REQUEST FOR CEO ENDORSEMENT

PROJECT TYPE: Full-sized Project
TYPE OF TRUST FUND:GEF Trust Fund

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PART I: PROJECT INFORMATION

Project Title: Promoting Market Transformation for Energy Efficiency in Micro, Small & Medium Enterprises			
Country (ies):	India	GEF Project ID:[1]	4893
GEF Agency (ies):	UNIDO	GEF Agency Project ID:	120262
Other Executing Partner(s):	Ministry of Micro, Small, and Medium Enterprises (MSME), Energy Efficiency Services Limited (EESL), Bureau of Energy Efficiency (BEE)	Submission Date: Resubmission Date:	12/20/2013 04/21/2015 06/01/2015 06/26/2015
GEF Focal Area (s):	Climate Change	Project Duration(Months)	60
Name of Parent Program (if applicable): • For SFM/REDD+ ☐ • For SGP ☐ • For PPP ☐		Project Agency Fee ($):	446,545

A. FOCAL AREA STRATEGY FRAMEWORK[2]

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount ($)	Cofinancing ($)
CCM-2	2.2 Sustainable financing and delivery mechanisms established and operational	2.2 Volume of investment mobilized	GEF TF	4,465,455	26,860,000
		Total project costs		4,465,455	26,860,000

B. PROJECT FRAMEWORK

Project Objective: To promote the implementation of energy efficiency in the MSME sector; to create and sustain a revolving fund mechanism to ensure replication of energy efficiency measures in the sector; and to address the identified barriers for scaling-up energy efficiency measures and consequently promote a cleaner and more competitive MSME industry in India.

Project Component	Grant Type	Expected Outcomes	Expected Outputs	Trust Fund	Grant Amount ($)	Confirmed Cofinancing ($)
1. Programme to identify energy intensive clusters and replicable technologies.	TA	1.1 10 energy intensive clusters identified based on objective criteria; 1.2 Identification of technologies that have the maximum impact on the cluster as a whole.	1.1.1 Objective and transparent mechanism for cluster level technology benchmarking established; 1.2.1 Tool kit of identified technologies prepared.	GEF TF	252,815	300,000

[1] Project ID number will be assigned by GEFSEC.
[2] Refer to the Focal Area Results Framework and LDCF/SCCF Framework when completing Table A.

2. Demonstration projects and aggregation of demand for demonstrated technologies in the clusters.	TA	2.1 Capacity built and awareness raised as a result of the demonstration projects.	2.1.1 100 Local Service Providers (LSPs) and technical personnel of MSME units trained; 2.1.2 Peer to peer network established and results of demonstration projects disseminated through cluster level workshops; M&V protocols finalized.	GEF TF	400,000	500,000
	INV	2.2 Demonstration of energy consumption reduction at the cluster level; 2.3 Scaling up of investment activities for EE in industry.	2.2.1 Thirty Five (35) energy efficient technologies demonstrated in industrial enterprises (minimum 2 units to be covered for each technology); 2.3.1 Investments undertaken by other MSME units as a result of the demonstration activities facilitated; 2.3.2 Specific needs and technical performance requirements of enrolled units and technology vendors identified, documented and finalized.	GEF TF	3,180,000	24,150,000
3. Financing models to support replication of energy efficiency projects in MSMEs.	TA	3.1 Establishment of sustainable and effective financial mechanisms.	3.1.1 Officials from government and private banks/ financial institutions sensitized on promoting EE equipment and trained on evaluating and investing in industrial EE projects; 3.1.2 A tailored portfolio of innovative financial products for MSMEs' investment in energy efficiency projects facilitated; 3.1.3 Industrial enterprises apprised of the existing financial schemes and national experts trained in preparation of innovative energy efficiency financial proposals; 3.1.4 Contracts for EESL/ESCOs with MSME	GEF TF	300,000	500,000

			units and technology providers standardized; 3.1.5 Institutional and governance structure, and working methodology of the EESL-MSME Revolving Fund (EMRF) finalized; options for seeking additional funds for the EMRF identified.			
4. Monitoring and Evaluation	TA	4.1 Monitoring and evaluation mechanisms and indicators established to facilitate successful project implementation and sound impact assessment.	4.1.1 Regular monitoring exercises conducted; 4.1.2 Midterm and final evaluation conducted.	GEF TF	120,000	250,000
			Subtotal		4,252,815	25,700,000
			Project management Cost (PMC)[3]	GEF TF	212,640	1,160,000
			Total project costs		4,465,455	26,860,000

C. SOURCES OF CONFIRMED COFINANCING FOR THE PROJECT BY SOURCE AND BY NAME ($)

Please include letters confirming cofinancing for the project with this form

Sources of Co-financing	**Name of Co-financier (source)**	**Type of Cofinancing**	**Cofinancing Amount** ($)
National Government	Bureau of Energy Efficiency (BEE)	In-kind	2,200,000
National Government	Ministry of Micro, Small and Medium Enterprises (MSME)	In-kind	1,000,000
Others	Energy Efficiency Services Limited (EESL)[4]	Investment	20,000,000
Others	Small Industries Development Bank of India (SIDBI)	Loans	3,560,000
GEF Agency	UNIDO	Cash	100,000
Total Co-financing			26,860,000

D. TRUST FUND RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY[1]

GEF Agency	**Type of Trust Fund**	**Focal Area**	**Country Name/ Global**	**(in $)**		
				Grant Amount (a)	**Agency Fee** (b)[2]	**Total** c=a+b
(select)	(select)	(select)				
Total Grant Resources						

1 IN case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table. PMC amount from Table B should be included proportionately to the focal area amount in this table.

2 Indicate fees related to this project.

3 PMC should be charged proportionately to focal areas based on focal area project grant amount in Table D below.

4 The amount brought in by EESL shall comprise both equity and debt.

E. DOES THE PROJECT INCLUDE A "NON-GRANT" INSTRUMENT? No

(If non-grant instruments are used, provide in Annex D an indicative calendar of expected reflows to your Agency and to the GEF/LDCF/SCCF/NPIF Trust Fund).

F. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Grant Amount ($)	Cofinancing ($)	Project Total ($)
International Consultants	400,000	200,000	600,000
National/Local Consultants	500,000	1,500,000	2,000,000

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF[5]

Changes have been made to the overall project objective, as well as the project components, outcomes and outputs, as per communications with the GEF Focal Point of India. Overall, the project has been re-focused on improving energy efficiency in the MSME industrial sector of India via continued capacity building, information dissemination, and establishment of standard operating procedures for implementing energy efficiency (EE) investment projects. Due to the evolving needs of the market, the Indian Government and UNIDO have decided that it will be more beneficial to the sector to change the focus of support mechanisms for energy efficiency in the MSME industry in order to stimulate longer-term sustainable change in market mechanisms and behavior. The detailed changes made are outlined in the table below.

Components and outputs at PIF stage		**Components and outputs at CEO endorsement stage**	
Project Component	**Expected Outputs**	**Project Component**	**Expected Outputs**
1. National program to build capacity and awareness on the ISO Energy Management Standard 50001 and system optimization.	1.1 Enhancing institutional capacity of BIS for promotion of ISO 50001; 1.2 National awareness campaigns on ISO 50001 and high level management officials from 1000 industrial enterprises sensitized on usage and benefits of the ISO 50001; 1.3 Capacity development of certification agencies for awarding ISO 50001 standard; 1.4 National energy auditor and manager training curriculum is strengthened; 1.5 100 national experts trained to implement ISO 50001 and 100 national experts trained on system optimization in steam, compressed air and pumping systems; 1.6 Training of 800 industrial technical personnel on energy management systems and 600 industrial technical personnel on system optimization. Suppliers of energy efficient products and services also trained on system optimization.	1. Programme to identify energy intensive clusters and replicable technologies.	1.1.1 Objective and transparent mechanism for cluster level technology benchmarking established; 1.2.1 Tool kit of identified technologies prepared.
2. Implementation of energy management system and system optimization projects	2.1: 80 industries implement energy management standard 2.2: 75 industries implement system optimization projects 2.3: Peer to peer network established and results of demonstration projects	2. Demonstration projects and aggregation of demand for demonstrated technologies in the clusters.	2.1.1: 100 Local Service Providers (LSPs) and technical personnel of MSME units trained; 2.1.2: Peer to peer network established and results of demonstration projects disseminated through workshops at the cluster level; M&V protocols finalized;

[5] For questions A.1 –A.7 in Part II, if there are no changes since PIF and if not specifically requested in the review sheet at PIF stage, then no need to respond, please enter "NA" after the respective question.

	disseminated		2.2.1 Thirty Five (35) energy efficient technologies demonstrated in industrial enterprises (minimum 2 units to be covered for each technology); 2.3.1 Investments undertaken by other MSME units as a result of the demonstration activities facilitated; 2.3.2 Specific needs and technical performance requirements of enrolled units and technology vendors identified, documented and finalized.
3. Benchmarking study of technologies and establishment of incubators for facilitating technology transfer and innovation	3.1: Technology benchmarking report is produced for key cross-cutting technologies 3.2: Regional technical centres established as incubators 3.3: Capacity building for adoption of designs by 25 manufacturers		Only cluster level benchmarking has been included in the revised Component 1. Others have been taken out altogether. The financing Component has been renumbered as Component 3 explained below.
4. Financial capacity development to support energy efficiency projects	4.1 Capacity of government/private financial institutions and banks enhanced to promote and invest in industrial EE projects 4.2 Industrial enterprises apprised of the existing financial schemes and trained in preparation of bankable energy efficiency project proposals 4.3 A tailored portfolio of financial incentives facilitated to participating enterprises for investments in energy	3. Financing models to support replication of energy efficiency projects in MSME.	3.1.1 Officials from government and private banks/financial institutions sensitized on promoting EE equipment and trained on evaluating and investing in industrial EE projects; 3.1.2 A tailored portfolio of innovative financial products for MSMEs' investment in energy efficiency projects facilitated; 3.1.3 Industrial enterprises apprised of the existing financial schemes and national experts trained in preparation of innovative energy efficiency financial proposals; 3.1.4 Contracts for EESL/ESCOs with MSME units and technology providers standardized; 3.1.5 Institutional and governance structure, and working methodology of the EMRF finalized; options for seeking additional funds for the EMRF identified.
No Monitoring and Evaluation Component	No Monitoring and Evaluation Component	4. Monitoring and Evaluation	4.1.1 Regular monitoring exercises conducted 4.1.2 Midterm and final evaluation conducted

A.1 <u>National strategies and plans</u> or reports and assessments under relevant conventions, if applicable, i.e. NAPAS, NAPs, NBSAPs, national communications, TNAs, NCSA, NIPs, PRSPs, NPFE, Biennial Update Reports, etc.

Over the past few years, the Government of India has taken several important steps towards the energy and climate agenda, the first of which was enacting the **Energy Conservation Act** in 2001. The Act provides for the legal framework, institutional arrangement and a regulatory mechanism at the Central and State levels to embark upon an energy efficiency drive in the country. Various provisions were created under the Act; including identification of Designated Consumers (DCs), Standards and Labelling of Appliances, Energy Conservation Building Codes, and establishment of an Energy Conservation Fund. The Bureau of Energy Efficiency (BEE) was also set up as a

component of the Act with the primary objective of reducing energy intensity of the Indian economy through active involvement of all stakeholders, resulting in accelerated and sustained adoption of energy efficiency in all sectors.

An **Integrated Energy Policy** was released in 2008; this is the first comprehensive energy policy by the Indian government and oversees all energy sectors. The policy report reflects numerous recommendations pertaining to the industrial sector and highlights the need to institutionalize measures encouraging the adoption of energy efficient technologies, particularly crosscutting technologies such as pumps, boilers, variable speed drives (VSDs) and motors. It also stresses the importance of strengthening energy service companies (ESCOs) for facilitating energy audits. Benchmarking of energy intensive sub-sectors, creating regional testing facilities and labelling of products were other important issues covered in the policy report.

In 2008, the Government of India released the **National Action Plan on Climate Change (NAPCC)** to address both development and climate-related objectives. The action plan is being implemented through eight National Missions, one of which is the **National Mission for Enhanced Energy Efficiency (NMEEE).** The mission aims to scale up efforts for creating and sustaining a market for energy efficiency to unlock investments of around INR 74,000 Crores (approximately US$1.5 billion). The NMEEE is expected to achieve fuels savings of about 23 million tonnes of oil equivalent (MTOE) in coal, gas, and petroleum products by 2014-15, along with an expected avoided capacity addition of over 19,000 MW. The carbon dioxide emission reduction is estimated to be 98.55 million tons annually.

A.2 GEF focal area and/or fund(s) strategies, eligibility criteria and priorities

The project is in line with the GEF 5 climate change mitigation goal to support developing countries and economies in transition towards a low-carbon development path. The project supports Objective 2 of promoting market transformation for energy efficiency in industry.

A.3 The GEF Agency's comparative advantage

Following the endorsement of the Lima Declaration in December 2013, UNIDO has a new mandate to promote inclusive and sustainable industrial development (ISID). Recognizing that future strategies for poverty reduction need to be economically empowered, UNIDO promotes ISID to harness the full potential of industry's contribution to the achievement of sustainable development, and lasting prosperity for all.

UNIDO has been recognized by the Global Environment Facility (GEF) as having comparative advantage in the development and implementation of Industrial Energy Efficiency (IEE) projects. With its mandate to promote ISID, UNIDO has positioned itself as one of the most relevant players to assist industries of both developing countries and economies in transition. UNIDO has long-standing sector-wide experience with the technical, policy and financing aspects of efficiency improvements in manufacturing and process industries. In India, UNIDO has extensive experience in cooperation with different government agencies in the development of policies and institutional frameworks to support entrepreneurs' development. UNIDO also has a strong partnership with various industrial and enterprise associations, which will facilitate the successful implementation of the project. In addition, UNIDO is currently implementing a number of projects in India, with more under development that demonstrate its extensive experience in the implementation of energy-related projects; Promoting Energy Efficiency and Renewable Energy in Selected Micro, Small and Medium Enterprises (MSME) Clusters in India, Technology Upgrading and Productivity Enhancement of the Machine Tools Industry in India and Promoting Business Models for Increasing Penetration and Scaling-Up of Solar Energy.

In addition to extensive technical expertise in the field of industrial energy efficiency, UNIDO has also developed expertise in the development, implementation and management of revolving funds and related financing mechanisms. Under the GEF-4 project, "Promoting Energy Efficiency Technologies in Beer Brewery Sector in Burkina Faso," UNIDO cooperated with a local financial institution to establish a financing line for local beer brewers to seek funding for energy efficient stoves. Under the GEF-5 funding cycle, UNIDO has developed projects for the implementation of revolving funds in Egypt and Ukraine. In Egypt, UNIDO has developed an energy efficiency project (GEF ID: 4790) focused on industrial process heat in industry, with one component dedicated to the development of a revolving fund to facilitate financing of solar thermal technologies. In Ukraine, a revolving fund will be established to continuously support technical assistance for enterprises engaging in energy efficiency. Through these initiatives, UNIDO has developed the expertise and capacity to design and manage revolving funds in close partnership with national partners.

Moreover, the expected outcomes of the project fit well into UNIDO's program and will contribute to achieving UNIDO's direct contributions to the UNDAF outcomes including; UNDAF Outcome 1- Inclusive growth and Outcome 6 – Sustainable Development. Under Outcome 1, the project will contribute to promoting employment,

skills and livelihoods – the project will focus on improving the competitiveness of industries and contribute to private sector development (including SMEs) through improvements in skill building, access to finance and improved technologies. Under Outcome 6, the project will demonstrate the viability of energy-efficient technologies in India's MSME sector.

To ensure the success of project implementation, the UNIDO team will involve various stakeholders and co-financing partners during the formulation and implementation of the project through consultation meetings, technical workshops, and contractual agreements. In addition, the UNIDO Team consisting of the UNIDO Representative in India and the Energy Branch of UNIDO will oversee project implementation. Furthermore, UNIDO will seek to coordinate in the field and at UNIDO Headquarters with the various branches of UNIDO, such as the Environment Branch, and the Business, Investment and Technology Services Branch.

UNIDO, as part of its co-financing contribution to the project, will contribute and US$ 100,000 in cash to the project.

A.4 The baseline project and the problem that it seeks to address:

BACKGROUND

Macroeconomic picture

Today, India is the fourth-largest economy in the world in terms of purchasing power parity. The economy is diverse in nature; encompassing modern and traditional agriculture, a wide range of industries, and an ensemble of services. India's GDP figure crossed the $1.8 trillion mark in 2012 and almost 30% of this was generated through industry. While a significant share of this came from large industries, the micro, small and medium enterprise (MSME) sector was equally important in terms of economic contribution towards the economy. On average, the sector contributed around 45% of manufacturing output, 40% of exports, and employed more than 69 million people. The Indian economy has witnessed impressive growth since liberation of the economy in 1991, ranging between 4% and 9.8% up until 2007.

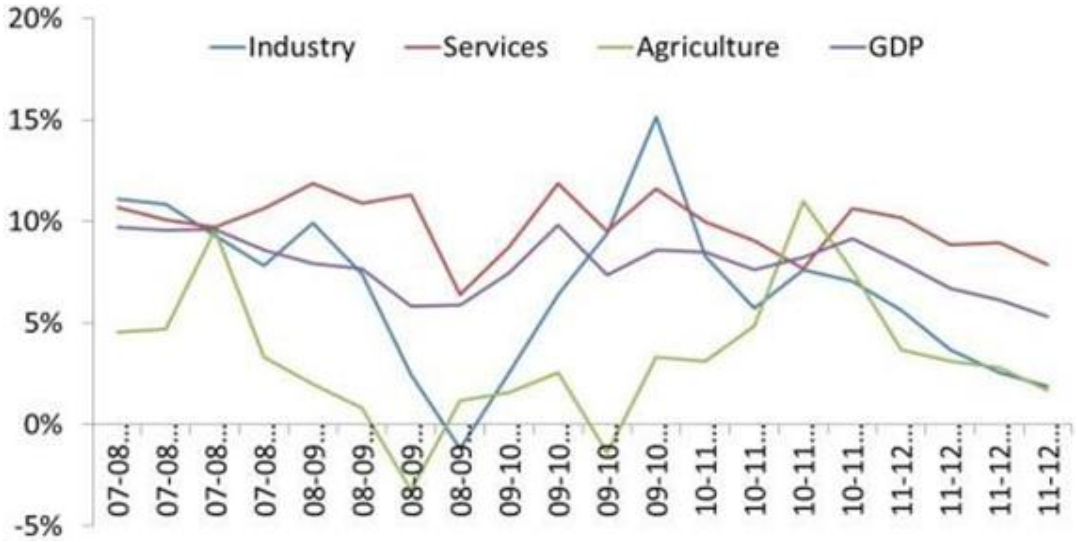

Figure 1: Overall GDP growth (2008-2012); Source: India Economic Update (World Bank 2012)

The economy slowed down during the global financial crisis, but has since recovered to around the 8% mark. In 2011-12, real GDP growth fell to a low of 6.5% (Figure 1), with the slowdown being most pronounced in the industrial sector, which has been instrumental in leading the recovery after the global financial slump. The slowdown in GDP growth witnessed over the past year could continue if investment remains weak. Slow growth in the core OECD countries and concern about another global recession could also weigh down growth. However, recent macroeconomic policy decisions, encouraging foreign direct investments and privatizations, and lowering fuel subsidies could boost investment demand and consequently economic growth in 2013-2014 and beyond.

The MSME Scenario in India

The 4th census of the Ministry of Micro, Small and Medium Enterprises (2006–07) reveals that there are 26.1 million MSMEs in the country, of which 7.3 million are manufacturing units and 18.8 million are service enterprises. At present, more than 36 million MSMEs account for 8% of GDP, 45% of manufacturing and 40% of

country exports. Most of the enterprises are micro (95%) and small (4.7%), with medium-sized enterprises representing only 0.3% of total units. The MSME sector in India is generally still using first-era technologies/processes, resulting in higher energy intensity. In light of the fact that the MSME sector has functioned for five decades within an overly protective economic and industrial framework, a large proportion of Indian MSMEs remain isolated from modern technological developments. They use obsolete, inefficient technologies to utilize commercial energy sources like coal, oil, gas and electricity, leading to wastage of energy, as well as release of high volumes of greenhouse gases and particulate emissions that are harmful to health and damage the atmosphere. Many MSME sub-sectors are energy-intensive, with fuel costs making up 20-40% of the total cost of production. Interventions from multi- and bilateral agencies have supplemented the efforts of the government, particularly in the area of energy efficiency, innovations in technology, information dissemination, outreach, capacity building and training. The MSMEs are also reluctant to buy energy efficient appliances, which are generally more expensive than less efficient options.

In order to promote technology up gradation and modernization, the Government of India has been taking several measures aimed at fostering a regime that could remove barriers for accelerated technology up gradation focusing on energy efficiency. The key objectives of the present government interventions are to:

(a) Enhance training and capacity building programmes, including strengthening of training delivery institutions. Enhancing skills will also encourage faster generation of employment as a result of improved capacity for growth;

(b) Promote adoption of clean and emerging technologies to not only reduce energy intensity (and therefore increase cost competitiveness) but also to upgrade the quality of output;

(c) Encourage innovation through setting up a large number of business incubators in educational institutions of repute;

(d) Promote markets for efficiency and inclusion by promoting market-based energy efficiency measures which are inclusive.

Barriers to Energy Efficiency in the MSME sector

- **Capacity and awareness**

A diverse range of stakeholders are involved in the entire process of implementing energy efficiency technologies and practices in industry. These stakeholders include actors from policy/decision-making bodies, industries and the business support network. However, there are several persisting gaps in the capacities and skills of these actors that hinder the successful deployment of energy efficiency measures. Specifically, the awareness and knowledge of new technologies are limited in MSME units; their reliance on time honored practices and confidence in the existing set-up and business as usual are barriers that have not been overcome.

There is also a lack of capacity among Local Service Providers (LSPs), who are the key players in the cluster to provide technical support to MSMEs. While LSPs have the power to influence the technology choices of MSME units, the lack of knowledge, inadequate expertise to handle new technologies and lack of information about the comparative advantages of the identified technologies, has limited their impact on the MSME units.

Directly linked to the capacity of LSPs, the availability of servicing and maintenance of technologies in the cluster neighborhood is another important consideration in making decisions in favor of such technologies. While various studies, demonstrations and other interventions have identified these technologies, their lack of availability and maintenance expertise near the clusters has been one of the key reasons for the current situation.

- **Lack of Demonstration Investments in most Clusters**

There are very few demonstrable projects showcasing the benefits of industrial energy efficiency. This aggravates the issue of low awareness and slow dissemination of best available technologies and practices. The MSME users' concern regards energy efficiency (EE) arises based mainly on performance risks and the benefits of EE/ESCO projects due to:

- Small size (thinly capitalized) and entrepreneurial nature of EE businesses;
- Obsolete machinery and processes used for manufacturing;
- Lack of data on energy consumption, including measurement and verification available for MSMEs;
- Lack of awareness of EE options suited to their specific needs;
- Lack of attitude adjustment between energy auditors/ESCOs and users;

- Consultants usually play it safe - demonstration of savings is difficult as it requires a reasonable amount of analytical work to compute the savings. If the situation at the MSME changes, convincing stakeholders at the execution of the contract requires a fair degree of give-and-take on the part of all parties involved in order to reach an amicable solution for contract variations;
- Lack of project development capability and ability to translate EE benefits into savings; and dividing it equitably or in a fair manner;
- Non-availability of turnkey solutions from a single service provider – dealing with multiple vendors is difficult to manage especially when contracting issues are linked to performance;
- EE project development and transaction costs are a high burden to bear for a sector new to consulting activities;
- Lack of standardized contracts, audit and Monitoring and Verification (M&V) protocols, annual performance reports etc.;
- EE finance schemes are not available at the small local banks typically lending to MSME clusters.

- **Lack of Effective Financing Mechanisms**

A lack of financing for energy efficient technologies is a major barrier in a growing industry like that of India, in particular amongst MSMEs. Specifically, the barriers to financing that the project seeks to address include:

- Limited penetration of energy efficient technology in public procurement;
- Local banks fail to adequately evaluate EE based proposals;
- Industries are unaware of numerous government schemes/subsidies/credits available for efficient technologies;
- Energy auditors mainly give technical recommendations which fail to address the financers concerns.

One potentially powerful business model for addressing this financing barrier is via an ESCO model or Energy Performance Contracting. However, this has not yet taken off in India due to the following reasons:

- High transaction costs for ESCOs to enter into contracts with MSME units given that the size of investments is low and the numbers are large;
- The risk of non-payment for ESCOs is perceived as being high, particularly from the micro units given their informal methodology of operation;
- For MSME units, the transaction costs to engage with technology vendors and obtain a good deal are also high. The size of investments and lack of a coordinated approach limits their ability to secure robust arrangements for technical performance;
- The perceived risk of performance of new technologies by the MSME units is high and therefore limits their attention towards them despite demonstrations, project preparation and financing arrangements.

The project seeks to address all three major barriers described above; in doing so, it would build on the significant work done in the energy intensive clusters by various agencies in the past that has led to creation of awareness and interest in new technologies.

Baseline Projects

The need for interventions in the MSME sector has engaged the attention of the Government for some time now. The efforts of the Government have been supplemented by those of other agencies such as the Ministry of MSME, BEE, GEF, World Bank, GIZ, JICA, UNIDO, UNDP, etc.

BEE has undertaken project development in about 30 energy intensive clusters through the **XI Five Year Plan**. Almost 600 Detailed Project Reports (DPRs) were prepared for SME units, and Small Industries Development Bank of India (SIDBI) was taken in by BEE as a partner to facilitate funding of these DPRs for interested units. However, despite these interventions, enhancement of awareness and facilitation of financing, the programme has been unable to influence the units to implement identified technical interventions. In a recent analysis carried out by the Ministry of MSME of the interventions of various agencies in 112 clusters, the following facts emerged:

- Capacity building and awareness have been undertaken in all 112 clusters, mostly through the cluster level associations. The capacity building has included the units, LSPs and other stakeholders;
- Preliminary/walk-through energy audits have been completed in more than 50% of the units in all clusters;
- Detailed energy audits have been conducted in more than 50% of the clusters and bankable DPRs are available;

- Cluster benchmarks have been prepared for about 34 of the 112 clusters in terms of energy use, technology performance, etc.;
- Demonstrations have been implemented in only about 19 of the 112 clusters; actual implementation and scaling up has occurred in less than 10% of the units;
- Documentation of best practices for implementation has not been done due to lack of implementation and replication.

In response to the limited adoption of EE technologies, several technologies have been identified in MSME clusters by various agencies in recent years. The technological interventions range from simple approaches such as lighting retrofits and installation of efficient motors to Variable Frequency Drives (VFDs) and efficient gasifiers, etc. The investments in most of the identified technological interventions are reasonable and their adoption by MSME units could lead to significant energy and costs savings.

It is pertinent to mention that in those cases where detailed audits have been conducted and investment grade DPRs are prepared, the agencies have also coordinated with Banks/Financial Institutions (FIs), in particular SIDBI, to provide financing to the units and/or ESCOs interested in implementation. However, this has generally failed to result in the MSME units adopting EE measures.

As a follow-up to the XI Five Year Plan, the BEE **XII Five Year Plan** is identifying 8 clusters for implementation of demonstration projects. Under this XII Five Year programme, BEE has set up an institutional mechanism in the form of a Steering Committee with which this proposed project will cooperate closely. Details of various industrial units covered under the existing projects shall be obtained from the Project Management Units (PMUs) and these industries will be invited to participate in the awareness and training programs to be organized under the proposed project. The project would also ensure coordination and build on lessons learnt under various projects of the Deutsche Gesellschaft für Internationale (GIZ) in India. These include the GIZ-BEE led "Indo-German energy programme"; "Eco Industrial Development" project; and the Indo-German programme "Advisory Services in Environmental Management (ASEM)."

The Ministry of MSMEs has launched the **National Manufacturing Competitiveness Programme (NMCP)** to improve competitiveness in Indian MSMEs with a specific focus on increasing productivity, upgrading technologies and conserving energy. One component of the NMCP, *Technology and Quality Upgradation Support to MSMEs (TEQUP),* aims to upgrade manufacturing processes with the use of energy efficient technologies, thereby reducing production costs and GHG emissions. This is achieved through capacity building of MSMEs, implementation of energy efficient technologies, establishment of Carbon Credit Aggregation Centres (CCA), encouraging MSMEs to acquire product certification from national and international bodies, and conducting impact studies. The proposed project will aim to build on the existing work of the Ministry of MSMEs in the relevant clusters, complementing the built capacity and awareness with a sustainable financing scheme to be operated in cooperation with Energy Efficiency Services Limited (EESL).

Also focusing on financing energy efficiency projects in Indian MSMEs, the "green" financial support of Agence Française de Développement (AFD) works with SIDBI to increase awareness of EE, increase the capacity of SIDBI, and encourage MSMEs to make green investments. This is achieved through €0.5 million of technical assistance and a long-term soft loan for SIDBI to distribute via direct loans or intermediary credit lines to commercial banks. SIDBI has also partnered with the Japan International Cooperation Agency (JICA) on the provision of financing schemes to MSMEs for the purchase of energy savings equipment, and with KfW (German Development Bank) on three financing schemes focused on facilitating investment in energy efficiency measures, cleaner production measures and innovative technologies in MSMEs. The World Bank, under its projects, **Financing Energy Efficiency at SMEs** and **Partial Risk Sharing Facility for Energy Efficiency,** aims to increased demand for energy efficiency investments in selected MSMEs and builds their capacity to access commercial finance. The proposed project will build on these projects by extending the project focus to capacity building of ESCOs as the key distributors of financing, rather than the project itself.

While not focusing primarily on energy efficiency, recent initiatives implemented by GIZ have aimed to support innovative capacity in MSME clusters throughout India. This has included capacity building at automotive and electronics clusters in Aurangabad and Bangalore, respectively, and the development of a Knowledge and News Network to connect Chambers and Associations across the clusters. The study undertaken by GIZ, "Shifting the Paradigm: Mapping the Inclusive Innovation Ecosystem," indicated that a dearth of available and tailored financing schemes still remains the central barrier to MSMEs investing in innovative products.

Analysis has shown, however, that while the schemes are available in the market, their penetration is not sufficient to cover the vast number of clusters and MSME industrial companies. Many MSMEs continue to rely on personal

equity or commercial loans due to limited awareness and complex requirements and procedures. The proposed project will aim to address such issues by carefully taking into account the lessons learned of similar financing mechanisms in India, as well as working closely with ESCOs, financing institutions, MSMEs and government partners to ensure that the requirements of all parties are met to the extent possible and expand the reach of investment programs.

There is a need, therefore, for an alternative approach that could build on the work done thus far, taking it a step further to the implementation stage. This would require an aggregator, facilitator, coordinator between technology vendors and units, and a financer to lay out a robust mechanism to reduce transaction costs of all stakeholders and mitigate the technical and financial risks.

The proposed project seeks to implement such an alternative approach: Energy Efficiency Services Limited (EESL), a public sector body under the administrative control of the Ministry of Power, tasked with the mandate to facilitate implementation of energy efficiency on a commercial basis, is the most suitably and strategically placed to fill in the gap at the implementation level. EESL has the mandate to work in the energy efficiency sector at the implementation level, while BEE, MSME, PCRA, etc. (other government institutions) operate within their mandate at the policy and regulatory levels.

The proposed project proposes this alternative approach, backed by a substantial co-financing commitment which can be invested as soon as the organization of the financing mechanism is fully underway and energy savings can be shown.

In addition to the baseline programs/projects related to industrial energy efficiency, the following projects are relevant in terms of their work in addressing energy efficiency in other sectors:

Focusing on improving awareness of energy efficiency in India, both the World Bank and the Asian Development Bank (ADB) have a number of ongoing projects in this field. The World Bank project, **Energy Efficient Lighting Carbon Offset Project,** while not focused specifically on industrial MSMEs, has created a baseline of awareness within both the government and general public that the proposed project will build upon.

The International Finance Corporation (IFC), as part of the World Bank Group, has also partnered with BEE and the Alliance to Save Energy for the development of a **Manual for the Development of Municipal Energy Efficiency Projects**. The manual, published in 2008, provides guidelines and templates for the development of energy efficiency projects to be used by various stakeholders, such as municipalities, ESCOs, energy equipment suppliers, and financial institutions. As these initiatives have worked closely with ESCOs and equipment vendors for the provision of project financing, the built capacity and awareness of energy efficient solutions will be leveraged by the proposed project.

The ADB project, **Madhya Pradesh Energy Efficiency Improvement Investment Program**, focuses on 32 districts of the Madhya Pradesh state and provides investment funding for the installation of separate feeders for households and irrigation water pumps, and high voltage distribution systems (HVDS), provision of new power connections, etc. to ensure better quality power supply to households and financial sustainability of the distribution companies.

A.5 Incremental /Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project:

Business as Usual Scenario

In the business as usual scenario, the level of energy efficiency amongst the MSME units within the clusters to be addressed by this project is unlikely to undergo significant improvement; this is particularly the case with the micro category of enterprises. While the UNIDO/GEF project, "Promoting Energy Efficiency and Renewable Energy in Selected MSME Clusters in India - under the Programmatic Framework for Energy Efficiency" is addressing energy efficiency in some clusters, it does not involve implementing an innovative financing scheme which would enable much larger penetration. It also does not address the clusters to be addressed within this project.

Overall in the industrial sector in India, a significant number of interventions in the past for capacity building, awareness, project development, technology benchmarking, etc. have not led to sufficient adoption of energy efficient technologies and their replication. Therefore, a systematic approach involving a sustainable financing mechanism is required to demonstrate and scale up investments in the MSME industrial sector. The lessons from previous attempts have resulted in the conclusion that such measures must address the following:

(a) Identification of common technical interventions that have high energy saving and replication potential in the cluster;
(b) Demonstration of the technology in one of the units with due measurement to validate the cost effectiveness of technical intervention in the cluster;
(c) Providing installation, operations and maintenance (O&M) and training support to interested MSME units. This would require identification of Energy Efficient Technology Providers (EETP);
(d) Developing innovative financial instruments that could overcome the barriers related to seeking debt financing by units;
(e) Aggregation of demand by an Institution which has back-to-back arrangements with EETPs and FIs/Banks to enable a single window service to MSME units.

In the business as usual scenario, these lessons learned are not being incorporated into the current approaches to EE promotion in the MSME sector, thus limiting the impact and sustainability of the current interventions. As a result, potential reductions in GHG emissions and improved efficiency are not fully taken advantage of, and MSMEs will continue to use outdated and inefficient technologies despite the availability of improved technologies.

Project Alternative

The proposed project will aim to divert industry from the business as usual track by strengthening the market "push" and "pull" forces that contribute to industrial energy efficiency, while the model of capacity building and technology adoption will ensure that the project has sustainable benefits beyond the project term. The proposed approach will lead to development of local technological capacity and adoption through training and awareness raising of industrial technical personnel and end-users; consequently leading to spin-offs beyond the project period. The proposed project also aims to "fill the gaps" of previous projects focusing on energy consumption improvements in MSMEs through the provision of an innovative financing mechanism, namely an EESL-MSME Revolving Fund (EMRF). The availability of the Fund, combined with trainings for the development of bankable project proposals and awareness raising, will simplify and improve financing options for MSMEs in the targeted clusters.

The components of the project, particularly those related to capacity building, training and awareness, will create market "pull" factors, inducing demand for energy efficient technologies and practices. The national experts trained under the project will intensify efforts to promote energy efficiency for leveraging their newly acquired skills and knowledge. Similarly, with improved capacities, government bodies and banks will accelerate their efforts in scaling up energy efficiency measures, and suppliers will market greener, energy saving and profitable products to a more sensitized and receptive industrial audience.

THE PROPOSED PROJECT

Project objective

The project aims to promote the implementation of energy efficiency in the MSME sector; to create and sustain a revolving fund mechanism to ensure replication of energy efficiency measures in the sector; and to address the identified barriers for scaling-up energy efficiency measures and consequently promote a cleaner and more competitive MSME industry in India.

The proposed project has 3 substantive components:

Component 1: Programme to identify energy intensive clusters and replicable technologies

This component will serve two key outcomes; **i) 10 energy intensive clusters identified based on objective criteria**; and **ii) Identification of technologies that have the maximum impact on the cluster as a whole**. The identification process of these outcomes will focus on the work already done by several agencies such as BEE, Ministry of MSME, UNIDO, JICA, World Bank, etc. and the selection process will be led by the Ministry of MSME, in consultation with EESL and BEE.

Output 1.1.1: Objective and transparent mechanism for cluster level technology benchmarking established

As a first step, the project proposes to undertake an assessment of the work done in the past by various agencies; the study will capture the best practices, incentive structures, implementation processes, guidelines and industry feedback etc. The Output will be achieved in line with the BEE XII Five Year Plan programme where 8 clusters are being identified for implementation of demonstration projects. Under this XII Five Year Plan programme, BEE has set up an institutional mechanism in the form of a Steering Committee comprising of the Ministry of MSME, BEE and EESL; the amount allocated by BEE for this is being taken as co-financing for the proposed GEF project.

To achieve this Output, the project will analyze the results of the energy audit and technology benchmarking studies. The initial identification of the clusters will be based on the following criteria:

- Prioritization following analysis of energy use and energy saving potential as per the aforementioned studies;
- Availability of DPR/Energy Audit Studies carried out by other agencies;
- Awareness/Capacity building activities already carried out in the past.

The identification of the replicable technologies in these identified clusters will be carried out based on the following objective assessment:

- Based on the work already done in the form of DPR preparation, energy audit studies, etc., identification of technologies that are commonly used by units in a cluster;
- Prioritization of technologies based on their potential impact on the overall savings potential assessed;
- Availability of technologies in India and their cost-benefit analysis;
- Selection of technologies that could provide maximum energy savings to the units;
- Assessment of technology deployment gaps in terms of training needs of MSME units, capacity gap of LSPs, servicing and spares of technology vendors and installation & maintenance services for technologies.

Cluster level agencies having due technical expertise shall be included for effective delivery of the intended objectives. Consultants, wherever required, shall be sourced from the list of UNIDO consultants.

Output 1.2.1: Tool kit of identified technologies prepared

This Output will firstly involve the **identification of commonly replicable technical interventions through equipment audits.** This will include the assessment and prioritization of EE measures and best operational practices recommended that have wider applicability in the cluster. It will require evaluation of Investment Grade Energy Audit (IGA) studies and/ or DPRs already prepared for the cluster. For sectors wherein data is not available, all necessary data collection activities will be conducted, such as walk through audits, detailed audits, equipment analysis etc. Equipment audits will be undertaken to identify such interventions.

The second step is to **develop technical specifications of the identified interventions** with support from technical experts and other engaged bodies in the cluster. Energy efficient technology/equipment providers of the technical intervention along with costs and other services (installation, O&M support, and training) will be finalized.

Finally, a comprehensive tool kit for the identified technologies will be prepared that will support the implementation process. The tool kit will, for the identified technologies, include the following:

(a) Technical specifications of the identified technologies;
(b) Performance requirements of the technologies based on the consultations done at the cluster level;
(c) List of equipment suppliers along with an assessment of their abilities to provide cluster level servicing and maintenance support;
(d) Analysis of operational requirements of the technologies in the cluster based on the experience gained by various agencies;
(e) Indicative costs of the identified technologies based on market inquires and/or implementation done in the past;
(f) Training, capacity building and customization support required at the cluster level.

Component 2: Demonstration projects and aggregation of demand for demonstrated technologies in the clusters

Outcome 2.1: Capacity built and awareness raised as a result of the demonstration projects

Output 2.1.1: 100 Local Service Providers (LSPs) and technical personnel of MSME units trained

The demonstration shall be conducted so that LSPs are brought into the implementation process along with proven energy efficient technology providers. This will help in developing the capacity of the LSPs to not only become accustomed to energy efficient technologies and processes but also to later be pioneers in scaling up activities by using the Ministry of MSME's various schemes and other ESCO funds.

The project will short-list 100 LSPs and unit level technical personnel in installation, operations and maintenance of the technologies demonstrated. This will be done through cluster level workshops on the technologies being demonstrated and a LSP coordination mechanism shall be established through the PMU.

Output 2.1.2: Peer to peer network established and results of demonstration projects disseminated through cluster level workshops; M&V protocols finalized

This output will involve engagement with Cluster Associations and MSME units to increase awareness of the significant potential energy and cost savings of the interventions, thereby enhancing confidence in investing in them. A lateral engagement with the programmes of BEE, Ministry of MSME, bilateral and multilateral agencies, etc. will be conducted in order to avoid duplication.

A peer to peer network will be established to analyze and validate the energy savings information from the demonstration projects. This network will include local technology experts, LSPs, representatives of MSME Associations at the cluster level, etc. This will not only enhance the credibility of the results, but also foster information exchange amongst industrial enterprises and encourage new enterprises. The network will be an interactive platform managed by the EESL PMU engaged experts. Results from the project demonstrations will be developed into case studies and shared through the established network. The network will also be used to enlist MSME units for replication and scaling up activities.

Once the validation of the energy use savings through the network has been accomplished, workshops will be conducted at each of the 10 clusters with the objective of:

(a) Dissemination of findings of the demonstration projects (to all units within the clusters);
(b) Articulation of energy use and cost savings from the technology demonstration;
(c) Finalization of returns on investment based on reasonable assumptions about internal rates of return (IRRs), interest rates and maintenance expenditures to enable third party financing;
(d) Finalization of the project periods based on the techno-commercial evaluation of the demonstration;
(e) Collating operational efficiencies in the units where the projects have been implemented and presenting them as co-benefits;
(f) Visits to the demonstration facility.

As part of developing the M&V protocols, the demonstration interventions would be monitored to validate the savings indicated in the IGA Report or DPR. The M&V protocols that will enable transparent and fair assessment of energy savings, as well as impact assessments, will be developed and finalized.

Outcome 2.2: Demonstration of energy consumption reduction at the cluster level

The implementation of technology demonstration in the identified clusters will enable actual demonstration of energy savings and operational efficiencies to the units; the demonstration of 2-3 technologies identified in each cluster will be undertaken at a minimum of 2 units. The selection of the technology, and units where this technology is to be demonstrated, shall be conducted by the PMU, based on guidance from the Steering Committee. This initial cost of demonstration will be met through the GEF grant and Ministry of MSME schemes, with some co-financing from EESL/ESCOs or financial investors/FIs.

To encourage participation in the project demonstrations, a limited initial contribution will be required from the enterprises with the financing received reimbursed to EESL via a delayed payment scheme. Once the MSME unit is satisfied with the energy saving outcome of the intervention, the same amount will be returned to the project and will be added to the EMRF to be created under Component 3. Appropriate contractual documents for this will be developed by EESL.

Based on the studies done in the past, an indicative list of clusters identified is below. The Steering Committee, based on transparent mechanisms following the above actions, will select the clusters and enterprises accordingly for carrying out of project interventions by the PMU. The selection criteria are tentatively outlined as:

a) Highest consumption of energy among the clusters;

b) Potential for energy efficiency improvements in the cluster based on the use of impact assessment studies carried out by BEE;

c) Level of interest of the clusters as evaluated based on the number of MSMEs submitting applications for project assistance;

d) Lessons learned from the studies carried out by the Ministry of MSME, SIDBI, BEE, etc. regarding specific clusters.

The same will also be used for the selection of enterprises with in the cluster chosen. A cluster energy scenario is attached as Annex J.

Table 1: Consolidated List of Clusters to be considered based on additional energy saving potential

Cluster	Total energy requirements in the cluster as a whole	Estimated annual additional energy saving potential in the clusters on implementation of the TPs		
	(toe)	Rs in Lacs	USD	Toe
Morbi (Ceramic Cluster)	1,397,962	10,241	17,409,700	29,219
Vellore (Rice Mill Cluster)	78,540	2,450	4,165,000	15,044
Odisha (Sponge Iron Cluster)	2,197,566	6,785	11,534,500	9,726
Varanasi (Brick Kiln Cluster)	43,618	1,260	2,142,000	5,516
Surat (Textile Cluster)	672,400	1,669	2,837,300	5,491
Jodhpur (Limestone Cluster)	140,047	687	1,167,900	4,865
Pali (Textile Cluster)	128,450	1,449	2,463,300	4,579
Vapi (Dyes & Chemicals Cluster)	28,556	874	1,485,800	4,069
Jorhat (Tea Cluster)	90,300	1,072	1,822,400	3,818
Batala / Jalandhar / Ludhiana (Casting & Forging Cluster)	23,068	1,987	3,377,900	3,724

Output 2.2.1: Thirty Five (35) energy efficient technologies demonstrated in industrial enterprises (minimum 2 units to be covered for each technology)

The project will short-list MSME units to implement technology demonstration of the identified technologies. The units will be selected based on their availability and willingness to share technical and commercial data, provide access to other units for technologies implemented, etc. The methodology to be followed will be on a first come-first serve basis for those satisfying the above conditions. The demonstration will include customization of the technologies to suit the requirements of the units. Adequate measures to assess the baseline information and that of the new technology will be adopted.

The demonstration of technology shall involve replacing the energy inefficient systems with the most energy efficient system. Best resources in the form of technical experts, state of the art technologies and equipment shall be utilized to transform the local demand-supply market. The cost of demonstration will be met through the GEF grant and MSME schemes, with some co-financing from EESL/ESCOs or financial investors/FIs. The 35 selected technologies, as well as the clusters, are elaborated upon in Annex J.

Outcome 2.3: Scaling up of investment activities for EE in industry

As indicated earlier, there is low capacity within MSME units that is coupled with a relatively low cost of technologies which leads to limitations in the ability of disaggregated procurement by individual units to secure performance guarantees, competitive costs and maintenance support.

Aggregation at the cluster level is intended to overcome these challenges, while at the same time reducing the overall transaction costs of all stakeholders. In the indicated list of clusters (see Table 1), if the top 10 clusters in terms of their energy use and savings potential is taken as an example, there are about 2,665 units. Following the demonstration activities, EESL will aggregate the demand with a target to reach out to about 400 units in the clusters where implementation of technical proposals is possible. The investments in these units will be done by EESL through its own funds (equity from its own sources) or commercial loans from SIDBI and/or other banks, or by an ESCO which will be arranged/facilitated by EESL with financial assistance from schemes of the Ministry of MSME.

Output 2.3.1: Investments undertaken by other MSME units as a result of the demonstration activities facilitated

The project will, following the dissemination workshops, take proactive steps to reach out to all MSME units for enrolment in the programme. Support from cluster level actors, including LSPs, Associations, etc. will be taken in this exercise. Only those technologies where technology aggregation is possible shall be adopted.

Demand for the intervention will be aggregated; of the 2,665 units in the 10 clusters, around 400 enterprises are expected to undertake EE project implementation. The bulk procurement via this mechanism will allow for

obtainment of the best price from EE technology providers, including installation, O&M, training support and raising debt funds to pay for the upfront capital cost. Due to aggregated demand, the EETP will also provide all such services in the cluster that the LSP is providing at present.

Output 2.3.2: Identification, documentation, and documentation of specific needs and technical performance requirements of enrolled units and technology vendors

To ensure that the MSME units find value in the project, the assessment of individual needs related to customization, operational training and other specific requirements will be undertaken. This will prepare the ground for effective and efficient deployment of technologies in the units enrolled.

Following the assessment of the individual units, modifications to the technical parameters, warranties, etc. will be included. Back-to-back arrangements will be entered with the vendors to mitigate any associated technical performance risks. In addition, performance bank guarantees or other such instruments will be pursued for this purpose.

Once the enrolment of a large proportion of the units has been undertaken, consultations between technology vendors and the enrolled units will be undertaken to ensure information symmetry between the two with regard to performance requirements and the ground level support expected.

Component 3: Financing models to support replication of energy efficiency projects in MSMEs

Outcome 3.1: Establishment of sustainable and effective financial mechanisms

Output 3.1.1: Officials from government agencies (Ministry of MSME, MOEF, MOP, etc.) and private banks/financial institutions sensitized on promoting EE equipment and trained on evaluating and investing in industrial EE projects

For sensitization and training of private and government-owned banks, the PMU-engaged experts will identify private sector consultants/experts to conduct sensitization programs for officials from government/private banks/FIs to promote lending for EE technologies; the program will outline the benefits of EE. The identified experts will also carry out training to sensitize banks/FIs on the benefits of making EE investments and the better appraisal of project proposals submitted by industrial enterprises. Trainings will cover various aspects, such as EE financing instruments; technical and financial evaluation; measurement and monitoring tools; credit rating of EE projects; and risk analysis and risk management of proposed EE investments.

Output 3.1.2: A tailored portfolio of innovative financial products for MSMEs' investment in energy efficiency projects facilitated

This output will contribute to the facilitation of Component 2 of the project; participating industries will be assisted and supported with customized financing options in order to encourage implementation. EESL/ESCOs will, based on the innovative financial products, provide upfront capital for the technologies and will be paid back based on the parameters identified over the project period

Given that the transaction costs and risks associated with ESCO investment in the MSME sector is high, a pure shared saving model has not been successful to scale up implementation of EE projects in the sector. Thus, there is a need to look at innovative financial products that can:

(a) Reduce transaction costs for technology vendors and FIs, as well as MSME units;
(b) Provide a transparent and fair mechanism for the apportionment of technical and financial risks;
(c) Provide measures to enhance the payment security for the ESCOs/EESL investments in technology deployment in the units.

In order to ensure that the replication of the EE projects in the MSME sector continues beyond the GEF project, a Revolving Fund will be set up to sustain the activity. The EESL MSME Revolving Fund (EMRF) will be seeded with the GEF grant, to be disbursed to industrial MSME Units under Outputs 2.2.1 and 2.3.1, and will be accredited by a portion of the returns that EESL will receive from implementing the project.

The EMRF will be coupled with an innovative financing model to be introduced to reduce the transaction costs of MSME units adopting the recommended technical intervention. The objective of this model will be to reduce the transaction costs of MSME units, to be undertaken by the SMEIP-E; for this, financial arrangements with FIs/banks will be worked out by EESL. The models will work on the principle of "Pay-As-You-Save" (PAYS) where regular payments to EESL/ESCO will be done by the units after installation of the technology.

One of the innovative financial instruments that can be tailored for this purpose is an annuity approach where, based on energy savings, providing for a reasonable return on investment and the capital cost, periodic payments from these units to EESL/ESCOs will be worked out over a reasonable contract period. This is akin to an Equated Monthly Instalment (EMI) where units are required to pay monthly amounts to the FI/ESCO/Supplier for the demonstrated intervention. In this manner, it will provide a single window system for MSME units to avail of the technical intervention with a delayed payment mechanism. EESL will provide the upfront capital for replications following the demonstration of technologies. Seed money for this mechanism is provided partially from the GEF grant of Component 2.

EESL/ESCOs will in turn have back-to-back arrangements with the technology suppliers to ensure technical performance of the technology over the contract period and beyond. The other services that will be a part of the intervention will include installation, O&M and training support. The innovative financial instruments and the methodology will mitigate the risks as depicted in the matrix below:

A. Uncertainty about Energy and Cost Savings	**B. Financing Model**	**C. Large Scale EE Technology Deployment**	**D. Replication and Scaling-up Strategy**
Pilot Demo Project for identified clusters to create confidence among stakeholders; Handholding of MSME Units; M&V of the Demo Project results as per the best international practices; Dissemination of results.	Bulk Procurement of single technology to reduce the upfront capital requirement; Convenient project repayment mechanism; Involvement of local banks/FI.	Offer size to private sector technology provider; Plug-in required local after sale service support; In-built capacity building and training program.	Regular coordination and engagement with all key public and private sector stakeholders (BEE, Ministry of MSME, others); Development of business case studies; Dissemination of concept and results in other clusters; Learning interaction among various clusters.

The pictorial representation of the Financing Mechanism is shown below:

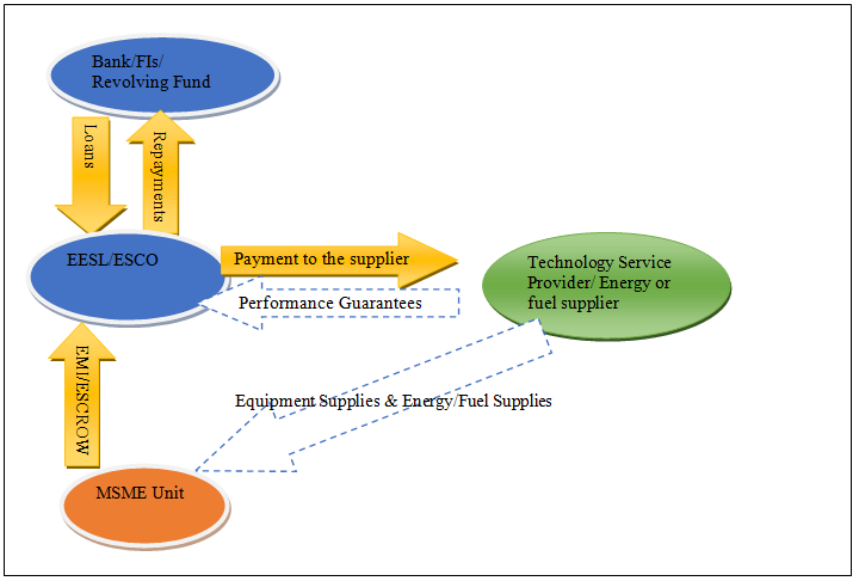

Figure 2: Description of the financial mechanism

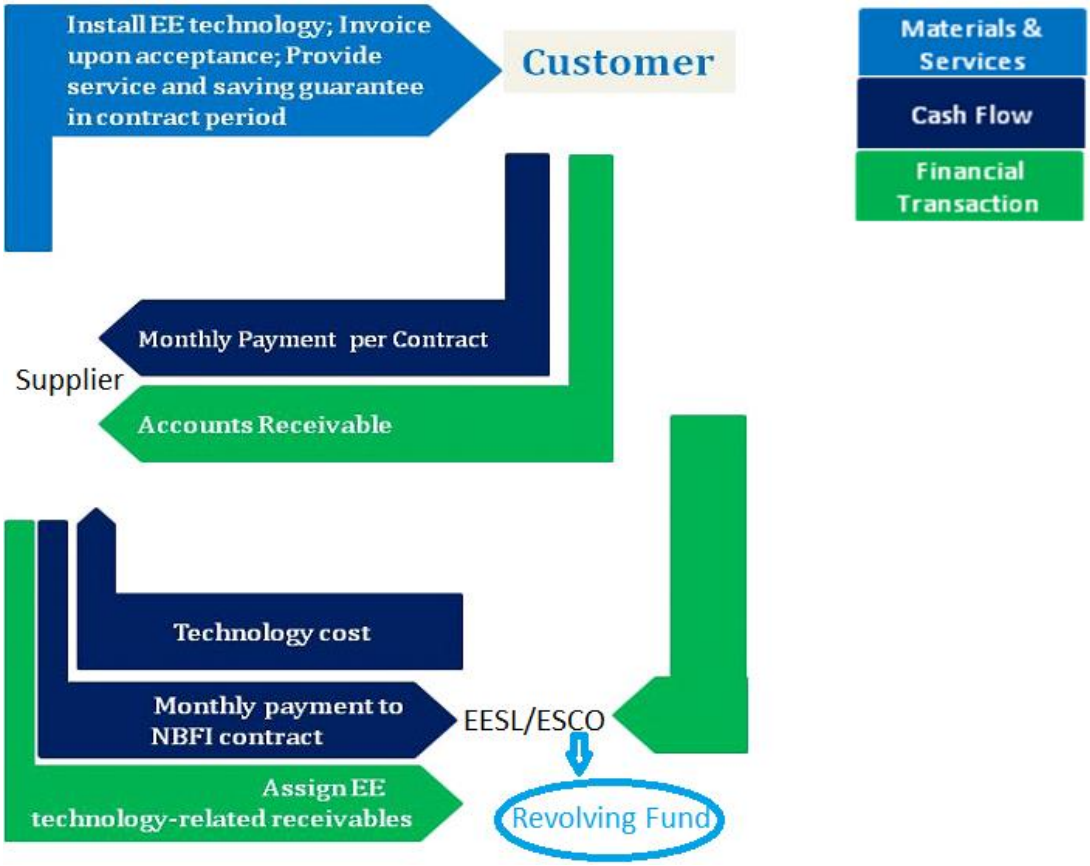

Figure 3: Material, service, and cash flows of the EESL/ESCO project and EMRF

Output 3.1.3: Industrial enterprises apprised of the existing financial schemes and national experts trained in the preparation of innovative energy efficiency financial proposals

Awareness programs for industrial enterprises – there are numerous financial schemes, subsidies, lines of credit etc. that promote investment in energy efficiency and technology upgradation. These are offered by numerous ministries, government bodies and international organizations working in the sector. However, feedback from stakeholders reveals that very few industrial enterprises are actually aware of such financing instruments. Faculty from banks, government bodies and other organizations will be invited to elaborate on the credit facilities, their eligibility criteria and the step-by-step process for availing them.

Output 3.1.4: Contracts for EESL/ESCOs with MSME units and technology providers standardized

Standard contracts will be developed for third party financing for the technologies with MSME units, as well as the bulk procurement of technologies by EESL/ESCOs from technology suppliers. The contracts will:

(a) Be simple and easy for MSME units to comprehend and implement;
(b) Outline the roles and responsibilities of MSME units/technology vendors and the third parties (EESL/ESCOs), including the apportionment of risks, payment plans, payment security measures, etc.;
(c) Bring out the technical performance requirements of the technology and detail the performance guarantee mechanism;
(d) Outline clear dispute resolution mechanisms.

Output 3.1.5: Institutional and governance structure, and working methodology of the EESL-MSME Revolving Fund (EMRF) finalized; options for seeking additional funds for the EMRF identified

In order to ensure that the replication of energy efficiency projects in the MSME sector continues even after the GEF project is completed, a revolving fund will be set up to sustain the activity. The fund will be seeded with the GEF grant to be disbursed to industrial MSME Units under Outputs 2.2.1 and 2.3.1 and will be accredited by a portion of the returns that EESL will receive from implementing the project.

The institutional structure of the fund will be further finalized after due consultations; however, the EMRF shall be owned by a trust with representation from EESL, the Ministry of MSME and other suitable government entities. The

operation of the EMRF shall be executed by EESL under the guidance of the trustee board. EESL will be the manager of the revolving fund and have responsibility for its operation and implementation as the Executing Partner of the project. UNIDO will serve as a technical advisor for EESL - providing assistance in identifying projects for investment, evaluating potential projects, and monitoring and evaluation of project impacts for reporting to the GEF and other interested parties. UNIDO will also assist EESL in procuring appropriate expertise for the Fund's implementation. UNIDO will also serve on the project steering committee which will provide guidance to EESL.

Upon project completion, the aim is for the revolving fund to continue to operate - likely with terms of lending slightly better than commercial rates and with infusions from the Indian Government as needed. By this time, the fund will have been capitalized, will have disbursed its first round of investments, be receiving reflows, and should not require additional non-reimbursable funds for technical assistance. International experiences and best practices in institutional mechanisms and governance structures will be evaluated for the same; international experts will be engaged for this purpose.

Further, the lessons learned from the implementation of similar facilities in India (i.e. the ADB energy efficiency investment loan) will also be considered and incorporated in the development phase of the EMRF. Specifically, the following have been highlighted as key issues for consideration in order to for the EMRF to operate in an effective, efficient and sustainable manner: i) confirmation of conditions (selection criteria, disbursement procedures, etc.) at an early stage; ii) provision of appropriate financing options; iii) maintenance of original receipts for all expenses financed under the loan for at least 5 years after loan closure; iv) monitoring of all subproject sites during project implementation; v) financial terms of lending (including transaction costs) must be competitive with commercial financing, etc.[6] The project's strategy to mitigate the risks and weaknesses identified in similar existing facilities, such as that of the ADB, is outlined below:

	Potential Risks/Weaknesses of Funding Mechanism	**Mitigation Strategy**
i.	Design weakness at project formulation, particularly in the exclusion of policy and institutional components;	The project has been formulated based on the lessons learned of similar projects implemented where replication of energy efficiency projects did not take place. The key lesson is that implementing an ESCO project in the SME sector is extremely transaction intensive and is therefore neither attractive for EESL nor to SMEs to continue with this approach. Taking note of this, the project has incorporated technology demonstration which will result in energy and cost benefits. Such demonstrated technology will then be offered to other SME units in a manner that they can pay for the capital cost over a period of time from the energy savings that accrued to them. EESL will aggregate demand and ensure that best price is provided for the technologies.
ii.	Inadequate project supervision during implementation, as shown by the minimal documentation of subproject implementation;	The project envisages capacity building, training, deployment and maintenance services to be provided as a package for technologies. The overall programme will be monitored through a strong institutional mechanism of the Ministry of MSME, BEE and EESL, as reflected in this document on page 19 and Annex H.
iii.	Inadequate provision for project monitoring and evaluation after the completion of all subprojects.	The programme includes monitoring and evaluation of the project in a manner that is aligned to the objectives of the programme; the same is detailed under Output 2.1.2. Provision for non-term course correction based on the evaluation has also been incorporated.
iv.	Inadequacies of project objectives and undermining of project selection criteria	The project objectives as indicated on page 12 of this document are very clear, and the technologies and the SME clusters where these technologies will be deployed have been pre-identified. It is also indicated very clearly that the selection criteria of these technologies, as well as their deployment, will be done after careful consideration of the Steering Committee (comprising of Ministry of MSME, BEE and EESL, etc.) as indicated in document on page 19, Annex F and Annex H. It is also confirmed

[6] http://www.oecd.org/derec/adb/35182572.pdf

		that lessons learned in the past will be noted by the Steering Committee so that objectives of the project and quality of technology and performance is not compromised or undermined.

The working methodology of the EMRF will be finalized under this component, but will tentatively include the following:

Funding and Cash Flow

The EMRF will source its seed-funding from the GEF grant and may also look at other donors. The Fund will operate on timely replenishment of capital spent to make it self-sustaining and serve a wider client base. Hence, the success of the fund depends to a great extent on how accurately the revenues from investments are predicted.

Critical control parameters

The cost projections of any initiative should insulate the Fund against changes in inflation, interest cost, rupee-dollar exchange rates and power tariff. The Fund should have a critical reserve level (say 30% of the total funding) below which the Fund should not operate. The reserve level is required to ensure continuity of the Fund and availability of funds through budgetary cycles and significant events for projects under execution.

Performance Measurement Factors

- Investment Targets
- Revenue
- Operating Costs
- Target Ratios
- Factors why targets are attainable
- Recording of significant business/regulatory events seasonal factors

In order to enhance the scope of the interventions, options from government and international funding sources that could be tapped by the EMRF will be evaluated based on the synergies of objectives between the EMRF and the donor funds.

Work Plan: The detailed component and activity wise work plan in provided in Annex G.

Global Environment Benefits

The project interventions will lead to energy savings, resulting in consequent GHG emission reductions; the global benefits in terms of avoided CO_2 emissions are estimated as follows:

A. Direct GHG reductions – Emission reductions achieved by demonstration projects that are planned and implemented as part of the project as well as energy efficiency investments leveraged as a result of the project during the project's supervised implementation period.

B. Indirect GHG Emission Savings – Emission reductions achieved after project completion (year 6 onwards) as a result of the enabling environment for EE practices and investments created by the GEF project and projects implemented by the equipment vendors/suppliers after receiving technical assistance from the projects.

In total, the project is expected to result in ***direct annual energy savings*** of 956,184 GJ; with lifetime of investments being 10 years, this means a total 10-year reduction of 9,561,838 GJ.

In terms of GHG reductions, the project is expected to provide 80,600 tonnes CO_2eqper year as direct GHG reductions by the end of the project in 2019. With lifetime of investments being 10 years, this means a total 10-year reduction of 806,000 tonnes CO_2eq resulting from the project.

These calculations are based on emission factors of 0.878 tonnes of CO_2/MWh of electricity and 0.0774 tonnes of CO_2/GJ of fuel oil based on the GEF's GHG calculating tool.

The GHG Emissions are based on energy savings estimates per investment cost as taken from the Impact Assessment Study Report prepared by BEE.

Detailed calculations of GHG emissions reductions can be found in Annex E.

Innovation

This project is heavily geared towards encouraging innovation in both (a) the technologies and practices used within the industrial MSME sector and (b) financing mechanisms for encouraging investment:

The technologies and practices – while not innovative technologies in the world market – can be considered as innovative to many/all of the clusters of MSME industries within India within the scope of the project. The activities related to improving the level of knowledge of professionals via training and peer-to-peer networks, and the development of a tool-kit of identified technologies, combined with demonstration projects will be specifically aimed at encouraging the incorporation of innovative practices and technologies in the industries impacted.

The financing mechanisms will be innovative in the sense of developing a revolving fund mechanism linked with non-reimbursable funds: expanding the knowledge and awareness of policy-makers and institutions on how such a programme can and should work to encourage replication across a broad spectrum of industries.

Sustainability and Scaling Up of the Project

This project is designed to ensure sustainability and scaling up of energy efficiency improvements beyond the project cycle. It will do so **during the project period** through immediate investments in knowledge and demonstration projects by:

1. Expanding the level of knowledge and awareness of policy-makers, financiers, and senior management of industries;
2. Training a cadre of professionals (technical staff, national experts, and suppliers) to assist in sustaining the project interventions;
3. Establishing a peer to peer network for the sharing of demonstration projects results and other knowledge; and
4. Development of a Tool kit which will be continuously updated to include newer technologies and suppliers.

For scaling up of the project and long-term sustainability in the **post-project period,** the project will be heavily focused on capitalizing and successfully setting up a scalable and sustainable financing mechanism – the EESL-MSME Revolving Fund (EMRF). The financial plan for the newly established fund will – amongst other sources of funding – allocate a part of the revenues to ensure that the interventions go beyond the coverage that this project entails.

The industrial sector and the number of industries, including MSMEs, are growing at a rapid rate. This offers immense potential for replication. The project will aim to ensure this replication by showcasing the demonstration projects in a structured manner; detailed case studies capturing the benefits will be prepared and highlighted to industries from the concerned sectors. These efforts will further contribute to an attitudinal change and a market shift towards energy efficiency. Additional efforts will be made to cover large geographical spreads during the dissemination process.

A.6 Risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and measures that address these risks:

Risk	Rating	Mitigation measure
Political risk: Changes in government priorities resulting in reduced support for the project, delays in activities and overall ineffectiveness of the interventions.	Low	The project seeks to transform the market for deployment of efficient technologies in the MSME sector. The MSME sector interventions are considered a high priority of the Government as spelled out in the XII Five Year Plan and articulated in the policy and planning of the Ministry of MSME and BEE. Thus, the risk of a drastic change is unlikely. To mitigate this risk the Project Steering Committee will be closely involved in the project's activities, giving guidance and advice throughout the identification, selection, and intervention processes.
Technical risk: Lack of energy savings from deployment of efficient technologies	Low	The project builds upon the work done in the past where such technologies have been identified based on field studies and cluster level energy audits. Moreover, the demonstration projects to be conducted using the GEF grant will ensure that only those technologies where the technical performance risk is minimal are

		taken up. UNIDO and EESL will ensure this by leveraging technical expertise from all stakeholders, including industry, government and others.
Sustainability risk: The risks envisaged here include inability to scale up implementation and lack of financing beyond the project period.	Low	EESL has committed financial resources to ensure that replication occurs beyond the project's implementation period. The EMRF to be established will also ensure that the best practices of project design and implementation are replicated in other clusters. To this end, the project proposes to use a combination of risk mitigation measures, such as opening of irrevocable revolving Letters of Credit, ESCROW arrangements, and/or taking advance post-dated cheques to ensure that the SME unit which avails of the scheme, does not default on payment. In addition, the Partial Risk Sharing Facility (PRSF) and Partial Risk Guarantee Fund (PRGF) are being set up by the World Bank and BEE, respectively; these funds would provide risk cover of up to 50% of the loan value and would therefore provide mitigation for financial risks. EESL is the transaction advisor to the World Bank, as well as BEE for the two funds. Thus, EESL is well placed to ensure that the above outlined payment security mechanisms are put in place so that the risks associated with EMRF re-payment are duly mitigated.
Financial risk: The risk of non-payment for investments made by EESL/ESCOs	Medium	UNIDO and EESL will not only provide training to industries for building their capacity on the long-term financial benefits of investing in energy efficiency, but the project will also leverage risk mitigation measures that are being set up by BEE, such as the Partial Risk Guarantee Fund under NMEEE. In addition, BEE and the World Bank, using GEF and Clean Technology Fund resources, is creating a Partial Risk Sharing Facility that will be managed by SIDBI with a focus on the MSME sector. By leveraging these instruments, the proposed project will reduce the financial risk of investment.
Climate change risk: The project is not subject to any climate change risks.	None	While no climate changes risks are foreseen, the project will mitigate any potential risks to project demonstration sites by include criteria related to such risks in the cluster surveys, and if a risk is identified, develop a mitigation strategy before implementation begins.

A.7 Coordination with other relevant GEF financed initiatives

Energy efficiency in Indian industry is supported primarily through interventions by the Government of India, as well as through projects and programmes implemented by various multilateral, bilateral and development agencies. This support is extended across both large, as well as MSME industry sectors. The work of international organizations focuses mainly on the MSME sector; the World Bank, UNDP and UNIDO with support from the GEF are implementing projects focusing on fostering energy efficiency investments across numerous energy-intensive sectors such as foundry, forging, dairy, chemicals, brick, steel re-rolling etc. The proposed project will take advantage of synergies with the ongoing and planned GEF-funded initiatives, particularly the World Bank-GEF projects on **Financing energy efficiency at MSMEs** (GEF ID #3551), and **Partial Risk Sharing Facility for Energy Efficiency** (GEF ID #4918). This proposed project is highly complementary to these World Bank-GEF projects that seek to address banks as the main direct beneficiary for risk reduction mechanisms, whereas this project addresses the ESCOs and industries themselves as the main beneficiaries – helping to address barriers related to "first movers" within industry and among ESCOs. Efforts will also be made to cooperate, where relevant, with the various World Bank projects that focus on chillers, railways and commercial buildings under the **Programmatic Framework for Energy Efficiency in India** (GEF ID #3538).

The proposed project will also take advantage of synergies with the UNIDO-GEF projects on **Promoting Energy Efficiency and Renewable Energy in Selected MSME Clusters in India** (GEF ID #3553), **Promoting Business Models for Increasing Penetration and Scaling Up of Solar Energy** (GEF ID #4788), and the **Cleantech Programme for SMEs in India** (GEF ID #5218).

B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:

B.1 Describe how the stakeholders will be engaged in project implementation.

The project will involve various stakeholders from the government, private and research sectors.

Implementing Agency	**UNIDO**	UNIDO is a specialized agency of the United Nations that promotes inclusive and sustainable industrial development (ISID). The Organization draws on four mutually reinforcing categories of services: technical cooperation, analytical and policy advisory services, standard setting and compliance, and a convening function for knowledge transfer and networking. UNIDO is the Implementing Agency (IA) of the proposed project and a member of the Project Steering Committee (PSC).
Project Steering Committee Members (PSC)	**Ministry of MSME**	Ministry of MSME is the Lead Executing Agency (EA) of the project. The Ministry of MSME will chair the PSC meeting for providing guidance to the PMU (to be established within the Ministry of MSME premises) on project work plan and execution. Specifically, the Ministry will play an advisory role and provide expert advice on aspects related to the MSME sector. The Ministry will also support the PMU though its field offices' presence across India for the implementation of the project. The PMU will adhere to the regulations of the UNIDO/GEF as a general rule for the executing the project.
	Bureau of Energy Efficiency (BEE)	BEE will be the guiding agency in the project and will be part of the Project Steering Committee.
	Energy Efficiency Services Limited (EESL)	EESL, under the Ministry of Power, Government of India, is the Executing Partner of the project, as well as a member of the PSC and will provide project guidance to the PMU hosted in the Ministry of MSME.
	GEF Operational Focal Point of India, Ministry of Environment, Forests and Climate Change (MoEFCC)	The GEF Operation Focal Point of India will be a member of the Project Steering Committee.
	Small Industries Development Bank of India (SIDBI)	SIDBI will be the lead bank for the provision of financial assistance towards energy efficiency investments during the project for EESL/ESCO/MSME units.
Private sector stakeholders	**MSME Industry**	MSME industrial enterprises will be the main beneficiaries under the project. The participating industrial enterprises will be required to share data, cooperate with experts, implement the recommended changes and comply with monitoring protocols.
	Industrial Associations	Major associations from important energy intensive MSME clusters will be involved during the project. Their role will be to facilitate workshops, create outreach and sensitize industries on relevant training programs and workshops. They will also be involved in the dissemination efforts of the project.
	Business Chambers of Commerce	The Business Chambers of Commerce in the project's areas of activity will be consulted and cooperated with for the implementation of awareness campaigns and trainings. Their role will be to facilitate and create outreach for the project's activities using their existing communication channels.
	Gender	The project will ensure to maintain gender equality at each stage of project

	Dimensions	implementation. Participation of women will be encouraged while selecting experts and consultants for training and capacity building activities. Project stakeholders will be encouraged to nominate women employees to participate in the project. Efforts will also be made to include gender focal points from relevant ministries in the Project Steering Committee meetings where possible.
	Other stakeholders:	These will include national experts, consultants, vendors, suppliers, business development service (BDS) providers, local banks and financing institutions who will be participants in the training programmes and capacity building workshops (either as faculty or as recipients).

The project will establish a robust institutional mechanism that will be necessary to coordinate with the various agencies that have worked or are working in the identified clusters. The Project Steering Committee will be established, including representatives from UNIDO, the Ministry of MSME, BEE, EESL and other related agencies, including SIDBI.

The below diagram indicates the project institutional arrangement; the detailed institutional and project management arrangement has been provided in Annex H.

B.2 Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF):

The project is expected to bring socioeconomic benefits related to employment generation and working environment. The implementation of demonstration projects and the associated training and capacity building offered to MSME units, service providers and suppliers will create employment and business opportunities in the field of energy efficiency and management, and these stakeholders will have a new and more refined skill-set. Implementation of energy efficiency projects is expected to bring about reductions in GHG emissions at the enterprises and this is bound to improve the working environment and reduce health related risks, especially for labor working in MSMEs where the conditions can be extremely challenging. These units will become competitive while at the same time improving their productivity.

Gender will be an important aspect of the project and emphasis will be given to ensure gender equality at each stage of project implementation. In order to incorporate gender mainstreaming into the project in a comprehensive manner, a gender analysis as part of the capacity assessments of the project will be conducted at the beginning of the

project. Suitable gender related activities will be identified and incorporated into project interventions afterwards. To the extent possible, many expected results have already included gender-disaggregated indicators and target.

The proposed project focus is on the Indian MSME energy intensive industrial sector where the number of women employees is considerably less than that of males. However, a gender balance will be considered while selecting experts and consultants for training and capacity building activities. Similarly, participating industries with women entrepreneurs will also be selected on priority basis. Finally, efforts will also be made to include gender focal points from relevant ministries in the PSC meetings where possible.

B.3 Explain how cost-effectiveness is reflected in the project design:

The proposed project that will benefit from the support of the GEF will result in reductions in energy consumption due to assistance in creating a sustainable financing mechanism and demonstration projects for EE in industry. The direct energy saved from the successful implementation of the project will lead to a reduction of CO_2eq emissions which is estimated at 806,000 tonnes of CO_2eq over the 10-year lifetime of the measures expected to be carried out during project implementation.

Given GEF funding of USD 4,912,000 (including agency fees) for this project, the avoided cost based on direct emissions reduction is ~6.09 USD per tonne of CO_2eq. Therefore, the cost effectiveness of the GEF contribution to this proposed project is very reasonable and acceptable.

Additional information on the calculations for GHG reductions is provided in Annex E of the Project Document.

Alternative options for promoting and supporting the market which were considered but not chosen due to less cost-effectiveness were as follows:

General approach	Notes on cost-effectiveness of the approach and why it was not chosen
Technical assistance facility linked to a direct lending facility.	This approach would not likely be effective due to the small size of the industries (and therefore investments) involved in each unit. A Multi-lateral Financing Agency would not be able to fund these investments (typically US$ 1,000 – 500,000) through direct loans and the transaction costs would remain high.
Technical assistance facility linked to a credit line facility.	This approach may be effective when the market has begun to pick up. However, it would require a significant campaign to increase the level of knowledge of EE within the banking sector while at the same time running the risk that the MSMEs will not be interested in credits on commercial terms for EE interventions.
Direct subsidies for interventions.	This approach is basically being used within other clusters as part of the UNIDO/GEF project "Promoting energy efficiency and renewable energy in selected MSME clusters in India." While this approach is expected to be effective, a new approach involving an ESCO model such as developed in this project is expected to have far-reaching impacts and perhaps allow for a step-change in market development.

C. DESCRIBE THE BUDGETED M&E PLAN:

Monitoring and evaluation (M&E) will include reports summarizing the overall progress and that of individual investment pilot projects that receive financing. These reports will be available for official use for the project's indicative M&E plan.

According to the M&E policy of the GEF and UNIDO, follow-up studies such as Country Portfolio Evaluations and Thematic Evaluations can be initiated and conducted. All project partners and contractors are obliged to (i) make available studies, reports and other documentation related to the project; and (ii) facilitate interviews with staff involved in the project activities.

A M&E framework will be used to assess the project's impact on GHG emissions reduction in the industrial sector in India. To facilitate reporting of progress and impacts to the GEF Secretariat and UNIDO, there will be three main processes:

i) Internal tracking: the PMU will collect market level data from official sources, private sector stakeholders, and partner government officials and agencies at regular intervals throughout the project's implementation period. This includes the monitoring of performance indicators in the Project Results Framework and the use of a GHG accounting methodology. Internal tracking will inform both the Midterm Review and the Final Evaluation.

Participating stakeholders in the project such as the industries implementing EE technologies will be required to provide information on energy savings and other benefits achieved under the project as part of the agreements to be signed. The PMU will be responsible for preparation of regular progress reports with full support of, and in agreement with, the participating companies, municipalities and other beneficiaries.

ii) Midterm Review (MTR) and **iii) Final Evaluation -** The GEF Monitoring and Evaluation Policy (2010, page 1) has two overarching objectives:

- Promote accountability for the achievement of GEF objectives through the assessment of results, effectiveness, processes, and performance of the partners involved in GEF activities. GEF results will be monitored and evaluated for their contribution to global environmental benefits; and
- Promote learning, feedback, and knowledge sharing on results and lessons learned between the GEF and its partners, as a basis for decision making on policies, strategies, program management, projects, and programs; and to improve performance.

The Midterm Review and Final Evaluation will examine the Project's performance with respect to the planning and adaptive management requirements of both UNIDO and the GEF (*The GEF Monitoring and Evaluation Policy 2010*). UNIDO uses a Results Based Management approach, captured in the Project Results Framework (Annex A), which includes performance indicators, targets and timelines. In addition to the reporting on the internal tracking of performance indicators, review and evaluation will focus on the following principal dimensions which are in agreement with the general guidelines of the *GEF Monitoring and Evaluation Policy 2010*[7]:

- **Relevance** – the extent to which the activity is suited to local and national environmental priorities and policies and to global environmental benefits to which the GEF is dedicated; this analysis includes an assessment of changes in relevance over time.
- **Effectiveness** – the extent to which an objective has been achieved or how likely it is to be achieved.
- **Efficiency** – the extent to which results have been delivered with the least costly resources possible.
- **Results** – in GEF terms, results include direct project outputs, short- to medium-term outcomes, and progress toward longer-term impact including global environmental benefits, replication effects, and other local effects.
- **Sustainability** – the likely ability of an intervention to continue to deliver benefits for an extended period of time after completion; projects need to be environmentally as well as financially and socially sustainable.

MTRs are important and valuable instruments for generating real-time learning as project activities unfold, and may therefore lead to mid-term improvements and evidence-based corrective actions ensuring that activities are on track to achieve planned outcomes. A review of progress at midpoint is part of the transparent and accountable management practices of UNIDO and the GEF. The MTR will have the following aims:

- To enhance project and sector-level learning;
- To enable informed decision-making about next steps;
- To strengthen the adaptive management of the Program; and
- To ensure accountability for the achievement of the Project's objective.

The monitoring and evaluation will be financed with US$ 120,000 budgeted including $50,000 for contracting external evaluation contractors - who must adhere to the internationally recognized professional standards that are applied to GEF project reviews and evaluations, as set out in the GEF Evaluation Principles and Criteria and Minimum Requirements, (*The GEF Monitoring and Evaluation Policy 2010*, page 27). Other costs associated with data collection will be included in the staff costs for team members in the day-to-day execution of their tasks and not tracked separately.

A PMU will be established in the Ministry of MSME for the project and will hold responsibility for continuous monitoring of project activities execution, performance and track progress towards milestones. UNIDO will be responsible for overall implementation and tracking overall project milestones and progress towards the achievement of the set project outputs. The UNIDO Project Manager will be responsible for narrative reporting to the GEF, as indicated in the above table. The following table presents the budgeted monitoring and evaluation plan of this project. The M&E Plan is detailed in the Annex F.

[7] The GEF (2010) Monitoring and Evaluation Policy. p.27. Available from: http://www.thegef.org/gef/sites/thegef.org/files/documents/ME_Policy_2010.pdf. Accessed: January 2013.

Type of M&E activity	Engaged Parties	Budget US$ *Excluding project team Staff time*	Time frame
Project inception workshop	PMU, UNIDO, consultants	15,000	Within first two months of Project start up, with reports immediately following Inception Workshop
Measurement of Means of Verification for Project Progress and Performance	UNIDO, M&E expert	5,000	Start verification of projects annually and at the project end
Semi-Annual project progress reports	PMU	5,000	Every six months
Promotional Materials	PMU	5,000	As required
Midterm Review	UNIDO, External consultants	30,000	At mid-point of project implementation
Project Terminal Report	UNIDO, PMU	15,000	At end of project implementation
Project Final Evaluation	Independent evaluator, PMU, UNIDO PM, and UNIDO Evaluation Group	45,000	Within 6 months of completion of project implementation
TOTAL indicative COST		**USD 120,000**	

D. LEGAL CONTEXT:

The Government of the Republic of India agrees to apply to the present project, mutatis mutandis, the provisions of the Revised Standard Technical Assistance Agreement concluded between the United Nations and the Specialized Agencies and the Government on 31 August 1956 and as amended on 3 October 1963.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT (S) AND GEF AGENCY (IES)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT (S):

(Please attach theOperational Focal Point endorsement letter(s) with this form. For SGP, use this OFP endorsement letter).

NAME	POSITION	MINISTRY	DATE*(MM/dd/yyyy)*
Mr. Susheel Kumar	**Additional Secretary, GEF Focal Point**	MINISTRY OF ENVIRONMENT, FORESTS AND CLIMATE CHANGE	04/16/2015

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for CEO endorsement/approval of project.

Agency Coordinator, Agency Name	Signature	Date *(Month, day, year)*	Project Contact Person	Telephone	Email Address
Mr. Philippe R. Scholtès, Managing Director, Programme Development and Technical Cooperation Division (PTC) UNIDO GEF Focal Point		06/26/2015	Mr. Sanjaya Shrestha, Industrial Development Officer, Energy Branch, UNIDO	+43-1-26026-3730	S.Shrestha@unido.org 

ANNEX A: PROJECT RESULTS FRAMEWORK

Project Narrative	Indicator	Baseline	Target	Sources of Verification	Assumptions/Risks
Project objective To promote the implementation of energy efficiency in the MSME sector, particularly targeting micro units; to create and sustain a revolving fund mechanism to ensure replication of energy efficiency measures in the sector; and to address the identified barriers for scaling-up energy efficiency measures and consequently promote a cleaner and more competitive MSME industry in India.	Lifetime energy savings and GHG emission reductions due to implementation of energy efficiency in MSME sector.	Limited direct and indirect energy savings by industry.	Direct energy savings: 956,184 GJ at the end of the project; Direct GHG reductions: 80,600 tonnes of CO_2eq at the end of the project.	Terminal report; Peer-to-peer network; Project evaluation report.	Assumes continued support of government bodies and banking institutions; Assumes it will be possible to convince industries to undertake low-risk investments.
Component 1: Programme to identify energy intensive clusters and replicable technologies					
Outcome 1.1: 10 energy intensive clusters identified based on objective criteria					
Output 1.1.1: Objective and transparent mechanism for cluster level technology benchmarking established.	Study capturing the best practices, incentive structures, implementation process, guidelines and industry feedback.	0 – Lack of study.	Study complete and available for decision-makers for investment.	The completed and disseminated study.	Information is available and accessible.

Project Narrative	Indicator	Baseline	Target	Sources of Verification	Assumptions/Risks
Outcome 1.2: Identification of technologies that have the maximum impact on the cluster as a whole					
Output 1.2.1: Tool kit of identified technologies prepared.	Existence of a comprehensive tool kit for the identified technologies to help the implementation process.	Lack of a tool kit for the identified technologies.	1 tool kit prepared and disseminated; Identified commonly replicable technical interventions through equipment audits; Developed technical specifications of the identified interventions.	Tool kit and materials prepared.	Common technologies for each cluster are identifiable; Data from existing studies is available and accessible.
Component 2: Demonstration projects and aggregation of demand for demonstrated technologies in the clusters					
Outcome 2.1: Capacity built and Awareness raised as a result of the demonstration projects					
Output 2.1.1: 100 Local Service Providers (LSPs) and technical personnel of MSME units trained.	Training of LSPs and technical personnel of MSMEs.	0 – Lack of training for technical personnel and LSPs in these clusters.	100 LSPs and technical personnel of MSMEs trained.	Training reports and evaluations from participants.	Sufficient interest on behalf of the LSPs and technical personnel.
Output 2.1.2: Peer to peer network established and results of demonstration projects disseminated through cluster level workshops; M&V protocols finalized.	Existence of a network to share knowledge and disseminate savings resulting from demonstration projects; Workshops conducted after validation of energy savings is completed; Existence of standardized Monitoring and	No formal peer-to-peer knowledge sharing platform existing; No workshops on energy savings validation have been conducted; Lack of established M&V protocols to assist in ESCO-type financing mechanisms.	Existence of a peer-to-peer knowledge sharing platform for dissemination of demonstration project results; Workshops conducted at each of the 10 clusters; Standardized M&V protocols established.	Project Reports that include activities and proof of the peer-to-peer platform; Workshop reports and evaluations from participants; The M&V protocols and examples of their use.	Continued interest and active participation from relevant stakeholders; Industry, ESCOs, suppliers, FIs, and government officials are actively involved in the development of the protocols.

Project Narrative	Indicator	Baseline	Target	Sources of Verification	Assumptions/Risks
	Verification (M&V) Protocols.				
Outcome 2.2: Demonstration of energy consumption reduction at the cluster level					
Output 2.2.1: Thirty Five (35) energy efficient technologies demonstrated in industrial enterprises (minimum 2 units to be covered for each technology).	MSME units implementing technology demonstration of the identified technologies.	No demonstration of selected technologies provided and thus minimal/ practically non-existent replacing of energy inefficient systems with efficient ones.	35 energy efficient technologies demonstrated (2 units for each technology).	Project Reports, technical schematics, investment receipts.	Industries agree to undertake low-risk investments in line with the project intervention.
Outcome 2.3: Scaling up of investment activities for EE in industry					
Output 2.3.1: Investments undertaken by other MSME units as a result of the demonstration activities facilitated.	Number of MSME units adopting EE technologies.	No enrolment in the programme and no adoption of technologies.	400 enterprises are targeted to undertake energy efficiency implementation projects.	Project & Investment reports.	Industries undertake investments via the proposed ESCO model.
Output 2.3.2: Identification, documentation and finalization of specific needs and technical performance requirements of enrolled units and technology vendors.	Identification and assessment of individual needs related to customization, and operational training; Modifications to the technical parameters, warranties, etc. and back-to-back arrangements to ensure technical performance guarantee of the	Lack of identification and documentation of specific needs and requirements of enrolled units; No modification to technical parameters, warrantees, etc. and back to back arrangements. Lack of consultations.	Individual needs related to customization, operational training and other specific requirements estimated; Modification of the technical parameters, warrantees etc. as well as back to back arrangements as required. 100 consultations conducted by	Project Reports; Project reports comparing old versions with new versions; Project reports.	Sufficient interest from MSMEs; Assumes the ability to agree on the topics between industry, ESCOs, and LSPs; Continued interest and involvement of stakeholders.

Project Narrative	Indicator	Baseline	Target	Sources of Verification	Assumptions/Risks
	technology; Number of consultations between technology vendors and enrolled units.		technology vendors.		
Component 3: Financing models to support replication of energy efficiency projects in MSMEs					
Outcome 3.1: Establishment of sustainable and effective financial mechanisms					
Output 3.1.1 Officials from government and private banks/financial institutions sensitized on promoting EE equipment and trained on evaluating and investing in industrial EE projects.	Number of officials trained from government and private banks/ financial institutions (FIs).	No officials trained.	Officials from both government and private banks are sensitized on promotion of EE equipment and evaluating and investing in industrial EE projects.	Training reports.	Assumes continued interest from stakeholders.
Output 3.1.2: A tailored portfolio of innovative financial products for MSMEs' investment in energy efficiency projects facilitated.	Establishment of the EESL MSME Revolving Fund with successful repayments occurring; Portfolio of financial products.	No Revolving Fund exists; No tailored portfolio of financial products for MSMEs to allow for ESCO model financing.	Fund established and operating with repayments; Tailored portfolio of financial products existing.	Project Reports, Financial Reports from the Fund; Bank and EESL reporting.	Industries, EESL, and banks undertake investments via the established ESCO model.
Output 3.1.3: Industrial enterprises apprised of the existing financial schemes and national experts trained in preparation of innovative energy efficiency financial proposals.	Number of enterprises involved in awareness raising activities.	Lack of awareness programs for the innovative financial proposals.	500 industrial enterprises involved in awareness activities.	Event reports.	Continued interest and participation from stakeholders.

Project Narrative	Indicator	Baseline	Target	Sources of Verification	Assumptions/Risks
Output 3.1.4: Contracts for EESL/ESCOs with MSME units and technology providers standardized.	Contracts between EESL/ESCOs with units and technology providers standardized.	Drafts exist, but no official existing standardized contracts.	Standardized contracts between EESL/ESCOs and i) MSME units; and ii) technology providers produced.	Versions of the contract.	Industry & ESCOs (EESL) collaborate and agree on common findings.
Output 3.1.5: Institutional and governance structure, and working methodology of the EMRF finalized; options for seeking additional funds for the EMRF identified.	Finalization of the institutional structure of the EMRF; Finalization of working methodology of EMRF; Identification of additional donor/lending funds for the EMRF.	The fund does not yet exist; Additional donor/ lending funds are difficult to confirm pending successful pilot implementation.	Finalized institutional structure of the fund; Finalized working methodology of EMRF; A number of additional donor/lending funds identified.	Institutional procedures/ by-laws; Working methodology documents; Commitment letters from donor/lending funds.	Active participation and support from EESL and donors and lenders.

ANNEX B: RESPONSES TO PROJECT REVIEWS

(From GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

(i) Responses to Comments from the GEF Secretariat:

In line with the letter of the GEF Operational Focal Point of India, dated 11 February 2014, and subsequent follow-up discussions, changes have been made to the overall project objective, as well as the project components, outcomes and outputs. Overall, the project has been re-focused on improving energy efficiency in the MSME industrial sector of India via continued capacity building, information dissemination, and establishment of standard operating procedures for implementing energy efficiency (EE) investment projects.

Due to the evolving needs of the market, the Indian Government and UNIDO have decided that it will be more beneficial to the sector to change the focus of support mechanisms for energy efficiency in the MSME industry in order to stimulate longer-term sustainable change in market mechanisms and behavior.

Detailed responses to the specific comments of the GEF Secretariat can be found in the attached document.

(ii) Responses to Comments submitted by GEF Council Members on the work program approved by the Council:

Nr.	Comments from Germany	Response
1	Development of EnMS implementation guidance for different clusters (Iron and steel, cement, pulp and paper, etc.): Guidelines for different industry sector like Cement, Iron & Steel, etc. should be developed which would ultimately help to implement EnMS in Industries.	In line with the project's revised focus, the project will focus on the development of an objective and transparent mechanism for cluster-level technology benchmarking, and a tool-kit of identified technologies for the identification of energy intensive clusters and replicable technologies.
2	Pilots and EnMS implementation - The project will conduct plant assessment and system audits to analyze scope for optimization of steam, pumping and compressed air systems. Why are under the pilot plants assessment only the steam, pumping and compressed air system considered? Why are not e.g. cooling systems assessed? EnMS should consider the whole process and specific process requirements in different industries.	In line with the project's revised focus, the relevant and most appropriate technologies will be identified under Component 1 of the project. This approach will ensure that the technologies promoted and demonstrated by the project, are those most beneficial to the cluster enterprises.
3	Training/ involvement of state designated agencies (SDA's): The SDAs could play a more active role in EnMS implementation as well as certification. Capacity building is needed in this regard.	In line with the project's revised focus, the relevant stakeholders, namely Local Service Providers (LSPs), as well as officials from government and private banks/financial institutions, will receive training from the project.
4	Please also note that there are other relevant projects of German Development Cooperation in India in addition to the GIZ/BEE led Indo-German energy programme mentioned in the PIF: The Project "Eco Industrial Development" and the Indo-German programme "Advisory Services in Environmental Management (ASEM)" are executed by the Indian Ministry of Environment & Forests together with GIZ with the objective to successfully test and propagate solutions for the environmentally-friendly and resource-efficient management of industrial areas, industrial clusters and the productive sectors. We would recommend coordination with these projects and build on their lessons learned in further developing the proposed GEF project.	The relevant baseline projects have been included in the CEO Endorsement Document.

(iii) Responses to STAP Comments:

Nr.	Comment	Response
1.	Systems optimization: The project aims at achieving larger energy savings through system optimization especially for steam, pumping and compressed air systems. STAP commends India for aiming at systems optimization to reduce energy consumption, since national and international experiences widely agree that while improving the efficiency of components might yield minor gains in industry, but a systemic optimization can result in more significant gains (20-30%) with pay back periods, in some cases less than 2 years. However, there is a need for a systematic assessment of what systems optimization involves; technology packages, capacity requirements, investment cost, O&M costs, etc.? Systems optimization may involve in some cases large investments. Thus it is very important to assess the investment cost as well as cost-benefit analysis of adopting system optimization.	In line with the project's revised focus, the relevant and most appropriate technologies will be identified under Component 1 of the project, through an objective and transparent mechanism (Output 1.1.1) and a tool-kit (Output 1.1.2). This approach will ensure that a systematic assessment of the various technologies is conducted.
2.	Barrier analysis: Several barriers have been listed and they seem like a generic set of barriers listed for most PIFs on energy efficiency. During the next phase, STAP suggests conducting systematic barrier analysis from the perspective of different stakeholders as well as for different technologies as well as rank the barriers so that targeted interventions can be designed for implementation in the project.	A detailed barrier analysis has been included in the revised CEO Endorsement Document (pgs. 9-10). These barriers have been assessed in line with the revised objectives and activities of the project.
3.	Developing benchmarks: The PIF states that the project aims at development of benchmark technologies and practices in order to guide the industries in reducing energy consumption levels. In addition, the PIF is silent what sectors/industries will be beneficiaries of this benchmarking process.	The revised project will focused on the development of an objective and transparent mechanism for cluster-level technology benchmarking under Output 1.1.1.
4.	Demonstration projects: Which specific industries or technologies would be considered for demonstration, since the proposed eight energy intensive sectors could cover hundreds of technologies/ processes and industries?	In line with the project's revised focus, the relevant and most appropriate technologies will be identified under Component 1 of the project. This approach will ensure that the technologies promoted and demonstrated by the project, are those most beneficial to the cluster enterprises. Annex J outlines various potential clusters and technologies to be considered.
5.	Baseline: A systematic baseline needs to be developed, considering the various ongoing mechanisms and interventions such as PAT and other national programs and international projects aimed at promoting energy efficiency in industries.	In the revised CEO Endorsement Document, numerous baseline projects focused on the introduction of energy efficiency measures in MSME clusters in India have been discussed. These projects focus on the demonstration of energy efficiency projects, the facilitation of financing for such projects and building awareness.

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS[8]

A. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES FINANCING STATUS IN THE TABLE BELOW:

PPG Grant Approved at PIF: **$72,728**			
Project Preparation Activities Implemented	***GEF/LDCF/SCCF/NPIF Amount ($)***		
	Budgeted Amount	***Amount Spent To date***	***Amount Committed***
Stakeholder selection	5,000	4,000	1,000
Baseline assessment	27,728	16,275	11,453
Determination of GHG emission reductions through GEF intervention	10,000	6,000	4,000
Detailed project design and securing co-financing commitments	30,000	22,200	7,800
Total	72,728	48,475	24,253

The balance of $24,253 from the PPG phase will be used for implementation activities carried out under the proposed project.

ANNEX D: CALENDAR OF EXPECTED REFLOWS

N/A

[8] If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for the activities.

ANNEX E: ENERGY SAVINGS AND GHG CALCULATIONS

The project interventions will lead to energy savings, resulting in consequent GHG emission reductions resulting from the setting up of financing mechanisms for EE. These interventions are included in **Component 2. Demonstration projects and aggregation of demand for demonstrated technologies in the clusters** with a total of USD 27,330,000 in investment financing envisioned (USD 3,180,000 from the GEF, USD 24,150,000 in cofinancing).

The global benefits in terms of avoided CO_2 emissions are estimated as follows:

Direct GHG reductions

Emission reductions achieved by demonstration projects that are planned and implemented as part of the project as well as energy efficiency investments leveraged as a result of the project during the project's supervised implementation period.

In total, the project is expected to result in:

- Direct annual energy savings of 956,184 GJ in the last year of the project (2019).
- A total 10-year reduction of 9,561,838 GJ (assuming a 10-year lifetime of investments).
- Annual reductions of 80,600 tonnes CO_2eq per year as direct GHG reductions in the last year of the project (2019)
- A total 10-year reduction of 806,000 tonnes CO_2eq as direct GHG reductions.

The energy savings and GHG emissions calculations are based on energy savings estimates taken from the Impact Assessment Study Report prepared by BEE – which analyses potential investments in EE in a number of industrial clusters. The methodology utilized is the "Revised methodology for calculating GHG benefits of GEF energy efficiency projects (version 1.0)"[9] – using the Financial Instrument Module.

These calculations are based on the following key parameters:

#	Parameter	Unit	Value	Source
A	Emission factor of electricity	tCO_2/MWh	0.8780	GEF GHG Reduction worksheet
B	Emission factor of Fuel Oil	tCO_2/GJ	0.0774	GEF GHG Reduction worksheet (using Residual Oil's emissions factor)
C	Reduction of Electricity consumption per USD 1,000 of investment	MWh per USD 1,000	8.04	Based on total potential investment and energy savings in the 10 clusters related to electricity (see calculations below)
D	Reduction of Fuel Oil consumption per USD 1,000 of investment	GJ per USD 1,000	40.24	Based on total potential investment and energy savings in the 10 clusters related to fuel oil (see calculations below)
E	% of investment in EE measures to reduce electricity	%	5.0%	Based on the total potential investment for the 10 clusters in electricity-reducing measures versus total potential investment
F	% of investment in EE measures to reduce fuel oil	%	95.0%	Based on the total potential investment for the 10 clusters in Fuel Oil-reducing measures versus total potential investment
G	Weighted average Reduction per USD 1,000 for electricity	MWh per USD 1,000	0.40	C x E
H	Weighted average Reduction per USD 1,000 for fuel oil	GJ per USD 1,000	38.22	D x F
G	Fraction of investments/ projects likely to occur in	%	10%	This is the default level in the GEF methodology, and likely conservatively high

[9] www.stapgef.org/revised-methodology-for-calculating-greenhouse-gas-benefits-of-gef-energy-efficiency-projects-version-1-0/

	BAU			given the lack of progress to date in many of the industrial clusters.
H	Lifetime of investments	Years	10	This is the appropriate timeframe for industrial EE investments.
I	Total investments for Component 2	USD	USD 27,330,000	USD 3,180,000 from the GEF, USD 24,150,000 in cofinancing

Step 1: Disaggregating the potential energy savings measures according to type of energy saved for each cluster

In order to find the potential for energy efficiency savings, the 10 highest GHG reductions and energy savings potential clusters have been selected from the represented list indicated below. The potential interventions were disaggregated according to the type of energy to be saved (fuel oil or electricity). Additional details for each measure in each cluster are included in Annex J.

Table 2: Potential for energy and GHG savings through measures to reduce electricity consumption in the 10 clusters examined.

Cluster	**Total Annual Energy Requirements in the Cluster as a whole (not just for electricity)**	**Estimated annual associated GHG emissions**	**# of potential measures identified**	**Estimated investment potential**	**Estimated potential annual energy savings**	**Estimated potential annual GHG savings**
	GJ	**Tonnes CO2eq**		**USD**	**MWh**	**Tonnes CO2eq**
Jodhpur (Limestone Cluster)	5,863,488	453,834	-	-	-	-
Varanasi (Brick Kiln Cluster)	1,826,198	141,348	-	-	-	-
Vapi (Dyes & Chemicals Cluster)	1,195,583	92,538	-	-	-	-
Surat (Textile Cluster)	28,152,043	2,178,968	2	466,667	10,990	9,649
Morbi (Ceramic Cluster)	58,529,873	4,530,212	-	-	-	-
Vellore (Rice Mill Cluster)	3,288,313	254,515	4	728,333	6,711	5,892
Jorhat (Tea Cluster)	3,780,680	292,625	2	1,540,000	10,618	9,322
Odisha (Sponge Iron Cluster)	92,007,693	7,121,395	-	-	-	-
Pali (Textile Cluster)	5,377,945	416,253	2	1,765,000	7,920	6,953
Batala / Jalandhar / Ludhiana (Casting & Forging Cluster)	965,811	74,754	1	46,667	302	265
Total market for interventions to reduce electricity usage	**200,987,627**	**15,556,442**	**11**	**4,546,667**	**36,541**	**32,082**
Energy savings (MWh) per 1,000 USD invested					**8.04**	**MWh/1,000 USD**

Table 3: Potential for energy and GHG savings through measures to reduce fuel oil consumption in the 10 clusters examined.

Cluster	Total Annual Energy Requirements in the Cluster as a whole (not just for fuel oil)	Estimated annual associated GHG emissions	# of potential measures identified	Estimated investment potential	Estimated potential annual energy savings	Estimated potential annual GHG savings
	GJ	Tonnes CO2eq	#	USD	GJ	Tonnes CO2eq
Jodhpur (Limestone Cluster)	5,863,488	453,834	2	118,333	203,688	15,765
Varanasi (Brick Kiln Cluster)	1,826,198	141,348	1	5,395,000	230,944	17,875
Vapi (Dyes & Chemicals Cluster)	1,195,583	92,538	3	645,000	170,361	13,186
Surat (Textile Cluster)	28,152,043	2,178,968	1	1,330,000	190,332	14,732
Morbi (Ceramic Cluster)	58,529,873	4,530,212	3	41,131,667	1,223,341	94,687
Vellore (Rice Mill Cluster)	3,288,313	254,515	3	2,223,333	605,704	46,882
Jorhat (Tea Cluster)	3,780,680	292,625	2	1,933,333	121,627	9,414
Odisha (Sponge Iron Cluster)	92,007,693	7,121,395	1	26,750,000	407,208	31,518
Pali (Textile Cluster)	5,377,945	416,253	4	2,466,667	163,201	12,632
Batala / Jalandhar / Ludhiana (Casting & Forging Cluster)	965,811	74,754	2	4,275,000	154,828	11,984
Total market for interventions to reduce fuel oil usage	**200,987,627**	**15,556,442**	**22**	**86,268,333**	**3,471,234**	**268,674**
Energy savings (GJ) per 1,000 USD invested					**40.24**	**GJ/1,000 USD**

Step 2: Finding the weighted average of energy consumption per fuel type per USD 1,000

In order to utilize the GEF GHG reduction tool for a number of energy sources, it is necessary to come to a weighted average of the amount of each energy source saved per USD 1,000 total invested.

This was done as follows:

#	Parameter	Unit	Value	Source
A	Total potential investment in 10 clusters for electricity savings	USD	4,546,667	See Table 2 above.
B	Total potential investment in 10 clusters for fuel oil savings	USD	86,268,333	See Table 3 above.
C	Total potential investment in the 10 clusters	USD	90,815,000	A + B
D	% of investment in EE measures to reduce electricity	%	5.0%	A / C
E	% of investment in EE measures to reduce fuel oil	%	95.0%	B / C
F	Weighted average Reduction per USD 1,000 for electricity	MWh per USD 1,000	0.40	8.04 MWh/1,000 USD (From Table 2) x D
G	Weighted average Reduction per USD 1,000 for fuel oil	GJ per USD 1,000	38.22	40.24 GJ/ 1,000 USD (From Table 3) x E

Step 3: Utilizing the GEF's Revised methodology for calculating GHG benefits of GEF energy efficiency projects to calculate Energy and GHG Reductions

The key parameters as described above, along with a schedule for investments, were input into the GHG calculations tool as follows:

Table 4: Investment, energy savings, and emissions reductions for Component 2 - Demonstration projects and aggregation of demand for demonstrated technologies in the clusters

		2014	2015	2016	2017	2018	2019
PROGRAMME	Investment in Year ($1,000)		0	636	2,480	9,725	14,490
BASELINE	Investment in Year ($1,000)	0	0	64	248	972	1,449
NET	Direct Cumulative Investment in Place ($1,000)	0.0	0.0	572.4	2,804	11,556	24,597
DIRECT SAVINGS	Incremental Annual Electricity Savings (MWh)	0	0	223	1,094	4,507	9,593
Incremental Annual Residual Oil Savings (GJ)		0	0	21,448	105,064	433,003	921,650

The total expected direct emissions reductions are then calculated by the GHG tool as follows:

Table 5: Total direct emissions reductions expected

All Components	**Cumulative**			**Annual**			
	Total	***2014-2019***	***2020-2034***	***2014***	***2019***	***2025***	***2035***
Direct Electricity Savings (MWh)	95,928	15,416	80,512	0	9,593	9,593	0
Direct Residual Oil Savings (GJ)	9,216,496	1,481,165	7,735,331	0	921,650	921,650	0
Direct Total Energy Savings (GJ)	**9,561,838**	1,536,664	8,025,174	0	956,184	956,184	0
Direct GHG Emission Savings (tCO2)	**806,000**	129,531	676,469	0	80,600	80,600	0

Indirect GHG emissions reductions estimates

Indirect Bottom-up emissions reductions estimate

This project is designed to ensure sustainability and replication of energy efficiency improvements beyond the project cycle. It will do so by:

1. Setting up of a revolving fund by EESL by allocating a part of the revenues to ensure that the interventions go beyond the coverage that this project entails.
2. Expanding the level of knowledge and awareness of policy-makers, financiers, and senior management of industries;
3. Training a cadre of professionals (technical staff, national experts, and suppliers) to assist in sustaining the project interventions;
4. Establishing a peer to peer network for the sharing of results of demonstration projects and other knowledge; and
5. Development of Tool kit which will be continuously updated to include newer technologies and suppliers.

Additionally, following the successful demonstration of the project, the EESL plans to arrange for investments of ~USD 150 Million via replication in other clusters. This would be additional leveraged co-financing that will result from the project. It will be tracked within the project, but is not counted as direct emissions reductions, since these funds have not been committed.

Due to these activities within the project, the "Number of Replications Post-project as Spillover" was given as 3, resulting in the following bottom-up emissions reductions from the GHG reduction tool:

Table 6: Indirect bottom-up GHG savings calculation

Component	Year of indirect savings	Total	Unit
INDIRECT BOTTOM-UP SAVINGS:	**2020-2029**	**2,686,665**	**tCO_2**

Indirect Top-down emissions reduction estimate

In order to calculate the Indirect-Top-down emissions reduction estimate, it has been estimated by the EESL that the market could attract at least USD 150 million in investment.

Using this as the estimate for the financial market over a 10-year period, the following table shows how the indirect top-down reductions estimate is 2,980,562 – which is quite similar to that of the indirect bottom-up estimate.

Table 7: Indirect Top-down emissions reduction estimate calculations

#	Parameter	Unit	Value	Source
A	Total size of 10-year market for investment	USD	150,000,000	EESL estimates
B	Total GHG Reductions per USD 1,000 invested	Tonnes CO_2eq	3.31	Based on the weighted emissions reductions from analysis of the clusters
C	Total size of market for GHG emissions reductions (annual reductions)	Tonnes CO_2eq	496,760	A / B
D	Total size of market for GHG emissions reductions (over 10 years)	Tonnes CO_2eq	4,967,604	C x 10
E	Causality Factor	%	60%	Substantial but modest (taking into account other initiatives in the sector)
F	**Indirect Top-Down Emission Reductions**	**Tonnes CO_2eq**	**2,980,562**	**D x E**

ANNEX F: MONITORING AND EVALUATION PLAN

1. Monitoring

Project Inception Phase

A project inception workshop will be conducted during this phase to kick-off the project at the national level. The workshop will include the full project team, national government counterparts, co-financing partners, and key industry stakeholders. The fundamental objective of the workshop will be to introduce the project at the national level. An inception workshop report, featuring proceedings from the workshop including stakeholder insights and opinions will be prepared soon after completing the workshop.

In addition to the inception workshop, several activities will be conducted in this period to ensure all preparatory work has been completed. These will be included in an inception report and will include:

- Introductions between PMU staff and the UNIDO teams;
- Review of the logical framework and minor revisions, if deemed necessary;
- Delineation of specific responsibilities and finalization of the scope of work for PMU experts;
- Finalization of monitoring, evaluation and reporting requirements;
- Finalization of all M&E modalities, including time-frames, meeting schedules, procedures and processes;
- Development and scheduling of consulting packages in line with proposed activities and budgets;
- Formation of the Project Steering Committee (PSC) and finalization of detailed first year annual plan;
- Measurement of impact indicators and scheduling future activities for impact monitoring.

Once the activities start, the PMU will be responsible for project monitoring on a day-to-day basis. Periodic monitoring of implementation progress will be undertaken by UNIDO, as appropriate through meetings with project counterparts. UNIDO, and/or the UNIDO Country/Regional office will conduct periodic visits based on an agreed upon schedule and monitoring will occur through the PSC meetings, which will take place at least twice a year. The terminal review will be held in the last month of the project operation, for which the PMU is responsible and will submit to UNIDO. The PMU, in conjunction with the PSC members, will be responsible for the preparation and submission of the following reports that form part of the monitoring process.

1.1 Project Implementation Review (PIR)

The PIR is an annual monitoring process mandated by the GEF. It is an essential management and monitoring tool for project managers and offers the main vehicle for extracting lessons from the ongoing project. Once the project has been under implementation for a year, the project team at UNIDO HQ is responsible for completing the PIR. The PIR should then be discussed at the PSC so that the result would be a PIR that has been agreed upon by project staff, the Lead Executing Agency, and UNIDO.

1.2 Semi-Annual Progress Reports

Short reports outlining main updates in project progress would be provided quarterly to UNIDO by the PMU.

1.3 Periodic Thematic Reports

As and when called for by UNIDO, the PMU will prepare Specific Thematic Reports, focusing on specific issues or areas of activity. The request for a Thematic Report will be provided to the PMU in written form by UNIDO and will clearly state the issue or activities that need to be reported on. These reports will be used as a form of lessons learned exercise, specific oversight in key areas, or as troubleshooting exercises to evaluate and overcome obstacles and difficulties encountered.

1.4 Technical Reports

These reports will be prepared by the national and international consultants/consulting organizations to be engaged during the project. As part of the Inception Report, the PMU would prepare a draft reports list, detailing the technical reports that are expected to be prepared on key areas of activity during the course of the Project, and tentative due dates. This list will be on the basis of consulting packages that will be defined at project start.

1.5 Project Publications

The PMU will determine if Technical Reports merit formal publication, and will also (in consultation with UNIDO, the government and other relevant stakeholder groups) plan and produce these publications in a consistent and

recognizable format. These publications may be scientific or informational texts on the activities and achievements of the project in the form of journal articles, multimedia publications, or other forms of distribution. Publications can be based on Technical Reports, or may be summaries or compilations of a series of Technical Reports and other research. In addition, promotional materials such as case studies and video footage, will be prepared by the PMU, as required. These reports will be coordinated and developed by the PMU with the assistance and input of international and national experts, project counterparts and UNIDO.

1.6 Terminal Review (TR)

The TR will be held in the last month of project operation and is the responsibility of the PMU to prepare and submit it to UNIDO. It shall be prepared in draft at least two months in advance in order to allow time for review, and will serve as the basis for discussions in the TR. The TR considers the implementation of the project as a whole, paying particular attention to whether the project has achieved its stated objectives and contributed to the broader environmental objective. It decides whether any actions are still necessary, particularly in relation to the sustainability of project results, and acts as the vehicle through which lessons learned can be captured to feed into other projects under implementation or formulation.

The PMU, based on the Terminal Review, will prepare the Project Terminal Report (PTR). This comprehensive report will summarize all activities, achievements and outputs of the project, lessons learned, objectives met (or not met), and structures and systems implemented. The PTR will be the definitive statement of the project's activities during its lifetime. It will also lay recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's activities.

2. Evaluation: The project will be subjected to at least two evaluations as follows:

2.1 Midterm Review:

A midterm review will be undertaken during the third year from project commencement by an external agency/evaluator. The midterm review will measure progress made towards the achievement of outcomes and will identify corrections if needed. The evaluation will focus on the effectiveness, efficiency, and timeliness of project implementation, highlight issues requiring decisions and actions, and present initial lessons learned on project design, implementation and management. The findings of this review will be incorporated as recommendations for enhanced implementation during the second half of the project's term. The organization, terms of reference, and timing of the midterm review will be decided after consultations between the project partners. The Terms of Reference for this midterm review will be prepared by UNIDO.

2.2 Final evaluation:

An independent final evaluation will take place six months prior to project closure, and will focus on the same issues as the midterm review. The final evaluation will also review impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The Final Evaluation should also provide recommendations for follow-up activities. The Terms of Reference for this evaluation will be prepared by the UNIDO Evaluation Group.

In addition, according to the Monitoring and Evaluation policy of the GEF and UNIDO, follow-up studies like Country Portfolio Evaluations and Thematic Evaluations can be initiated and conducted. All project partners and contractors will be obliged to (i) make available studies, reports and other documentation related to the project and (ii) facilitate interviews with staff involved in the project activities.

ANNEX G: PROJECT TIMELINE

Components/Activities		Year 1	Year 2	Year 3	Year 4	Year 5
Component 1	1.1.1: Objective and transparent mechanism for cluster level technology benchmarking established	← →				
	1.2.1: Tool kit of identified technologies prepared	← →				
Component 2	2.1.1: 100 Local Service Providers (LSPs) and technical personnel of MSME units trained	←	→			
	2.1.2: Peer to peer network established and results of demonstration projects disseminated through cluster level workshops; M&V protocols finalized	←	→			
	2.2.1: Thirty Five (35) energy efficient technologies demonstrated in industrial enterprises (minimum 2 units to be covered for each technology)	←	→			
	2.3.1: Investments undertaken by other MSME units as a result of the demonstration activities facilitated	←	→			
	2.3.2: Identification, documentation and finalization of specific needs and technical performance requirements of enrolled units and technology vendors	←	→			
Component 3	3.1.1: Officials from government and private banks/ financial institutions sensitized on promoting EE equipment and trained on evaluating and investing in industrial EE projects	←	→			
	3.1.2: A tailored portfolio of innovative financial products for MSMEs' investment in energy efficiency projects facilitated		←	→		
	3.1.3: Industrial enterprises apprised of the existing financial schemes and national experts trained in preparation of innovative energy efficiency financial proposals		←	→		
	3.1.4: Contracts for EESL/ESCOs with MSME units and technology providers standardized	←	→			
	3.1.5: Institutional and governance structure, and working methodology of the EMRF finalized; options for seeking additional funds for the EMRF identified	←	→			

ANNEX H: INSTITUTIONAL AND PROJECT MANAGEMENT ARRANGEMENT

Institutional arrangement:

The project will be implemented by UNIDO as the Implementing Agency (IA) in collaboration with local partners in India. The main national counterparts in the project will include the EESL, BEE (Ministry of Power); Ministry of MSME; and SIDBI. UNIDO will oversee the overall implementation, internal monitoring and reporting to GEF, while the PMU, to be established within the Ministry of MSME (Lead Executing Agency) at their respective premises, will undertake the day-to-day project management activities. The PMU will be guided by the PSC, and also by the UNIDO Regional office. The PMU will report to the PSC and National Project Director, a high level official from the DC MSME, managed by Ministry of MSME (EA) and will be responsible for the successful execution of the project. The PMU will adhere to the regulations of the UNIDO/GEF as a general rule for executing the project. EESL will act as Executing Partner and will work in coordination with the PMU and will report to the PSC, NPD and UNIDO.

Energy Efficiency Services Limited

EESL, under the Ministry of Power (MOP), Government of India, is the Executing Partner and will work in coordination with the PMU for execution of the project. It will also provide technical guidance to the PMU hosted and housed within the premises of the Ministry of MSME on a regular basis. EESL will report to the PSC, UNIDO and NPD regarding execution of the project. Being the executing partner of the project, the mechanism for project's fund transfer to EESL will be finalized during the implementation phase.

The objective of the EESL is to lead the market related action of the NMEEE as well as to create and sustain markets for energy efficiency. EESL, under the aegis of the MOP, is a joint venture company promoted by 4 Central Public Sector Undertakings (CPSUs), namely NTPC Limited, Power Grid Corporation of India Limited (PGCIL), Power Finance Corporation Limited (PFC Limited) and Rural Electrification Corporation (REC). The authorized share capital of EESL is Rs. 190.00 crores (~US$ 32.3 million) with equal contribution from the 4 promoters after analyzing the market potential and future scenario, business models have been devised for various activities.

The objectives of creation of the EESL by Government are:

- Create market access in public and private facilities – handholding, information dissemination, capacity building
- Provide advisory support to Central and State Government and their agencies
- Develop projects for various sectors addressing specific barriers and challenges
- Design innovative risk mitigation measures to address technical, financial and regulatory risks
- Provide and secure funding at reasonable rates for project implementation
- Develop model templates necessary for project implementation by including the above
- Disseminate best practices to stakeholders so that replication can occur

Bureau of Energy Efficiency (BEE)

BEE is a statutory body under the Ministry of Power, Government of India. It was established under the provisions of the Energy Conservation Act in 2001 to assist in developing policies and strategies for reducing the energy intensity of the Indian economy. BEE co-ordinates with designated consumers, designated agencies and other organizations to facilitate accelerated and sustained adoption of energy efficiency across all sectors. BEE is the pioneer of the PAT scheme for large industrial enterprises and is also involved in GEF World Bank and UNIDO projects. BEE has a network of State Designated Agencies (SDAs) who will help in effective implementation of the project.

Ministry of MSME

The Ministry designs policies and facilitates programmes, projects and schemes, and monitors their implementation with a view of assisting MSMEs. The ministry and its organizations assist the States in their efforts to encourage entrepreneurship, employment and livelihood opportunities and enhance the competitiveness of MSMEs in the changed economic scenario. Programmes and schemes undertaken by the Ministry seek to provide adequate flow of credit from financial institutions; support for technology up gradation; integrated infrastructural and testing facilities; skill up gradation and; support for product development amongst others.

The Ministry of MSME is the Lead Executing Agency (EA) of the project and will host the PMU and provide in-kind support to the PMU. The project activities will also be supported through field offices of the Ministry present across the country for the implementation of the project. The Ministry of MSME will send its representative to the

project as the National Project Director (NPD) to guide the PMU in the execution of the project and will actively link this project with ongoing or new schemes. The PSC will be headed by the Ministry of MSME.

Small Industries Development Bank of India (SIDBI)

SIDBI, set up under an act of the Indian Parliament, is the principal financial institution for the promotion, financing and development of the MSME sector. SIDBI has tied up with organizations such as the World Bank to execute a project on financing energy efficiency. SIDBI is also facilitating concessional loans for energy efficiency projects through lines of credit from Japan International Cooperation Agency (JICA), French Development Agency and KfW.

Project Implementation Arrangement:

UNIDO will monitor the overall implementation work of the PMU and report to the GEF on project activities, work plans, financial information, GHG reductions, case studies etc. The field-based activities will be undertaken by the PMU with advisory support from the PSC. The EESL is the executing partner and the Ministry of MSME will chair the PSC meeting. The PMU, based within Ministry of MSME, will be fully responsible for day-to-day activities of the project and will report to the UNIDO Project Manager and the National Project Director, a high level official from the Ministry of MSME on a regular basis on the project activities and seek support as well. The UNIDO Project Manager will report to the GEF as per the GEF requirements on the project implementation and monitoring. The PMU will also report to the UNIDO Regional Office in India.

The below Figure shows the block diagram of the project implementation/execution arrangement:

Project Management Unit

Project execution will be conducted by the PMU to be established at the Ministry of MSME premises. The PMU will also be responsible for liaising with national government bodies and other project partners. The PSC will oversee the work of the PMU and general execution of the project in regular interventions.

UNIDO will provide authorize required expenses for the PMU for execution of project activities. The PMU will report to the UNIDO project manager on a regular basis.

The PMU office will comprise of a National Project Coordinator who will be supported by a team of professionals to manage the entire scope of work. The recruitment of the National Project Coordinator will be done by UNIDO in consultation with the PSC. The team will comprise of a technical advisor, project assistant and national experts. The main tasks of the staff will include drafting detailed terms of reference, issuing request for proposals, evaluating and negotiating tenders and implementing and monitoring project activities. All these activities will be done in close coordination with UNIDO and according to UNIDO/GEF regulations.

The PMU will be responsible for providing the following reports:

- Quarterly progress, semi- yearly and financial reports
- Quarterly work plans and budgets
- Annual project implementation reviews
- Periodic thematic reports
- Technical reports (As prepared by engaged experts/sub-consultants)
- Project publications (As prepared by engaged experts/sub-consultants)
- Terminal report

The PMU will provide all related information to the evaluation experts for both the midterm review and the final evaluation. More details regarding the reporting structure are provided under the monitoring and evaluation plan in Annex F.

Project Steering Committee (PSC)

A PSC will be set up to provide advisory inputs for the project. The PSC, chaired by the Ministry of MSME, will meet twice per year to review the implementation progress, confirm the work plan for the subsequent year and provide strategic guidance to the PMU on project implementation and if required, correct the course of the project. Minutes of meetings will be prepared by the PMU in consultation with the Ministry of MSME and UNIDO. The committee will comprise of representatives from UNIDO, BEE, Ministry of MSME, EESL, SIDBI, GEF Focal Point, banks and other relevant bodies. The final composition of the PSC will be decided during the project inception phase. Representatives from other multi-lateral organizations and relevant line ministries may also be invited to the steering committee meetings on an ad hoc basis, depending on their involvement in the project. The PMU will act as the Secretariat of the PSC.

The project will also undertake the task of establishing a working technical group that will include representatives from the Ministry of MSME, BEE, EESL, UNIDO and other related agencies to coordinate with various agencies that have worked or working in the identified clusters. This working group's tasks will be led by the EESL and will meet quarterly and report to the PSC Chair on a periodic basis. They will provide support and guide the PMU on the followings:

a) To synergize the activities of the agencies working in the identified clusters

b) To assimilate experiences and best practices of the work done by the agencies at the cluster level

c) To finalize the technological interventions in the clusters

d) To leverage the working level relationships established by different agencies at the cluster level

ANNEX I: COFINANCING LETTERS

Please refer to the attached letters from the project's various co-financing partners.

ANNEX J: DETAILED INFORMATION ABOUT EACH CLUSTER

Jodhpur (Limestone Cluster)	Unit	Value
Total energy requirement of the cluster	GJ	5,863,488
Average investment per unit per cluster	USD	1,764
1. Insulation of Kiln		
Number of units in which implementation of the TP has been considered	#	58
Number of surveyed units in which implementation of this TP is feasible	#	58
Estimated Investments for implementation of the TP	Rs	5,000,000
Estimated Investments for implementation of the TP	USD	83,333
Estimated investment per unit	USD	1,437
Additional Annual Energy Saving Potential in the cluster with the implementation of the Technology Proposed (TP)	GJ	91,021
Annual financial savings potential	Rs	30,700,000
Annual financial savings potential	USD	511,667
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
2. Improved storage & handling of Pet Coke & a Reduction in Carpet Losses		
Number of units in which implementation of the TP has been considered	#	107
Number of surveyed units in which implementation of this TP is feasible	#	107
Estimated Investments for implementation of the TP	Rs	2,100,000
Estimated Investments for implementation of the TP	USD	35,000
Estimated investment per unit	USD	327
Additional Annual Energy Saving Potential in the cluster with the implementation of the Technology Proposed (TP)	GJ	112,667
Annual financial savings potential	Rs	38,000,000
Annual financial savings potential	USD	633,333
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
Varanasi (Brick Kiln Cluster)	**Unit**	**Value**
Total energy requirement of the cluster	GJ	1,826,198
Average investment per unit per cluster	USD	30,309
3. Conversion from Straight Line to Natural Draft Zig Zag Firing or replacement of existing Bull Trench Kiln (BTK) Kilns with Vertical Shaft Brick (VSBK) Kilns or Installation of Hoffman Kilns		
Number of units in which implementation of the TP has been considered	#	178
Number of surveyed units in which implementation of this TP is feasible	#	178
Estimated Investments for implementation of the TP	Rs	323,700,000
Estimated Investments for implementation of the TP	USD	5,395,000
Estimated investment per unit	USD	30,309
Additional Annual Energy Saving Potential in the cluster with the implementation of the Technology Proposed (TP)	GJ	230,944
Annual financial savings potential	Rs	126,000,000
Annual financial savings potential	USD	2,100,000
Fuel used		Fuel Oil

Emissions factor	Tonnes GHG per GJ	0.0774
Vapi (Dyes & Chemicals Cluster)	**Unit**	**Value**
Total energy requirement of the cluster	GJ	1,195,583
Average investment per unit per cluster	USD	4,727
4. Installation of Waste Heat Recovery System on the Boilers (Economizer & Air Preheater) and Thermopacs (Air Preheater) - applicable to around 50% of the units only		
Number of units in which implementation of the TP has been considered	#	261
Number of surveyed units in which implementation of this TP is feasible	#	131
Estimated Investments for implementation of the TP	Rs	14,200,000
Estimated Investments for implementation of the TP	USD	236,667
Estimated investment per unit	USD	1,807
Additional Annual Energy Saving Potential in the cluster with the implementation of the Technology Proposed (TP)	GJ	22,944
Annual financial savings potential	Rs	11,900,000
Annual financial savings potential	USD	198,333
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
5. Improvement in the performance of the Boiler including Installation of VFD's on the ID/ FD fans for better draft and combustion control (applicable to around 50% of the units only)		
Number of units in which implementation of the TP has been considered	#	249
Number of surveyed units in which implementation of this TP is feasible	#	125
Estimated Investments for implementation of the TP	Rs	9,400,000
Estimated Investments for implementation of the TP	USD	156,667
Estimated investment per unit	USD	1,253
Additional Annual Energy Saving Potential in the cluster with the implementation of the Technology Proposed (TP)	GJ	29,182
Annual financial savings potential	Rs	15,100,000
Annual financial savings potential	USD	251,667
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
6. Condensate & waste heat recovery from drained water using PHEs (applicable to around 50% of the units only)		
Number of units in which implementation of the TP has been considered	#	302
Number of surveyed units in which implementation of this TP is feasible	#	151
Estimated Investments for implementation of the TP	Rs	15,100,000
Estimated Investments for implementation of the TP	USD	251,667
Estimated investment per unit	USD	1,667
Additional Annual Energy Saving Potential in the cluster with the implementation of the Technology Proposed (TP)	GJ	118,235
Annual financial savings potential	Rs	60,400,000
Annual financial savings potential	USD	1,006,667
Fuel used		Fuel Oil

Emissions factor	Tonnes GHG per GJ	0.0774
Surat (Textile Cluster)	**Unit**	**Value**
Total energy requirement of the cluster	GJ	28,152,043
Average investment per unit per cluster	USD	12,720
7. Recovery of condensate from the Jet Dyeing Machines and Installation of steam traps		
Number of units in which implementation of the TP has been considered	#	176
Number of surveyed units in which implementation of this TP is feasible	#	176
Estimated Investments for implementation of the TP	Rs	79,800,000
Estimated Investments for implementation of the TP	USD	1,330,000
Estimated investment per unit	USD	7,557
Additional Annual Energy Saving Potential in the cluster with the implementation of the Technology Proposed (TP)	GJ	190,332
Annual financial savings potential	Rs	110,900,000
Annual financial savings potential	USD	1,848,333
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
8. Installation of VFD on the ID/ FD fans to Optimize the excess air supply to the Boiler & Draft Control (applicable to around 50% of the units only)		
Number of units in which implementation of the TP has been considered	#	136
Number of surveyed units in which implementation of this TP is feasible	#	68
Estimated Investments for implementation of the TP	Rs	17,000,000
Estimated Investments for implementation of the TP	USD	283,333
Estimated investment per unit	USD	4,167
Additional Annual Energy Saving Potential in the cluster with the implementation of the Technology Proposed (TP)	MWh	2,559
Annual financial savings potential	Rs	5,400,000
Annual financial savings potential	USD	90,000
Fuel used		Electricity
Emissions factor	Tonnes GHG per MWh	0.87795548
9. Installation of Capacitor Banks & APFC Panel for Power Factor Improvement		
Number of units in which implementation of the TP has been considered	#	184
Number of surveyed units in which implementation of this TP is feasible	#	184
Estimated Investments for implementation of the TP	Rs	11,000,000
Estimated Investments for implementation of the TP	USD	183,333
Estimated investment per unit	USD	996
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	MWh	8,432
Annual financial savings potential	Rs	50,600,000
Annual financial savings potential	USD	843,333
Fuel used		Electricity
Emissions factor	Tonnes GHG per MWh	0.87795548
Morbi (Ceramic Cluster)	**Unit**	**Value**
Total energy requirement of the cluster	GJ	58,529,873

Average investment per unit per cluster	USD	31,391
10. Installation of Waste Heat Recovery System (Recuperator)		
Number of units in which implementation of the TP has been considered	#	462
Number of surveyed units in which implementation of this TP is feasible	#	462
Estimated Investments for implementation of the TP	Rs	600,600,000
Estimated Investments for implementation of the TP	USD	10,010,000
Estimated investment per unit	USD	21,667
Additional Annual Energy Saving Potential in the cluster with the implementation of the Technology Proposed (TP)	GJ	576,439
Annual financial savings potential	Rs	300,300,000
Annual financial savings potential	USD	5,005,000
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
11. Improvement in the Insulation of the Kiln to reduce surface losses		
Number of units in which implementation of the TP has been considered	#	387
Number of surveyed units in which implementation of this TP is feasible	#	387
Estimated Investments for implementation of the TP	Rs (Lacs)	225,800,000
Estimated Investments for implementation of the TP	USD	3,763,333
Estimated investment per unit	USD	9,724
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP	GJ	309,153
Annual financial savings potential	Rs (Lacs)	161,000,000
Annual financial savings potential	USD	2,683,333
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
12. Installation of NG based Gas Turbine for power generation and further utilizing the exhaust flue gases of the turbine in spray dryers (applicable to around 5% of the units only)		
Number of units in which implementation of the TP has been considered	#	469
Number of surveyed units in which implementation of this TP is feasible	#	23
Estimated Investments for implementation of the TP	Rs	1,641,500,000
Estimated Investments for implementation of the TP	USD	27,358,333
Estimated investment per unit	USD	1,189,493
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP	GJ	337,749
Annual financial savings potential	Rs	562,800,000
Annual financial savings potential	USD	9,380,000
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
Vellore (Rice Mill Cluster)	**Unit**	**Value**
Total energy requirement of the cluster	GJ	3,288,313
Average investment per unit per cluster	USD	10,941
13. Replacement of old energy inefficient boiler with new Energy Efficient Boiler		
Number of units in which implementation of the TP has been considered	#	257
Number of surveyed units in which implementation of this TP is feasible	#	257

Estimated Investments for implementation of the TP	Rs	106,400,000
Estimated Investments for implementation of the TP	USD	1,773,333
Estimated investment per unit	USD	6,900
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	GJ	471,392
Annual financial savings potential	Rs	160,900,000
Annual financial savings potential	USD	2,681,667
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
14. Installation of new Air Compressor replacing the old inefficient air compressor and		
Number of units in which implementation of the TP has been considered	#	326
Number of surveyed units in which implementation of this TP is feasible	#	326
Estimated Investments for implementation of the TP	Rs	27,700,000
Estimated Investments for implementation of the TP	USD	461,667
Estimated investment per unit	USD	1,416
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	MWh	2,849
Annual financial savings potential	Rs	16,300,000
Annual financial savings potential	USD	271,667
Fuel used		Electricity
Emissions factor	Tonnes GHG per MWh	0.87795548
15. Optimization of compressed air generation pressure		
Number of units in which implementation of the TP has been considered	#	257
Number of surveyed units in which implementation of this TP is feasible	#	257
Estimated Investments for implementation of the TP	Rs	2,400,000
Estimated Investments for implementation of the TP	USD	40,000
Estimated investment per unit	USD	156
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	MWh	1,407
Annual financial savings potential	Rs	8,000,000
Annual financial savings potential	USD	133,333
Fuel used		Electricity
Emissions factor	Tonnes GHG per MWh	0.87795548
16. Replacement of iron buckets with plastic buckets for Elevators		
Number of units in which implementation of the TP has been considered	#	291
Number of surveyed units in which implementation of this TP is feasible	#	291
Estimated Investments for implementation of the TP	Rs	5,300,000
Estimated Investments for implementation of the TP	USD	88,333
Estimated investment per unit	USD	304
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	MWh	1,082
Annual financial savings potential	Rs	6,100,000
Annual financial savings potential	USD	101,667
Fuel used		Electricity

Emissions factor	Tonnes GHG per MWh	0.87795548
17. Installation of VFDs on Fans installed on the Hot Air Dryers		
Number of units in which implementation of the TP has been considered	#	236
Number of surveyed units in which implementation of this TP is feasible	#	236
Estimated Investments for implementation of the TP	Rs	8,300,000
Estimated Investments for implementation of the TP	USD	138,333
Estimated investment per unit	USD	586
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	MWh	1,372
Annual financial savings potential	Rs	7,800,000
Annual financial savings potential	USD	130,000
Fuel used		Electricity
Emissions factor	Tonnes GHG per MWh	0.87795548
18. Insulation of Boiler / un-insulated steam lines		
Number of units in which implementation of the TP has been considered	#	250
Number of surveyed units in which implementation of this TP is feasible	#	250
Estimated Investments for implementation of the TP	Rs	13,700,000
Estimated Investments for implementation of the TP	USD	228,333
Estimated investment per unit	USD	913
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	GJ	56,229
Annual financial savings potential	Rs	19,300,000
Annual financial savings potential	USD	321,667
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
19. Condensate / Flash Steam Recovery using flash steam recovery vessel		
Number of units in which implementation of the TP has been considered	#	333
Number of surveyed units in which implementation of this TP is feasible	#	333
Estimated Investments for implementation of the TP	Rs	13,300,000
Estimated Investments for implementation of the TP	USD	221,667
Estimated investment per unit	USD	666
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	GJ	78,084
Annual financial savings potential	Rs	26,600,000
Annual financial savings potential	USD	443,333
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
Jorhat (Tea Cluster)	**Unit**	**Value**
Total energy requirement of the cluster	GJ	3,780,680
Average investment per unit per cluster	USD	32,835
20. Proper sizing of motors and using energy efficient motors in withering and other section		
Number of units in which implementation of the TP has been considered	#	134
Number of surveyed units in which implementation of this TP is feasible	#	134

Estimated Investments for implementation of the TP	Rs	70,700,000
Estimated Investments for implementation of the TP	USD	1,178,333
Estimated investment per unit	USD	8,794
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	MWh	3,698
Annual financial savings potential	Rs	29,500,000
Annual financial savings potential	USD	491,667
Fuel used		Electricity
Emissions factor	Tonnes GHG per MWh	0.87795548
21. Replacement of standard Natural Gas burners with energy efficient burners and modulators or VFDs on combustion air fan for air to fuel ratio control in the dryers		
Number of units in which implementation of the TP has been considered	#	140
Number of surveyed units in which implementation of this TP is feasible	#	140
Estimated Investments for implementation of the TP	Rs	41,000,000
Estimated Investments for implementation of the TP	USD	683,333
Estimated investment per unit	USD	4,881
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	GJ	58,029
Annual financial savings potential	Rs	30,800,000
Annual financial savings potential	USD	513,333
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
22. Installation of VFD for Hot Air ID fan		
Number of units in which implementation of the TP has been considered	#	145
Number of surveyed units in which implementation of this TP is feasible	#	145
Estimated Investments for implementation of the TP	Rs	21,700,000
Estimated Investments for implementation of the TP	USD	361,667
Estimated investment per unit	USD	2,494
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	MWh	6,920
Annual financial savings potential	Rs	13,100,000
Annual financial savings potential	USD	218,333
Fuel used		Electricity
Emissions factor	Tonnes GHG per MWh	0.87795548
23. Installation of Biomass Gasification to meet thermal energy requirement (applicable to around 50% of the units only)		
Number of units in which implementation of the TP has been considered	#	150
Number of surveyed units in which implementation of this TP is feasible	#	75
Estimated Investments for implementation of the TP	Rs	75,000,000
Estimated Investments for implementation of the TP	USD	1,250,000
Estimated investment per unit	USD	16,667
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	GJ	63,597
Annual financial savings potential	Rs	33,800,000

Annual financial savings potential	USD	563,333
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
Odisha (Sponge Iron Cluster)	**Unit**	**Value**
Total energy requirement of the cluster	GJ	92,007,693
Average investment per unit per cluster	USD	250,000
24. Installation of Waste Heat Recovery Systems on the Exit flue gasses from the Kiln to Pre-heat the raw material or 12 Utilizing the waste heat for power generation (applicable to around 10% of the units only)		
Number of units in which implementation of the TP has been considered	#	107
Number of surveyed units in which implementation of this TP is feasible	#	107
Estimated Investments for implementation of the TP	Rs	1,605,000,000
Estimated Investments for implementation of the TP	USD	26,750,000
Estimated investment per unit	USD	250,000
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	GJ	407,208
Annual financial savings potential	Rs	678,500,000
Annual financial savings potential	USD	11,308,333
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
Pali (Textile Cluster)	**Unit**	**Value**
Total energy requirement of the cluster	GJ	5,377,945
Average investment per unit per cluster	USD	13,524
25. Installation of Modulator or VFD on ID/ FD fans in Boiler / Thermopac for optimum air to fuel control & maintaining furnace draft		
Number of units in which implementation of the TP has been considered	#	343
Number of surveyed units in which implementation of this TP is feasible	#	343
Estimated Investments for implementation of the TP	Rs	28,000,000
Estimated Investments for implementation of the TP	USD	466,667
Estimated investment per unit	USD	1,361
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	GJ	70,799
Annual financial savings potential	Rs	42,200,000
Annual financial savings potential	USD	703,333
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
26. Installation of Waste heat recovery in Thermopac / Boiler coupled with condensate/ flash steam recovery & Insulation of steam lines		
Number of units in which implementation of the TP has been considered	#	338
Number of surveyed units in which implementation of this TP is feasible	#	338
Estimated Investments for implementation of the TP	Rs	10,800,000
Estimated Investments for implementation of the TP	USD	180,000
Estimated investment per unit	USD	533
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	GJ	17,961

Annual financial savings potential	Rs	10,800,000
Annual financial savings potential	USD	180,000
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
27. Installation of VFDs on jet dyeing water pump, stenter fans		
Number of units in which implementation of the TP has been considered	#	267
Number of surveyed units in which implementation of this TP is feasible	#	267
Estimated Investments for implementation of the TP	Rs	61,400,000
Estimated Investments for implementation of the TP	USD	1,023,333
Estimated investment per unit	USD	3,833
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	MWh	4,559
Annual financial savings potential	Rs	27,200,000
Annual financial savings potential	USD	453,333
Fuel used		Electricity
Emissions factor	Tonnes GHG per MWh	0.87795548
28. Installation of Capacitor Banks & APFC Panel for Power Factor Improvement		
Number of units in which implementation of the TP has been considered	#	289
Number of surveyed units in which implementation of this TP is feasible	#	289
Estimated Investments for implementation of the TP	Rs	44,500,000
Estimated Investments for implementation of the TP	USD	741,667
Estimated investment per unit	USD	2,566
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	MWh	3,361
Annual financial savings potential	Rs	20,200,000
Annual financial savings potential	USD	336,667
Fuel used		Electricity
Emissions factor	Tonnes GHG per MWh	0.87795548
29. Installation of Solar Thermal Systems for Preheating of Boiler Feed Water		
Number of units in which implementation of the TP has been considered	#	348
Number of surveyed units in which implementation of this TP is feasible	#	348
Estimated Investments for implementation of the TP	Rs	104,400,000
Estimated Investments for implementation of the TP	USD	1,740,000
Estimated investment per unit	USD	5,000
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	GJ	58,280
Annual financial savings potential	Rs	34,800,000
Annual financial savings potential	USD	580,000
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
30. Installation of Fabric Moisture Control in Stenters to avoid over drying & Installation of Suction Slit (vacuum slit) in Stenters		
Number of units in which implementation of the TP has been considered	#	345

Number of surveyed units in which implementation of this TP is feasible	#	345
Estimated Investments for implementation of the TP	Rs	4,800,000
Estimated Investments for implementation of the TP	USD	80,000
Estimated investment per unit	USD	232
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	GJ	16,161
Annual financial savings potential	Rs	9,700,000
Annual financial savings potential	USD	161,667
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
Batala / Jalandhar / Ludhiana (Casting & Forging Cluster)	**Unit**	**Value**
Total energy requirement of the cluster	GJ	965,811
Average investment per unit per cluster	USD	59,510
31. Installation of Induction Furnace for Melting to replace the Oil fired Rotary furnaces (applicable to around 25% of the units only)		
Number of units in which implementation of the TP has been considered	#	280
Number of surveyed units in which implementation of this TP is feasible	#	70
Estimated Investments for implementation of the TP	Rs	246,200,000
Estimated Investments for implementation of the TP	USD	4,103,333
Estimated investment per unit	USD	58,619
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	GJ	146,245
Annual financial savings potential	Rs	186,200,000
Annual financial savings potential	USD	3,103,333
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
32. Insulation of the Rotary Furnace & cupola (applicable to around 90% of the units only)		
Number of units in which implementation of the TP has been considered	#	380
Number of surveyed units in which implementation of this TP is feasible	#	342
Estimated Investments for implementation of the TP	Rs	10,300,000
Estimated Investments for implementation of the TP	USD	171,667
Estimated investment per unit	USD	502
Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	GJ	8,583
Annual financial savings potential	Rs	10,300,000
Annual financial savings potential	USD	171,667
Fuel used		Fuel Oil
Emissions factor	Tonnes GHG per GJ	0.0774
33. Installation of Capacitor Banks for Power Factor Improvement		
Number of units in which implementation of the TP has been considered	#	120
Number of surveyed units in which implementation of this TP is feasible	#	120
Estimated Investments for implementation of the TP	Rs	2,800,000
Estimated Investments for implementation of the TP	USD	46,667
Estimated investment per unit	USD	389

Additional Annual Energy Saving Potential in the cluster with the implementation of the TP:	MWh	302
Annual financial savings potential	Rs	2,200,000
Annual financial savings potential	USD	36,667
Fuel used		Electricity
Emissions factor	Tonnes GHG per MWh	0.87795548