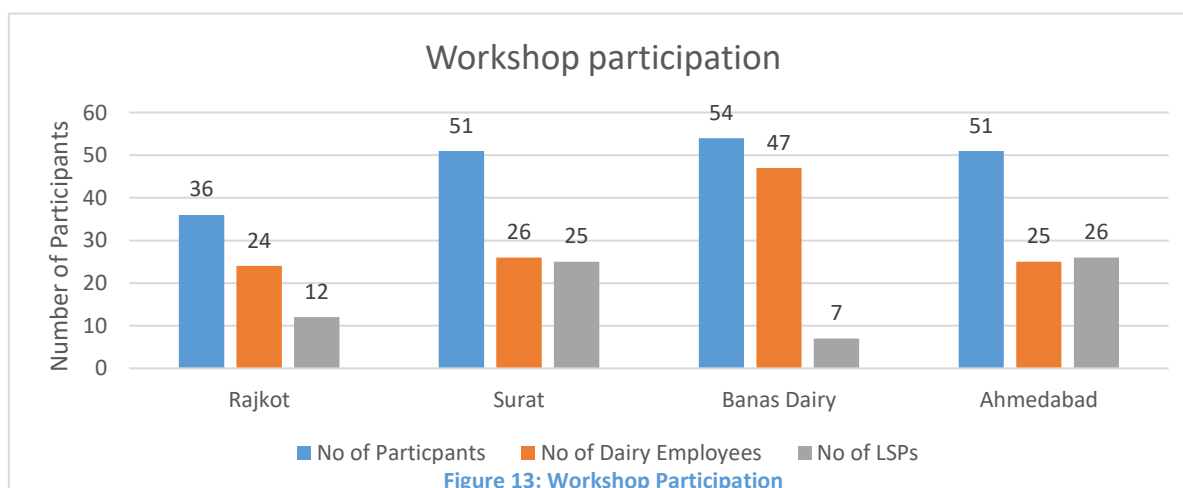
One day training programs were organized at four different cities in Gujarat dairy cluster to train the local service providers and dairy units on best operating practices, latest technologies/innovations and to create awareness on importance of energy efficiency and renewable energy. The workshops provided a platform to interact with 150+ 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 Gujarat Dairy cluster

Table 4: Workshop summary

Dates	Location	Workshop Theme	No of LSPs/OEMs	Total No of Participants
9-Apr-18	Rajkot	Electrical & Utilities, Thermal Utilities, Refrigeration System & Renewable	70	192
19-Apr-18	Surat			
26-Apr-18	Banas			
30-Apr-18	Ahmedabad			

The four training programs organized in Gujarat Dairy Cluster helped in the capacity building of all the stake holders in Gujarat Dairy cluster which include service providers, OEMs and dairy 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 Gujarat dairy cluster.



## 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 Gujarat Dairy cluster more than 12 technologies were identified and based on discussion with stakeholders, 10 DPR for 7 technologies in 7 units including two milk chilling centers 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 <sub>2</sub> savings/year
			Rs Lakhs	Rs Lakhs	Months		
1	Falling Film Chiller for IBT	Valsad Dairy	37.8	39.78	13	43.34	413.25
2	Bio Gas Reactor for canteen Waste	AFDG	4.79	11.12	28	10.65	26.82
3	Micro Turbine	AFDG	40.95	53.69	16	44.58	425.09
4	Demand Side Controller for Compressor	AFDG	20.74	14.19	8	22.58	215.25
5	Demand Side Controller for Compressor	Sumul Dairy	2.04	3.84	23	2.17	20.66
6	40 kW Bio Gas Power Generator	Sarhad Dairy	16.13	31.86	24	21.67	206.63
7	Steam Traps and Condensate Recovery	Sarvottam Dairy MCC	10.76	11.35	13	28.5	89.33
8	Desuperheater for Chiller Compressor	Harij MCC	1.05	6.86	78	8.29	
9	Evaporative Condenser	Sursagar Dairy	13.08	29.52	27	17.04	162.47
10	30 kW Solar Roof top	Sumul Dairy	3.72	14.61	47	3.96	37.71

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11	337 kW Solar Roof top	Sarhad Dairy	33.06	150	54	44.43	423.63
12	kVAR Energy Compensator	AFDG	1.24	1.75	17	1.35	12.86
		<b>Total</b>	<b>185.36</b>	<b>368.6</b>	<b>24</b>	<b>248.558</b>	<b>2033.70</b>

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

Table 6: Highlighting key benefits of the technologies

S I N O	Name of Technology	Benefits						Replication Potential	
		EE	RE	SI	PR	WM	EN	Dairy	MCC
1	Falling Film Chiller for IBT	√		√	√		√	√	
2	Bio Gas Reactor for canteen Waste		√	√		√	√	√	
3	Micro Turbine	√		√			√	√	
4	Demand Side Controller for Compressor	√		√			√	√	
5	Demand Side Controller for Compressor	√		√			√	√	
6	40 kW Bio Gas Power Generator	√		√		√	√	√	
7	Steam Traps and Condensate Recovery	√		√	√		√	√	√
8	Desuperheater for Chiller Compressor	√		√				√	√
9	Evaporative Condenser	√		√	√		√	√	√
10	30 kW Solar Roof top		√	√			√	√	√
11	337 kW Solar Roof top		√	√			√	√	√
12	kVAR Energy Compensator	√		√			√	√	√
<b>EE: Energy Efficiency; RE: Renewable Energy; SI: Skill Improvement; WM: Waste Management; EN: Environment</b>									

## 8. CONCLUSION AND WAY FORWARD

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

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

Figure 14: Summary of Capacity Building Workshops

Focus Areas for Improvement	Capacity and Skill Development	OEM Interaction
Boiler and Steam System	√	√
Electrical Motors - Operation & Maintenance	√	
Compressed Air System	√	√
Industrial Refrigeration	√	√
Pumping System	√	
Waste Heat Recovery	√	√
Variable Frequency Drives	√	√
Electrical Safety	√	
Renewable Energy	√	√

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 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:

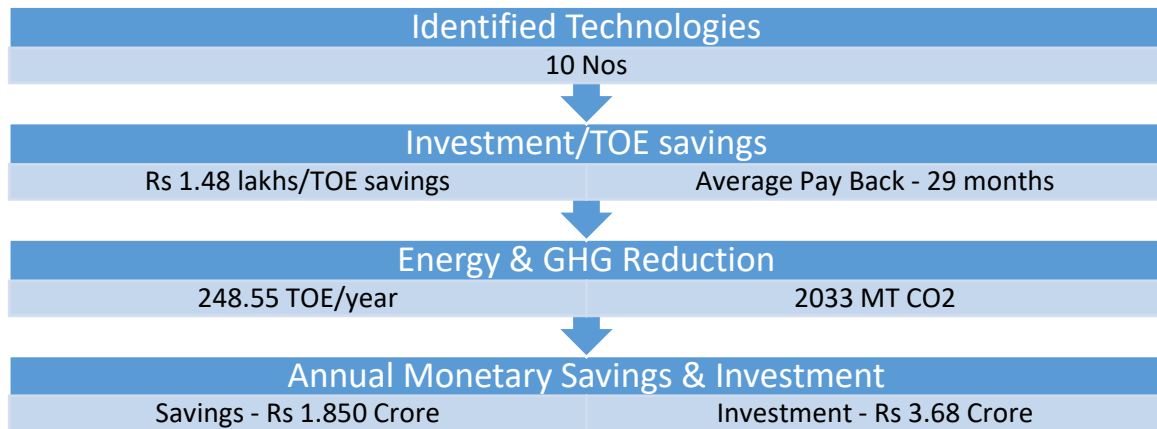


Figure 15: Key highlights of feasibility studies

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 large scale dairy units and milk chilling center in the cluster and the project can create much larger impact on overall environment management of the entire Gujarat Dairy clusters. 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