



GEF-6 REQUEST FOR PROJECT ENDORSEMENT/APPROVAL

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: GEF TRUST FUND

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PART I: PROJECT INFORMATION

Project Title: Creating and sustaining markets for energy efficiency			
Country(ies):	India	GEF Project ID: ¹	9258
GEF Agency(ies):	ADB and UNEP	GEF Agency Project ID:	01381
Other Executing Partner(s):	Energy Efficiency Services Limited (EESL)	Submission Date:	19 April 2017
GEF Focal Area (s):	Climate Change	Project Duration (Months)	60 months
Integrated Approach Pilot	IAP-Cities <input type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/>		Corporate Program: SGP <input type="checkbox"/>
Name of Parent Program		Agency Fee (\$)	1,697,037

A. FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES²

Objectives/Programs(Focal Areas, Integrated Approach Pilot, Corporate Programs)	Trust Fund	(in \$)	
		GEF Project Financing	Confirmed Co-financing
CCM1 – Program 1	GEF TF	18,855,963	434,200,000
Total Project Cost		18,855,963	434,200,000

B. PROJECT DESCRIPTION SUMMARY³

Project Objective: To reduce greenhouse gas (GHG) emissions through energy efficiency through scaling up and new technology applications						
Project Components	Financing Type ⁴	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Confirmed Co-financing
1. Expanding and sustaining investments in existing market sectors	TA	1. Energy efficiency improved through the installation of street lighting (SL), domestic LEDs (DL), 5 star ceiling fans and agricultural pumps	1. Due diligence conducted (ADB) 2. Energy savings contracts signed and executed with ULBs, DISCOMs and consumers (ADB) 3. Gender sensitive social marketing campaigns scaled up for target consumers, DISCOMs, ULBs, and suppliers	GEF TF	399,000 (UNEP)	1,000,000

¹ Project ID number remains the same as the assigned PIF number.

² When completing Table A, refer to the excerpts on [GEF 6 Results Frameworks for GETF, LDCF and SCCF](#).

³ Acronyms in the logframe: SL - Street Lighting; DL - Domestic Lighting; CL - Ceiling Fan; AgPump - Agricultural Pump; ULB - Urban Local Body; DISCOM - Distribution Company; MRV - Measurement, Reporting and Verification; TG - Trigeneration; SG - Smart Grid

⁴ Financing type can be either investment or technical assistance.

			(ADB) 4. Review and recommendations of business models for each market sector conducted (SL, DL, BEE 5 Star Ceiling Fan and Agricultural Pumps), including MRV protocols (UNEP)			
	INV/TA		5. Supply tenders for installation and maintenance awarded and contracts signed (ADB) 6. Revolving fund, or similar sustainable financing mechanism designed and operationalized (ADB)	GEF TF	1,366,806 (ADB)	399,000,000
2. Building market diversification	TA	2. Energy efficiency improved through the installation of super efficient ceiling fans, tri-generation technologies and smart-grid application	7. Standards and specifications for technology tenders developed (UNEP)	GEF TF	708,573 (UNEP)	
	INV		8. Super-efficient ceiling fans, tri-generation and smart grid investments in at least 10 projects conducted (ADB)	GEF TF	13,000,000 (ADB)	31,200,000
	TA		9. Financial and Energy savings performance of super-efficient ceiling fans, tri-generation and smart grid investments monitored, measured and reported (UNEP) 10. New ESCO business models for ceiling fans, tri-generation and smart grid technologies validated (UNEP)	GEF TF	1,041,526 (UNEP)	
3. Replication and scaling up	TA	3. Enabling conditions created to support EESL growth strategy targeting US\$ 300 million in investments across all 7 technologies (SL, DL, BEE 5 Star CF, Agricultural Pumps, Super-efficient CF, TG, SG)	GEF TF	1,742,155 (UNEP)	2,000,000	
			11. Growth strategy drafted, based on collected experience, lessons, data from Components 1 & 2, on energy and financial savings and a review of other technologies EESL could expand into in the medium to long term. (UNEP) 12. Business processes automated at EESL. (UNEP) 13. Energy savings plans and capacity-building for ULBs, DISCOMs, facilities owners and managers for implementation of energy savings plans conducted (UNEP)			

			14. Investment opportunities and potential sources of finance identified / and screened for the growth strategy (ADB)			
Subtotal					18,258,060	433,200,000
Project Management Cost (PMC) ⁵				GEF TF	597,903	1,000,000
Total Project Cost					18,855,963	434,200,000

C. CONFIRMED SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (\$)
Multilateral Development Bank	ADB	Loan	200,000,000
Multilateral Development Bank	ADB	Cash (TA)	1,000,000
National Government	EESL	Equity and Loans	199,000,000
National Government	EESL	In-kind	2,960,000
Bilateral organisation	KfW	Loans	31,200,000
International Organisation	UNEP	In-kind	40,000
Total Co-financing			434,200,000

D. TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee (b) ^{b)}	Total (c)=a+b
ADB	GEFTF	India	Climate Change		14,366,806	1,114,081*	15,480,887
UNEP	GEFTF	India	Climate Change		4,489,157	582,956*	5,072,113
Total GEF Resources					18,855,963	1,697,037	20,553,000

* IA fee calculations includes equal sharing in project preparation

⁵ For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

E. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS⁶

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	NA
2. Sustainable land management in production systems (agriculture, rangelands, and forest landscapes)	120 million hectares under sustainable land management	NA
3. Promotion of collective management of transboundary water systems and implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services	Water-food-ecosystems security and conjunctive management of surface and groundwater in at least 10 freshwater basins;	NA
	20% of globally over-exploited fisheries (by volume) moved to more sustainable levels	NA
4. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO _{2e} mitigated (include both direct and indirect)	<i>Direct (by 2022⁷):</i> 10,556,082 tCO_{2eq}
		<i>Direct (by 2032):</i> 37,904,820 tCO_{2eq}
		<i>Indirect (by 2032):</i> 22,351,511 tCO_{2eq}
Increase in phase-out, disposal and reduction of releases of POPs, ODS, mercury and other chemicals of global concern	Disposal of 80,000 tons of POPs (PCB, obsolete pesticides)	NA
	Reduction of 1000 tons of Mercury	NA
	Phase-out of 303.44 tons of ODP (HCFC)	NA
Enhance capacity of countries to implement MEAs (multilateral environmental agreements) and mainstream into national and sub-national policy, planning financial and legal frameworks	Development and sectoral planning frameworks integrate measurable targets drawn from the MEAs in at least 10 countries	NA
	Functional environmental information systems are established to support decision-making in at least 10 countries	NA

F. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT? No

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

Not Applicable

⁶ Update the applicable indicators provided at PIF stage. Progress in programming against these targets for the projects per the *Corporate Results Framework* in the [GEF-6 Programming Directions](#), will be aggregated and reported during mid-term and at the conclusion of the replenishment period.

⁷ End-of-project target

PART II: PROJECT JUSTIFICATION

A.0. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN WITH THE ORIGINAL PIF

Although the overarching project components remain the same as in the PIF, several project outcomes and outputs have undergone wording and/or numbering changes, which are described here below:

Logframe elements	PIF wording	CEO Endorsement wording	Explanations
Outcome 1 (<i>number unchanged</i>)	Energy efficiency improved through the installation of street lighting (SL) and domestic LEDs (DL)	Energy efficiency improved through the installation of street lighting (SL), domestic LEDs (DL), 5 star ceiling fans and agricultural pumps	Two additional technologies have been included in the scope of Outcome 1: “5 star ceiling fans” and “agricultural pumps”.
Output 4 (<i>number unchanged</i>)	4. Review and recommendations for business models for each market sector conducted (SL, DL) (UNEP)	4. Review and recommendations of business models for each market sector conducted (SL, DL, BEE 5 Star Ceiling Fan and Agricultural Pumps), including MRV protocols (UNEP)	Since the scope of Outcome 1 has been broadened with to two additional technologies, these have also been included in Output 4: “5 star ceiling fans” and “agricultural pumps”.
Outcome 2 (<i>number unchanged</i>)	Energy efficiency improved through the installation of ceiling fans, tri-generation technologies and smart-grid application	Energy efficiency improved through the installation of super efficient ceiling fans, tri-generation technologies and smart-grid application	The wording of the type of ceiling fans that are considered in Outcome 2 has been refined to “super efficient ceiling fans”.
PIF number: Output 8 New number: Output 10	8. New ESCO business models for ceiling fans, tri-generation and smart grid technologies validated (UNEP)	10. New ESCO business models for ceiling fans, tri-generation and smart grid technologies validated (UNEP)	This output has simply been renumbered as “Output 10” to follow the framework’s logic.
PIF number: Output 10	10. Gender sensitive social marketing campaigns conducted for target consumers, DISCOMs, ULBs, and suppliers (UNEP)		This output has been removed and its content has been shifted to Output 13.
PIF number: Output 11 New number: Output 8	11. Super-efficient ceiling fans, tri-generation and smart grid investments in 10 projects conducted (ADB)	8. Super-efficient ceiling fans, tri-generation and smart grid investments in at least 10 projects conducted (ADB)	The wording of this output has been slightly modified to better reflect its expectations. In addition, this output has been renumbered as “Output 8” to follow the framework’s logic.
Outcome 3 (<i>number unchanged</i>)	Enabling conditions created to support EESL growth strategy targeting US\$ 300 million in investments across all 5 technologies (SL, DL, CF, TG, SG)	Enabling conditions created to support EESL growth strategy targeting US\$ 300 million in investments across all 7 technologies (SL, DL, BEE 5 Star CF, Agricultural Pumps, Super-efficient CF , TG, SG)	The number of technologies considered in this project has increased compared to the PIF: agricultural pumps have been included in the project’s scope; and ceiling fans (CF) have been broken down into two different categories: “BEE 5 star ceiling fans” and “super-efficient ceiling fans”.

Logframe elements	PIF wording	CEO Endorsement wording	Explanations
PIF number: Output 12 New number: Output 11	12. Growth strategy drafted, based on collected experience, lessons, data from Components 1 & 2, on energy and financial savings and a review of other technologies EESL could expand into in the medium to long term	11. Growth strategy drafted, based on collected experience, lessons, data from Components 1 & 2, on energy and financial savings and a review of other technologies EESL could expand into in the medium to long term (UNEP)	This output has simply been renumbered as “Output 11” to follow the framework’s logic.
PIF number: Output 13 New number: Output 12	13. Business processes automated at EESL	12. Business processes automated at EESL (UNEP)	This output has simply been renumbered as “Output 12” to follow the framework’s logic.
PIF number: Output 14 New number: Output 13	14. Energy savings plans and capacity-building for ULBs, DISCOMs, facilities owners and managers for implementation of energy savings plans conducted (UNEP)	13. Energy savings plans and capacity-building for ULBs, DISCOMs, facilities owners and managers for implementation of energy savings plans conducted (UNEP)	This output has simply been renumbered as “Output 13” to follow the framework’s logic.
PIF number: Output 15 New number: Output 14	15. Investment opportunities and potential sources of finance identified / and screened (UNEP/ADB)	14. Investment opportunities and potential sources of finance identified / and screened for the growth strategy (ADB)	This output has simply been renumbered as “Output 14” to follow the framework’s logic.

The GEF funds’ distribution across project components/outcomes have undergone slight adjustments compared to the original PIF. Below table provides a comparison of the GEF project financing between the PIF and the CEO Endorsement stages:

Logframe elements	GEF financing at PIF stage (US\$)	GEF financing at CEO Endorsement (US\$)	Explanations
Component/Outcome 1 - TA	400,000	399,000	<i>Minor adjustments on the amount of funds allocated to the main project components have been made while developing the budget during the project preparation phase.</i>
Component/Outcome 1 – INV/TA	1,345,806	1,366,806	
Component/Outcome 2 - TA	1,855,099	1,750,099	
Component/Outcome 2 - INV	13,000,000	13,000,000	
Component/Outcome 3 - TA	1,657,155	1,742,155	
PMC	597,903	597,903	<i>No changes.</i>
Total Project Cost	18,855,963	18,855,963	<i>No changes.</i>

Finally, the co-financing partners’ commitments remain the same as for the PIF stage.

A.1. PROJECT DESCRIPTION

A.1.1 THE GLOBAL ENVIRONMENTAL AND/OR ADAPTATION PROBLEMS, ROOT CAUSES AND BARRIERS THAT NEED TO BE ADDRESSED;

Energy Scenario in India

India is facing formidable challenges in meeting its energy needs. As per the National Institution for Transforming India (NITI) Aayog's report on Energy efficiency and Energy Mix in the Indian Energy System (2030), using India Energy Security Scenarios 2047⁸, if India perseveres with sustained growth rate of 7.4% per annum till 2047, then its primary energy supply requirement will be 3 to 4 times, compared to 2012 level. It is estimated that by 2047, the country would require 1,112,000 MW of power generation capacity against the overall installed capacity of 193,000 MW in 2012. In the last financial year, 2015-16, the country had electricity shortage of 2.1% and peak demand shortage of 2.6% as per Central Electricity Authority (CEA). The break-up of electricity consumption in different sectors in India is shown in Figure 1.

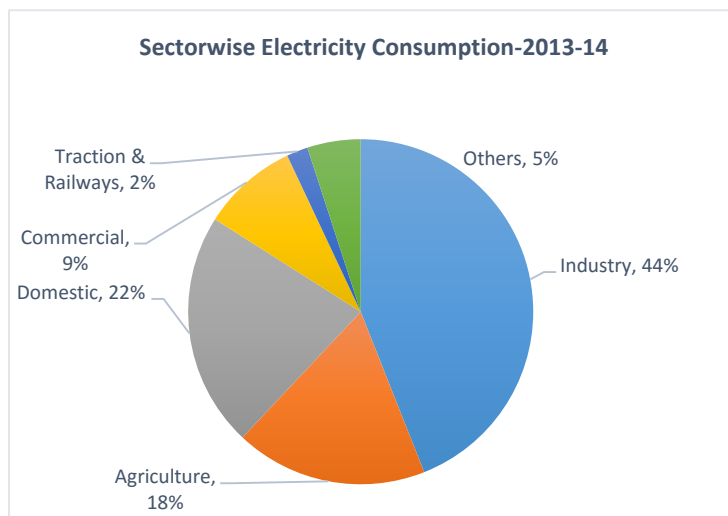


FIGURE 1: SECTORWISE ELECTRICITY CONSUMPTION 2013-14

"Industrial, Residential and Commercial sectors together account for around 75% of electricity consumption in India."

In 2014, India was the fourth largest energy consumer in the world, behind the China, United States, and Russia. In the same year, the country had the ninth-largest economy as measured in 2014 \$ US (converted at official exchange rates), and the third largest, when GDP is adjusted for inflation and purchasing power. Inflation-adjusted GDP has grown at over 7% per year since 2000, with a dip to around 5% in 2012 according to the Indian Central Statistical Organization (CSO). This pace of economic growth, coupled against a projected increase in population of an additional 400 million by 2050 (making India the world's most populous nation with 1.6 billion people, according to Pew Research Centre data), underscores the need for effective supply and Demand Side Management (DSM) of energy resources.

India's CO₂ emissions from fuel combustion have increased by 9 times between 1971 and 2013 from 182.4 million tons to 1,868 million tons. Out of the total 1,868 million tons of CO₂ emission, around 944.6 million tons in 2013 were generated from electricity and heat production.

Making clean and affordable energy and electricity available to consumers has become a growing concern for the Government of India (GOI) and other stakeholders. In fact, India's CO₂ "intensity" (measured by grams of CO₂ per kilowatt-hour of electrical output) has reduced by 7% between 2005 and 2011 (Pales and West, OECD/IEA, 2014). The GOI has also determined that increased end-use efficiency is essential to contain energy demand without sacrificing growth. A target was set in 2010, to reduce the energy intensity of its economy by 20-25%

⁸ Source: <http://niti.gov.in/content/india-energy-security-scenarios-iess-2047-energy-scenario-building-tool-developed-energy>

below 2005 levels by 2022 (MOEF, 2010). Achieving this target will require about USD 68 billion of investment in efficiency measures (ADB, 2013). The key factors driving India towards energy efficiency are:

- Avoidance of requirement of capital intensive new energy supply infrastructures
- Narrowing the gap between energy requirement and supply
- Improving energy security or sufficiency
- Reducing energy generation related greenhouse gas (GHG) emissions

Government of India has adopted broad policies and regulations including the Integrated Energy Policy (IEP), Energy Conservation Act 2001 (EC Act), Electricity Act, 2003, and the National Mission for Enhanced Energy Efficiency (NMEEE) for promotion of energy efficiency in India. Additionally, Bureau of Energy Efficiency (BEE) at national level and State Designated Agencies (SDAs) at state level are also providing the relevant push towards energy efficiency. Besides, financial institutions like the Small Industries Development Bank of India (SIDBI) and the Indian Renewable Energy Development Agency (IREDA) are also promoting customized DSEE financing products among Micro, Small and Medium Enterprises (MSMEs) and other key economic sectors.

The overall size of the energy efficiency market in India is estimated to be 22.81 billion USD⁹. Both government policies and efforts by multilateral and bilateral organizations to conserve energy across a wide range of sectors have supported the emergence and growth of new domestic and international energy service companies (ESCOs). The business proposition of the ESCO is to identify opportunities for increasing the energy efficiency of industrial and commercial units, among others, through design of comprehensive energy solutions, and implementation of different financial models. The GOI has strengthened the institutional and legal framework through the Energy Conservation Act in 2001, which created the Bureau of Energy Efficiency (BEE). Despite the government measures and the fact that the potential for application of performance contracting in both the public and private sectors in developing nations is enormous, the growth of the ESCO industry has been particularly slow in the country and presently there are just 127 ESCOs empanelled with BEE.

For ESCO clients to obtain market-rate financing for energy efficiency projects, banks must recognize the savings potential that an ESCO's involvement can offer. Despite implementing a number of demonstration projects in commercial and industrial sectors, ESCOs have not yet achieved a critical mass which will be sufficient to support uptake and scaling up to meet India's sustainable energy needs. A few notable barriers which constraint ESCO market in India include:

- *Limited access to finance:* Most projects undertaken by the ESCOs are capital intensive. ESCOs are dependent on either the prospective clients or financial institutions for funding. Banks often lack awareness on the savings potential of EE projects, which result in higher interest rates and capital costs. In a survey conducted by the World Resources Institute (WRI), about 42 % of ESCOs faced capital financing issues, particularly SMEs (Delo, Lall and Singh, 2010).
- *Limited capacity in public sector:* Central, State and Urban Local Bodies (ULBs) are often unable to identify and propose energy efficiency investments due to lack of capacity, lack of finances for such innovative measures and also partially due to high administrative & transaction costs.
- *Government procurement regulations:* The public sector plays a pivotal role in creating a market within which ESCOs can operate successfully, however there are a number of conflicting regulations and overlapping mandates and jurisdictions, which distort energy efficiency markets. Markets are characterized by: i) energy policy disincentives (e.g. high costs of electricity which stimulates self-generation of inefficient diesel power), ii) limited enforcement of energy policy and lack of clear

⁹ Source: EESL Business plan for FY 2016 - 2021

incentives (Dhingra & Julena, 2005), and iii) poor understanding of legislation which may differ across States (Urge-Vorsatz, et al., 2007).

- *Perceived technology bias:* The industry is presently dominated by "vendor-driven" ESCOs, which are affiliated to equipment manufacturing companies. Clients generally perceive the services offered by these ESCOs to be biased, rather than providing comprehensive energy management solutions (Kumar and Vaddy, 2013). Further, there may also be technical, safety and reliability concerns hamper the introduction of any new technology.
- *Lack of simplified monitoring and verification (M&V) protocols:* Energy savings is measured from a baseline set at the start of a defined EE project. Metering systems for energy monitoring have become costly, and often faulty tracking systems lead to disputes between the ESCO and the client. This results in loss of earnings for the ESCO and also creates mistrust between the parties. There is lack of simplified M&V protocols to measure and verify the energy savings of demonstration projects in a transparent manner. M&V systems need to help ESCOs demonstrate tangible energy savings.
- *Payment Security Mechanism:* Weak payment security mechanism is one of the barriers in ESCO based energy efficiency projects. Due to improper payment security mechanism, energy efficiency (EE) is not the favoured destination for investment by the private players and ESCOs.

In response to these barriers, the GoI created Energy Efficiency Services Limited (EESL) in 2009 to undertake risks, demonstrate energy efficiency ESCO projects and transform the energy efficiency market. EESL was created under the aegis of the Ministry of Power as joint venture by the four central Public Sector Undertakings, i.e., National Thermal Power Corporation Ltd. (NTPC), Power Grid Corporation of India Ltd. (PGCIL), Power Finance Corporation (PFC) and Rural Electrification Corporation (REC), which made equal equity contribution of USD 3.8 million.

Key objectives, missions and vision of EESL

EESL seeks to create an energy efficiency market, particularly in the residential sector and public facilities (municipality, buildings, agriculture, industry etc.); implement innovative business models and give confidence to private sector Energy Service Companies (ESCOs) to undertake future projects for replication. EESL works as ESCO, as Consultancy Organization for Climate Change initiatives, Energy Efficiency, etc. and as a resource centre for capacity building of State Designated Agencies (SDAs), Utilities, financial institutions, etc. EESL is also leading all of the market-related actions of the NMEEE. It is the first such public sector company exclusively for implementation of energy efficiency in South Asia and amongst a very few such instances in the world.

The key objectives of EESL are:

- To carry out and promote the ESCO based business in the space of energy efficiency and climate change including manufacture and supply of energy efficiency services and products.
- To implement energy efficiency projects for demand side measures including residential and public buildings, municipal functions, agriculture, lighting etc.
- To implement energy efficiency schemes, programmes and policies of central and state governments or its agencies.
- To carry out such other activities as offered by the Central Govt., State Govt., Bureau of Energy Efficiency or any other agencies related to the Energy Efficiency and climate change.
- Partner with private ESCO's and other companies to promote energy efficiency.
- To provide consultancy services in the field of CDM projects, Carbon Markets, Demand Side Management, Energy Efficiency, Climate change and other related areas.
- To identify and impart training to build the capacity of stakeholders.

- To act as a resource centre in the field of energy efficiency and take up the activities of capacity building training and other related activities.

Concerns Related to EE Financing

A number of barriers and constraints to EE finance and scaling up are identified in the literature, including reviews of Global Environment Facility-supported EE financing programs. These, and other general characteristics of EE markets, may exacerbate risks, increase costs, dampen the interest of financial institutions in the sector, create marketing challenges, and contribute to the gap between economic potential and commercial realization of EE:

- *EE investment markets are characterized by a large number of small, highly dispersed projects, which result in limited profitability*
- *High pre-investment development and transaction costs in relation to total capital deployed, which necessitates solutions that reduce the cost per enterprise or transaction – but can also result in shortage of well prepared, investment grade projects*
- *Limited awareness of end users, complicated technical information requirements, and long marketing cycles associated with the customer sales and decision-making process, which inhibit project pipeline development*
- *Multi-step EE sales cycles, particularly from the customer/purchaser perspective. This is particularly relevant for energy investment decisions of large firms and institutions, which require a range of inputs to decision-making. For many, energy use is a small percentage of overall operating costs, and becomes a lower priority*
- *Weaknesses in the project-by-project approach to EE financing and development. This points to a need for programmatic market aggregation approaches, including specialized EE finance companies that can package, originate, and warehouse finance transactions for mainstream capital sources*
- *Limited experience of financial institutions with EE financing, and/or a lack of specifically adapted EE financial products on offer, and slow start up time to initiate specific EE financing products*
- *Real and perceived credit risks, lack of collateral offered by EE equipment, and difficulties creating creditworthy financing structures, and*
- *Wide range of financing structures required for EE financing to address needs of various market segments.*

Energy Efficiency Financing Mechanisms

Different EE financial mechanisms have been deployed in different markets. Most feature transaction structures which include government departments / agencies or public sector financial institutions as the lead institution, managing finances across a wide customer or user base. In very few instances, have energy service companies (ESCOs) been central to the transaction structure. The recent PR China experience is instructive, as this features a three-party investment mechanism, including end users, financial institutions and three large ESCOs. ESCOs are in charge of all aspects of project development, financing and implementation - “from the head to the tail of the dragon” – a model attractive to end users because the ESCO takes technical and financial risk, and also does most of the work.¹⁰

One of the main constraints to realizing potential energy savings through EE financing, is that investment delivery mechanisms are not suitably adapted to operate in the national and local context in which they are applied. While local banks and other financing organizations have “played useful roles in the energy efficiency business”, there is a need to develop programs that “combine technical project development with financial

¹⁰ Taylor, P. Robert et. Al. 2008. Financing Energy Efficiency: Lessons from Brazil, China, India and Beyond. Washington DC: The World Bank.

products appropriate for dispersed investments, with benefits focussed on operating costs savings.”¹¹ Generally speaking, the experience has been mixed.

ESCO-driven financing is one form of investment delivery discussed in the literature. Documentation on the experience suggests that generally, ESCOs are likely to have:

- *more technical and administrative experience with EE than other actors*
- *familiarity with financing models combined with eligibility to receive public funding*
- *internal capacity to manage projects in more specialized technical markets, and*
- *capability to bundle large project portfolios.*

On the downside, EE investments lack collateral value as they are integrated with other building and facility systems. This may discourage financial institutions from engaging with ESCOs. In countries such as India and PR China, ESCOs may be undercapitalized and lack the marketing capability which is required to build up effective demand for EE projects. If the finance for ESCO-driven models is primarily from public sources, there would be a need to track the policy impacts of EE procurement programs (i.e. market effects, energy and CO₂ savings) and follow cost-effective measures with regards to procurement. Public funding may also discourage risk-taking behaviour and diminish the scope of EE projects and procurement.¹²

ESCOs may provide financing to end users, but will almost always seek external sources of funds. In addition to loans, other occasional sources might include export credits, equity capital financing through special-purpose vehicles, financing from utilities repaid through energy bills, or informal sources. Multilateral development banks may offer direct financing to large end users such as utilities, although this is usually channelled through local intermediary financing institutions. While there are a range of sources for financing energy efficiency projects, the local banking sector will still play a key role. Energy efficiency projects often represent a relatively small niche business for major financial institutions. Sector experience suggests that:

- *Most finance that targets operating cost savings is nonconventional. A significant portion of lending in Brazil, India, and China is for working capital. If project finance is available, there is a preference for large projects which support capacity expansion. Term lending for projects to improve business efficiency and increase productivity is less common*
- *Banks generally have insufficient knowledge of energy efficiency technologies, and are likely to consider this type of specialized knowledge outside of the scope of their operational interest. Further, processing frameworks within banks vary and banks are reluctant to alter these. To be effectively put into operation, new lines of business will have a greater chance of acceptance if they fit within the existing systems*
- *Banks should establish and internalize strategies to attract and retain customers in new business areas. This will require, however, some effort on promoting the business case for EE*
- *Relative small size and challenges with replicability of EE projects increase transactions costs.*¹³

A.1.2 BASELINE SCENARIO OR ANY ASSOCIATED BASELINE PROJECTS

Programs implemented by EESL

EESL is currently one of the leading ESCO's in India. Over the past few years, it has been implementing energy efficiency projects in various sectors. The programs initiated by EESL at national level are as given below:

¹¹ *Ibid.* pp 162-168.

¹² MacLean, J. and Purcell, D. *op.cit.* pp. 20-21.

¹³ Taylor, P. Robert et. al. *op.cit.* pp 11-12.

- Domestic Efficient Lighting Program (DELP) now renamed as Unnat Jyoti by Affordable LEDs for All (UJALA) Scheme for residential consumers
- Street Lighting National Program (SLNP) for municipal sector
- Agriculture Pump sets
- Public buildings
- Utility driven Demand Side Management action plan
- CSR (Corporate Social Responsibility)

Most of the work undertaken by EESL as of now has been in domestic lighting, street lighting and Agriculture pumps, which is explained further below. EESL have committed to a replacement target of 770 million domestic LED lamps, 35 million LED SL, 1.5 million Agricultural pumps and 42.2 million BEE 5 star rated ceiling fans. The table below provides an overview of EESL's progress as on date, its targets and contribution by GEF project towards reaching these targets.

TABLE 1 - EESL PROJECT STATUS

S. No.	Technology	Target for EESL's implementation (No. of Units) ¹⁴	No. of units implemented ¹⁵	No. of units contributed by GEF project	No. of remaining units for EESL's implementation
1.	Domestic Lighting (DL)	770,000,000	208,296,978	39,776,293	521,926,729
2.	Street lighting (SL)	35,000,000	1,653,204	1,505,942	31,840,854
3.	Agricultural Pump	1,500,000	2,527	229,532	1,267,941
4.	BEE 5 star Ceiling Fan	42,200,000	287,929	2,128,298	39,783,773

EESL plans to expand their business portfolio for existing products as well as to adopt/invest in new innovative products in future.

Expansion and sustaining investment in existing market sectors

At present, EESL has distributed around 208 million LEDs lamps under DELP and around 1.65 million LED lamps in SL. Through GEF TF, EESL intends to expand the reach of these established energy efficient technologies in the domestic market and further make these technologies a sustainable investment. Under this project, the GEF TF along with the co-financing would support implementation of 229,532 agricultural pumps, 40 million LED lamps under DELP, 2 million 5 star ceiling fans and 1.5 million Street Lights. The proposed investment in each of the technology under this section is provided below:

TABLE 2 - PROPOSED INVESTMENTS IN EACH OF THE TECHNOLOGIES

Technology	Proportion of Total Investment	Proposed Investment (Million USD)	Target of implementation (Million Units)
DELP	14%	56.05	39.77
Street Lighting program	35%	140.12	1.51
Agricultural Pumps	43%	172.15	0.23
BEE 5 Star Ceiling fans	8%	32.08	2.13
Total		400.34	

To bring about market transformation in the domestic and street lighting sectors EESL has identified market, financial and other barriers and developed solutions for them. A few of the improvement/ innovation options developed by EESL include:

¹⁴ Source: EESL

¹⁵ Source: National Ujala Dashboard, www.ujala.gov.in on 10th February 2017

- *Innovative business models – An established business model is a prerequisite for executing implementation through ESCO route and this has been a drawback of ESCOs operating in India. EESL has developed number of business models for promoting DELP as well as SLNP which includes Standard Offer Program (SOP) model, on-bill financing model, etc. and these models have resulted in successful implementation of DELP and SLNP projects. With the time, EESL have selected the most effective business models as per different client requirements.*
- *Measurement & verification of energy savings – a suitable M&V methodology for energy savings estimation has been a problem in the ESCO business because of the cost and accuracy of M&V to show actual savings. In this regard, EESL has adopted a deemed savings model for estimating energy savings. This cost effective option has been accepted by different clients, while EESL is also considering other options for different technologies.*

Deemed savings

Deemed savings are a set of predetermined savings values for efficiency measures that are developed from commonly accepted data sources and analytical methods, and maintained by states or regional bodies. These savings estimates are called "deemed savings values" and provide a savings estimate for each change made to a home or building. Deemed savings can also take the form of an algorithm, providing a formula of inputs for arriving at a savings estimate. Deemed savings have a multitude of benefits; they are fast, easy to calculate, constant and predictable. Because of those traits, deemed values are commonly used to estimate energy savings from efficiency programs

The “deemed savings” approach has been proven by EESL. The “deemed savings” approach features: a) an energy services agreement (ESA) between the ESCO and host facility with a fixed price for services defined, b) A Financing Agreement (FA) between the ESCO and a financial institution, c) an agreement between ESCO and government or utility under which ESCO receives payments based on deemed savings. The ESA specifies the services provided by the ESCO and a fixed payment by host facility for ESCO services. The FA specifies an ESCO equity investment, financial institution debt investment, with interest rate and term of loan. The ESCO makes loan repayments from host and utility/government payments (USAID, 2014)

- *Exploring innovative areas for automation – EESL is planning to introduce advanced technologies in its service offerings. For example, in SLNP, automation can be achieved through installation of Centralized Control and Monitoring Systems (CCMS) which centralizes operation of street lighting system instead of*

being operated from different switching points. This CCMS will generate reports which can be used for accurate determination of energy savings and the same can then be used for payment to EESL rather than using the conventional deemed savings approach used by EESL.

Building market diversification-EESL investment in new technologies

In addition to the ongoing programs on lighting and agriculture pumping, EESL is currently exploring new technologies for investment in the field of energy efficiency. EESL is replicating the success of DELP and SL programs and has already started its work on super energy efficient fans. However moving into new technologies carries commercial and technology risks and therefore EESL's business plan is to work with concessional sources of financing to develop experience and models that work for them.

The GEF project will support the procurement and installation of 783,937 super-efficient ceiling fans. Each new super-efficient fan (@ 35W), is assumed to replace a regular fan of 70W making 50% energy saving, of 105 electricity units annually (calculated as 10 hours of operation for 300 days per year). The detailed cost assessment is provided in baseline section.

The GEF project will also promote tri-generation and smart grid technologies. which are also estimated to have huge potential in energy savings and are aligned with initiatives GOI like Smart Cities. The energy saving potential for a 10 MW tri-generation project is around 130 million kWh/year.

COMPONENT 1 - EXPANDING AND SUSTAINING INVESTMENTS IN EXISTING MARKET SECTORS

This section of the document will detail the baseline scenario for each of the technology proposed under the Component 1 of the project. Detailed baseline for each sector is provided in subsequent subsections below:

DOMESTIC LIGHTING AND STREET LIGHTING

Overview

In India, street and domestic lighting sectors present huge opportunities for energy efficiency as these sectors have been traditionally using quite outdated technologies. For example, in domestic sector, incandescent bulbs are very common and with time, the market moved towards CFLs. As per the most recent data published by Electric Lamp and Component Manufacturers in India (ELCOMA), around 770 million incandescent bulbs are still sold in the country annually. However, CFL's are now outdated as well with the emergence of LED energy efficient lighting for the domestic sector.

Similarly, the street lighting sector is dominated by use of Fluorescent Tube Lights (FTLs) followed by mercury vapour lamps, sodium vapour lamps, metal halides, etc. All of which are now obsolete in terms of energy efficiency. The advent of newer LED street lights provide the same or better light output with almost half the energy consumption and extended operating life.

In view of this, the Prime Minister of India launched the national Demand Side Management Efficient Lighting Programme (DELP) and the Street Lighting National Programme (SLNP) for implementation in 100 cities. EESL is responsible for meeting these replacement programmes in 100 cities in DELP and SLNP areas. LED replacements save 50% in electricity compared to CFLs and 88% savings compared to inefficient Incandescent Lamps (ICLs).

Lighting replacement in domestic as well as municipal sectors presents huge saving potentials nationally, as summarised below:

**TABLE 3 - INVESTMENT AND SAVING POTENTIAL
EXISTING IN STREET LIGHTING AND DOMESTIC LIGHTING**

Sector	Investment Potential¹⁶ (USD¹⁷ in billions)	Energy Saving Potential (Billion kWh/Annum)
Street Lighting	5.14	9
Domestic Lighting	1.10	105 ¹⁸

The subsequent section elaborates on the innovative business model adopted by EESL for implementation of domestic lighting and street lighting projects.

Business model – DELP (domestic lighting)

For implementation of DELP, EESL has adopted a demand aggregation strategy wherein EESL aggregates demand from various locations and initiates procurement of large quantities of LED bulbs to get the benefit of a low bulk price. The benefit of lower cost is pooled with the ongoing projects and the benefit is shared with all parties in the model. EESL enters into an agreement with DISCOMs for demand aggregation and to recover the cost of LED bulbs. DISCOMs have their demand side management action plans, wherein replacement of ICL’s with LED is one of their main interventions. DELP obviates the need for DISCOMs to invest in the upfront cost of LED bulbs and to avoid having to buy expensive power to meet peak demand. EESL procures the LEDs bulbs and provides to consumers at a rate of USD 1.50 each as against their market price of USD 4.0-5.0. The upfront investment made by EESL is paid back as mentioned below:

On-bill financing: Under this business model, EESL procures LED lamps to be distributed through aggregating the demand to have price advantage. EESL will then sign an energy savings services contract with the DISCOM in the state and will set up kiosks in billing centres of DISCOMs for offering LED bulbs with following two options:

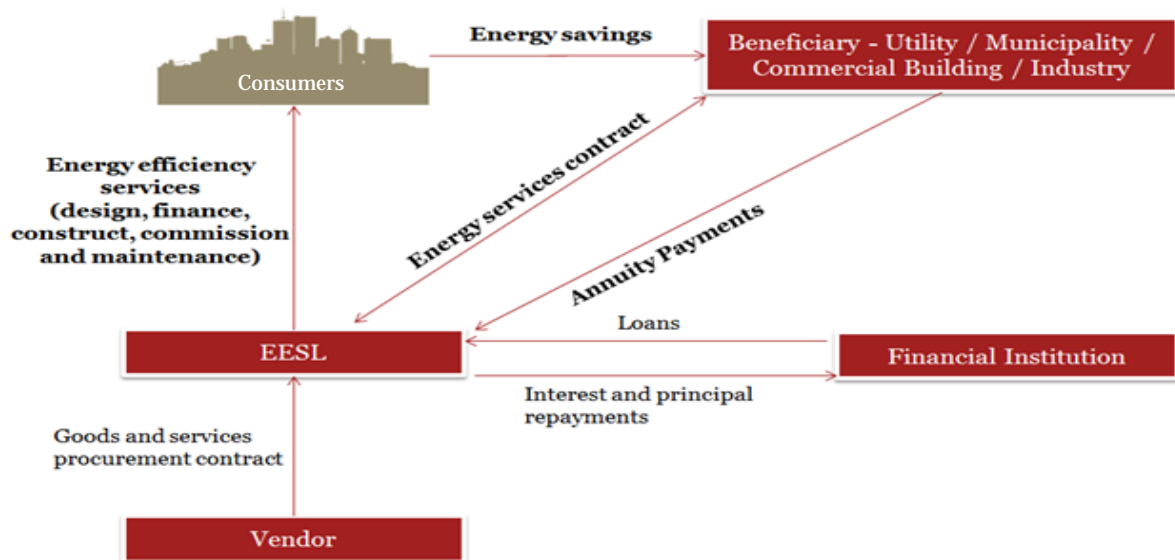
- Under Option 1, EESL procures the LEDs lamps at aggregate level and distributes to the consumers at an upfront rate of USD 0.15 (10% of the total consumer rate) each as against their market price of USD 4.0-5.0. Based on the debt service, interest rate and return on equity for EESL, an annuity is designed which is recovered from the consumer over the period of 10-12 months on their energy bills. The payments received by EESL from DISCOMs are annuities, finalized during the project preparation stage.
- Under option 2, EESL provides consumers a provision to procure the lamps at a discounted upfront cost wherein the consumer pays total cost of bulb during distribution and is subsequently not charged on their energy bills.

FIGURE 2 - ON-BILL FINANCING

¹⁶ Assumptions: Target of 35 Million Street light installation and 770 Million Bulb replacement program

¹⁷ 1 USD = 66 INR

¹⁸ Source: Monitoring & Verification Report, Street Lighting and DELP projects, EESL, September 2015



Cost benefit analysis for DELP

The cost benefit analysis for DELP is given in Table 4 below. The table below clearly indicates that there exists a saving potential of 53.55 kWh in a year by replacing an incandescent lamp (ICL) of 60 W with a LED lamp of 9 W. There are monetary savings of around USD 3.3 per year.

TABLE 4 - COST BENEFIT ANALYSIS FOR DELP

Parameters	Value	Unit
Power rating of incandescent lamp	60	W
Power rating of LED Lamp	9	W
Power saved per lamp	51	W
Operating hours per day	3.5	hrs
Number of days in a year	300	days
Energy saved per year	53.55	kWh/yr
Electricity tariff	0.061	USD/kWh
Cost saved per lamp per year	3.27	USD/yr
Approximate cost of LED Lamp	1.5	USD
Simple Payback period	5 to 6	Months

Business model – SLNP (street lighting)

For street lighting projects, the procedure adopted by EESL is such that EESL signs an MoU with the concerned ULB or municipality, finalize demo project site, demonstrates the technology to be adopted, determines annuity and payment mechanism, undertakes implementation of energy efficient street lights and then conduct monitoring & verification.

In terms of business model, EESL aggregates street lighting demand from various Urban Local Bodies (ULBs) in a state and initiates procurement of large quantities of LED street lights to get the benefit of low bulk price. It then replaces the conventional street lights with LEDs at its own costs (without any need for ULBs to invest) and the consequent reduction in energy and maintenance cost of the ULB is used to repay EESL over a period of time. The contracts that EESL enters into with ULBs are typically of 5 to 7 years duration where it not only

guarantees a minimum energy saving (of-typically 50%) but also provides free replacements and maintenance of lights at no additional cost to the ULB.

Under this model, ULB repayments to EESL are less than the present level of expenditure incurred by ULB towards energy bills, operation and maintenance of existing conventional SL system. Thus there is no additional expenditure required to be incurred by the municipality for change over to smart and energy efficient LED street lights.

Cost benefits analysis for Street lighting projects

In a typical street lighting programme, conventional lights of various wattages are replaced with equivalent LEDs lamps. In order to conduct the cost benefit analysis for a street lighting project, an example based on a typical ULB replacement programme is presented below.

TABLE 5 - ANNUAL ENERGY SAVINGS FOR A TYPICAL ULB STREET LIGHTING REPLACEMENT PROGRAMME

Sr. No.	Particulars	Numbers	Wattage (W)	Ballast Losses (W)	TOTAL Power (W)	LED Equivalent (W)	Existing Consumption (kWh/year)	LED Consumption (kWh/year)	Annual Energy Savings (kWh/year)
1	100 W ICL	3,600	100	-	100	12	1,445,400	173,448	1,271,952
2	40 W FTL	10,200	40	12	52	20	2,129,556	819,060	1,310,496
3	40 W DFTL	2,400	80	24	104	40	1,002,144	385,440	616,704
4	HPSV-70 W	3,600	70	15	85	40	1,228,590	578,160	650,430
5	HPSV-150 W	2,300	150	20	170	72	1,569,865	664,884	904,981
6	HPSV-250 W	2,100	250	25	275	120	2,318,663	1,011,780	1,306,883
7	HPSV-400 W	550	400	25	425	200	938,506	441,650	496,856
8	MH - 400 W	250	400	25	425	200	426,594	200,750	225,844
Total		25,000			1,636		11,059,317.5	4,275,172	6,784,145.5

The wattages of conventional light and their supportive replacement is only indicative and both the proportion and wattages will vary from project to project basis. Based on the above example of a typical replacement project for an ULB, the cost benefit analysis of the project is provided below:

TABLE 6 - COST BENEFIT ANALYSIS FOR A TYPICAL ULB STREET LIGHTING REPLACEMENT PROGRAMME

Parameters	Value	Unit
Energy saved per year (drawn for the table above)	6,784,145.50	kWh/yr
Electricity tariff	0.091	USD/kWh
Annual Maintenance Charge	4%	of project cost
Cost saved per project per year	617,357	USD/yr
Project cost ¹⁹	2,320,000	USD
Simple Payback period	3.76	Years

AGRICULTURAL DEMAND SIDE MANAGEMENT (AGDSM)

Overview

¹⁹ Includes equipment cost from Table 5 and Project Management Charges

The agriculture sector is one of the most important sectors of the Indian economy. Agriculture plays a significant role in the overall socio-economic development of India. There are about 20 million pump sets presently operating in India with an annual addition of 0.25 to 0.5 million pump sets. The agriculture sector consumes 20-22% of total electricity consumption in the country.

Managing agricultural electrical load is increasingly becoming a challenge for electricity utility in India. Subsidized tariffs generate a perception of zero marginal cost of electricity use and consequently, efficiency in consumption is disregarded. Upgrading of existing pumping systems presents an immediate need and an unprecedented opportunity. Implementation of this program is crucial as energy bills for agricultural pump sets are being paid by Govt. in the form of subsidies.²⁰

Low or free electricity coupled with high inefficiencies contributes to adoption of local made inefficient & unreliable pump sets, results in massive water wastage & higher energy consumption. The average efficiency of existing inefficient pump sets is in the range of 20% - 30% whereas efficiency range of new star rated Energy Efficient Pump sets (EEPS) is 50% - 60%. Therefore, there is a need to tap the huge energy savings potential promised in agriculture pumping sector.

AgDSM (Agriculture Demand Side Management)

In Energy Sector and Power sector, Agricultural Demand-side Management (AgDSM) consists of activities, methodologies, awareness, policy and technologies that influence consumer (farmers) behaviour and changes farmers' consumption patterns.

The objective of the AgDSM programme is to reduce consumption. The AgDSM proposition is very simple i.e. replacement of inefficient agricultural pump sets with BEE star rated and high efficiency pump sets to reduce the amount of electricity needed to pump water in agriculture sector. By doing so, electricity usage can be reduced. If the savings from the reduction in electricity usage can be sustained and the total cost of the electricity saved exceeds the total installed cost of the pump sets over its useful life, there will be a net economic gain.

To accelerate the implementation of BEE AgDSM scheme, Energy Efficiency Services Limited (EESL) had taken a step forward in implementation of AgDSM projects all over India. EESL has conducted the survey & study for implementation of AgDSM. Subsequent section explains the estimation of savings for AgDSM project.

Under ESCO based AgDSM projects, EESL would bear the upfront capital cost in implementation of the AgDSM projects, hence leading to no upfront capital investment of the State Electricity Utilities or the State Governments. The investments made by EESL are recovered from the State Electricity Utilities over a fixed project duration through the energy savings achieved by replacement of the existing inefficient pump sets with Energy Efficient Pump Sets (EEPS).

Business Models for AgDSM

For implementation of AgDSM projects EESL will utilise the ESCO mode/ Shared Saving approach. The detail of ESCO model is provided below:

ESCO Mode: An ESCO (EESL) which has a contract with DISCOM finances and implements the project; the ESCO would borrow the project debt and repay it from project energy saving revenues. The pump manufacturers can also participate as ESCOs in this mode of implementation.

²⁰ Source: Bureau of Energy Efficiency

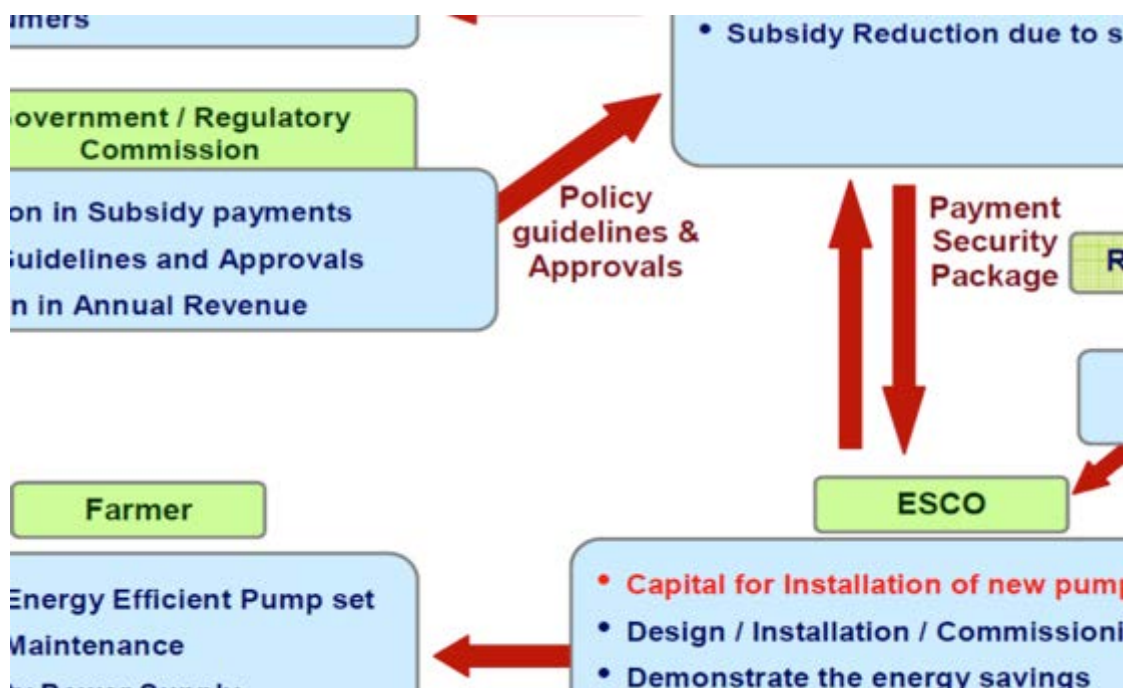


FIGURE 3 - AGDSM BUSINESS MODEL – ESCO MODE

Cost benefit Analysis of Agriculture Pumps

The cost benefit analysis for Agricultural pumps is given in the table below, which clearly indicates there exists a saving potential of 3,357 kWh in a year by replacing an agricultural pump of 7.5 HP (5,595 W) working with 30% efficiency with an energy efficient pump of 5 HP (3,730 W). This will give monetary savings of around USD 272/year.

TABLE 7 - COST-BENEFIT ANALYSIS OF AGRICULTURAL PUMPS (SAMPLE EXAMPLE OF A SET OF 2,000 PUMPS)²¹

Head	Parameter	Value
Capital Expenditure details	No. of Pumps (7.5 HP each)	2,000
	Project Cost (inclusive of Project development and project management charges)	USD 1.5 million
Operational Details	Energy Savings (kWh) per pump	3,357kWh
	Annual Operating Hours (6 hours/day, 300 days/year)	1,800 hours
	Energy Savings (kWh)	6.71 Million kWhs/annum
	Annual Maintenance Charges	5%
General Details	Project Life	5 Years
	Tariff	USD 0.061 per kWh
Financial Feasibility	Payback period	3 year and 8 months

The energy savings from the Project (Energy Savings) shall be calculated as per the following formula:

Energy Saving = (Total power (in kW) consumed by the old pump sets connected to a single feeder to be replaced by Energy Efficient Pump Set (EEPS) – Total power (in kW) consumed by the replaced EEPS) x hours of pump operation.

²¹ Source: Bureau of Energy Efficiency

The *challenges* that this model will face is that farmers view the monitoring of consumption with suspicion, and are generally averse to pump replacement, since detailed site assessments show smaller optimal pump-size. Systematic awareness and publicity campaigns on the benefits to farmers, greater grass-root NGO involvement, and recognition through energy and water conservation awards can help overcome this scepticism. To counter this, EESL has been doing capacity building and awareness campaigns dedicated to AgDSM along with other relevant stakeholders.

Presently, EESL awards the contract on Supply, Installation, Testing, Commissioning (SITC) and maintenance basis. The present contracts with suppliers are including after sales services along with maintenance and spare parts. With experience of executing similar projects, EESL have realized that such contracts are not optimal financially. EESL is reviewing its existing contracting methodology and intends to achieve better operational efficiency by segregating the SITC and maintenance contracts.

ENERGY EFFICIENT 5 STAR CEILING FANS

Ceiling fan market in India: The ceiling fan household stock stands at close to 350 million as per 2011-2012 data²² in India. The annual market is close to 40 million fans in India, and the fan industry is growing annually at around 6%. The ceiling fans are mainly used by the residential sector followed by commercial sector. Considering the rating of conventional ceiling fans of 70W²³, the total approximate annual energy consumption in India because of inefficient ceiling fans is around 73.5 billion kWh. This is based on the stock data that are a few years old, while stock today will have increased, hence total energy consumption from ceiling fans will be higher. Considering the population and market size of ceiling fans, energy efficient ceiling fans offer a large potential to reduce power consumption in the residential & commercial sectors. It is also one of the most economic option for energy savings after lighting.

The Bureau of Energy Efficiency (BEE), the nodal agency for energy efficiency under Government of India, developed a **Standards & Labelling (S&L) programme for ceiling fans**. The programme aims to promote efficient domestic production and encourage consumers to purchase energy efficient products. The products (ceiling fan models) are rated from 1 to 5 star with 5 star rated fans being the most efficient. The 5 star rated ceiling fan is about 30% more efficient (consumes 50W) than conventional ceiling fans (which consumes about 70W).

Overview of market penetration of 5 star ceiling fans in India: In India, mass penetration of any technology is governed by its efficiency, effectiveness and economics, of which the latter two take priority. Indian consumers have a range of options, including conventional ceiling fans, star rated fans and more recently super-efficient ceiling fans. The star labelling ceiling fan programme has only contributed to a 5% penetration of 5 star rated fans in Indian market, while super-efficient fans have yet to be demonstrated in any numbers.

Possible reasons for low penetration of 5 star fans in India:

- *Limited variants in terms of aesthetics of the fan.* For urban consumers, design /looks of ceiling fan is the primary factor and energy consumption is the secondary factor in decision making for procuring ceiling fan from market.

²² Source: <http://superfan.in/energy.html>

²³ <https://beeindia.gov.in/content/seep-0>

- *Air delivery is the key requirement for consumers.* As per Bureau of Indian Standard (BIS), ceiling fans should have minimum air delivery of 210 cu m/min. All the conventional fans were providing air delivery between 220-230 cu m/min, compared to five star fans which delivered only 210 cu m/min after launch.

BEE is in the process of revising their technical requirements for star rated fans to raise air delivery. BEE rates fans by a service factor, which is a value of air delivery (cu m/min) divided by energy consumption (watts). The service value for a 5 star fan was 4 and above, while BEE is now revising the minimum service value to 4.4, to ensure a minimum air delivery of 220 cu m/min. A similar service value has been incorporated in super-efficient fan technical specifications. Upgrading 5 star ceiling fans to meet the revised service rating (50 watts for 220 cu m/min) is not an issue for manufacturers. The EESL has already initiated the projects for 5 star ceiling fans. The technical specifications for 5 star ceiling fans under these projects require 220 cu m/min air delivery while consuming maximum 50 watts at 230 volts, and manufacturers have started supplying at these specifications, so the issue of air delivery has been mitigated. Further, the issue of aesthetics has been there as the 5 star fans were initially introduced in the market in single colour. The EESL has started providing 5 star ceiling fans in the two favourite colours. It is expected that as the market for energy efficient ceiling fans expands manufacturers will bring more choices of fans including colours and designs to respond consumer demand and capture higher market share.

Because of the low penetration of 5 star ceiling fans there is an urgent need to devise an innovative market based mechanism for energy efficient ceiling fans for accelerating its adoption /penetration in India. Considering the replacement of conventional ceiling fans with BEE's 5 star rated ceiling fans, there is a potential to realize 40 billion kWh of annual energy savings.

5 star ceiling fan technology under the proposed GEF grant: Increasing the penetration of 5 star rated ceiling fans would be beneficial over the conventional fans as it is around 30 percent more efficient than conventional fans. There is no technology constraint in developing 5 star ceiling fans in India.

Under the proposed GEF project, the EESL will invest in this market sector. This is an excellent platform for EESL to implement projects in 5 star ceiling fans as it would not only create the market for advanced technology but will also bring down the cost of fans significantly and will lift society towards advanced technologies.

Business model for BEE 5 Star Ceiling fans: The business model for ceiling fans will be based on earlier programmes implemented by EESL for domestic lighting sector. The programme will adopt a demand aggregation strategy wherein EESL aggregates demand from various institutions and initiates large scale procurement of five-star ceiling fans to drive price reduction. The benefit of lower cost is pooled with the ongoing projects and the benefit is passed on to all.

EESL will initially target Institutional consumers, including government, to help bring down the cost. As prices drop, EESL will then target domestic consumers.

- For Institutional consumers, EESL will make an upfront capital cost recovery;
- For domestic consumers, considering the high initial cost, EESL will probably provide two options for consumers: (i) upfront payment and (ii) on-bill payment.

Under this business model EESL will not provide after sales services of installation or maintenance, although warranty conditions will be passed on the consumers.

Cost Benefit analysis of 5 star ceiling fans: the cost benefit analysis for 5 star ceiling fans is given below in the table. The table below clearly indicates there exists a saving potential of 60 kWh in a year by replacing a

conventional fan of 70 W with a 5 star fan of 50 W. The monetary savings at USD 0.075/kWh is around USD 4.5/year. The cost of a conventional fan is around USD 13 and the cost of a 5 star fan is around USD 15²⁴.

TABLE 8: COST-BENEFIT ANALYSIS OF 5-STAR CEILING FANS

Parameter	Unit	Total
Wattage of conventional fan (zero star rated)	Watt	70
Wattage of 5-star rated efficient fan	Watt	50
Power saving per unit	Watt	20
Hours of usage	Hrs/day	10
Operating Days	Days/year	300
Energy Savings per unit	kWh/yr	60
Electricity Tariff	USD/kWh	0.075
Annual savings	USD	4.50
Cost of 5-star rated efficient fan	USD	15
Cost of Conventional Fan	USD	13
Simple payback period	Years	0.4
Equipment Life	Years	10

The simple payback period considering the savings and incremental investment for a 5 star ceiling fans is around 0.4 years (about 5 months)²⁵. The life of ceiling fans is generally to be about 10+ years. Hence, the additional investment is being recovered in only about 5% of the life of fan and for the remaining years there will be energy savings to the tune of USD 4.5 per year.

Since 2010, when the 5 star programme started, manufacturers have built-up their capacity to produce these fans in bulk. During the recent tendering process initiated by EESL for 5 star ceiling fans, 8 manufacturers in India exhibited their ability to produce these ceiling fans in bulk quantity, indicating competition in the market segment in India. In sum, it is envisaged that intervention of EESL for implementing projects for 5 star ceiling fans is viable and has significant energy savings potential.

Number of BEE 5 Star Ceiling Fans considered under this project: The overall budget is kept as USD 32,107,664. The quantity of BEE 5 Star ceiling fans is calculated assuming the costs in the table below:

TABLE 9 - NUMBER OF BEE 5 STAR CEILING FANS TO BE CONSIDERED

Parameter	Value
Capital Cost of single fan	USD\$ 15.05
Total budget under this project	USD 32,107,664
Total Ceiling Fans under this project	2,133,400 units

Existing procedure adopted by EESL for MRV: EESL already has a robust MRV procedure in place wherein third party verification of its projects are carried out for each of the existing technology. As EESL adopts a deemed savings approach for these technologies, a standard MRV is followed across them. The standard approach followed by EESL for MRV in existing other areas is described below:

Planning for MRV: All MRV standards and procedure will be defined and adopted at inception.

²⁴ The cost has been considered based on the bids received by EESL for 5 star ceiling fans. The cost includes the distribution & marketing component for fans by EESL. Based on the Debt Service, Interest rate and Return on Equity for EESL, an upfront cost is arrived. This is an approximate upfront cost for consumers. The cost of 5 star ceiling fans have reduced considerably after the tendering done by EESL.

²⁵ Here, the payback refers to the duration in which the consumer recovers the premium paid for energy efficient ceiling fan against the price of conventional fan.

A survey questionnaire will be developed and administered including the following important parameters:

- *Units (DELP/SL) which are in operation*
- *Units (DELP/SL) which are mal-function*
- *Units (DELP/SL) which are not in operation*

A Sampling Plan: a sampling plan would be developed to estimate the sampling size based on the intended confidence level of 90% and a 7.5% margin of error.

Measurement: Studies are periodically undertaken by EESL along with DISCOMs for the DELP project (street lighting) to capture important parameters like hours of operation, Electricity consumption of street lighting; days of operation, etc. Similar surveys would be done to capture important parameters and further extrapolated to account for the number of units in working condition.

Analysis: the following parameters would be estimated for the project from the field survey:

- *Energy savings achieved*
- *Avoided capacity of power generation*
- *Estimation of GHG emission reduction for each project*

The formula to be used to calculate energy savings in the deemed approach is shown below:

$$[\text{Energy savings}] = [\text{Baseline Consumption}] - [\text{Consumption post Project Implementation}]$$

Estimating baseline: baseline estimates will be calculated based on technology specific assumptions like watts, operational hours, annual days of operation, etc. These will be fixed and agreed to during the contracting stage by EESL.

Consumption post project implementation: The DISCOMS and EESL periodically undertakes load research studies which provides information on the load pattern in residential & commercial space. The findings of the load research will support assumptions in estimating operating hours per day and number of days of operation.

EESL monitors energy consumption of each technology on a dashboard, the dashboard is available to the public and estimates are based on installation numbers.



FIGURE 4 - NATIONAL DASHBOARD TO MONITOR DELP SCHEME

Energy Efficiency Revolving Fund

An energy efficiency revolving fund (EERF) has been identified as a viable option for scaling up energy efficiency financing and supporting demand side energy management in India. Typically, an EERF targets the public sector through loans which are provided to public agencies which will cover the initial investment costs of energy efficiency (EE) projects. (In some countries the policy environment allows public agencies to realign savings, from approved budget for operating expenses, to pay for EE investment loans which are usually classified under capital expenses, There are, however, economies where payments of EE loans through energy savings could not be implemented in public or government owned facilities because this basic policy has not been addressed.) A portion of the savings accrued are then used to repay the energy efficiency revolving fund (EERF) until the original investment is recovered, in addition to interest, fees or any service charges. Repayments can then be used to finance additional projects, which will allow the capital to revolve, as a sustainable financing mechanism. In many cases, the borrower and lender are public sector entities, financing may be provided with longer tenor periods, and with lower security requirements than commercial loans.

Empirical data suggests that EE projects generally have positive financial rates of return. Re-investment of cost savings is seen to be more efficient than standard grant-based approaches, especially since these projects can demonstrate commercial viability, build capacity across the ESCO spectrum, and improve creditworthiness for future commercial financing.

A cursory review of literature on Global Environment Facility (GEF) support for EE financing facilities highlights the following challenges and insights²⁶:

²⁶ (i) World Bank. 2014. Guidance Note: "Establishing and Operationalizing an Energy Efficiency Revolving Fund".
(ii) MacLean, J. and Purcell, D. H. 2014. "Strategies for Energy Efficiency Finance". Montpelier, VT: Regulatory Assistance Project (RAP).
(iii) Taylor, P. Robert et. Al. 2008. Financing Energy Efficiency: Lessons from Brazil, China, India and Beyond. Washington DC: The World Bank.

- a. *The motivation for EE financing has traditionally been to encourage domestic financial institutions to invest, as well as encourage private sector participation. Investment delivery mechanisms have been commonly operated by local banks and other financial institutions have been a useful first step, however there remains significant untapped potential*
- b. *Strong government support is essential to the success of any program. Operations of any EE fund should be supported by enabling conditions, such as:*
 - *favorable interest rates*
 - *competition in the banking sector*
 - *management of energy prices*
 - *policies and incentives to explore new markets such as tri-generation and smart grids*
 - *legal measures, including formation of associations to pledge common assets as loan security, and*
 - *subsidies for renovation of buildings and heating systems, and others.*
- c. *With exception of PR China, ESCOs have not been central to the EE financing paradigm, rather they have been one among many actors in the supply chain. An ESCO-led financing model may hold some attraction to intermediaries and end users, as transaction costs and risks would be borne by the ESCO. In addition, ESCOs are likely to have the requisite domain knowledge and expertise required to assess investment potential of projects, and are suitably placed to develop a robust project pipeline*
- d. *EE financing could best be delivered as a composite package, which includes equity, loans, risk guarantees and technical assistance, in varying degrees and depending on market conditions and the local regulatory environment*
- e. *Increased diversification of the fund portfolio, for example, support for investments into renewable energy (RE), will necessitate special efforts to ensure appropriate balance of investments (there may be tendency to favour more profitable RE pursuits)*
- f. *Local financial institutions will need to be actively engaged in order to secure participation in financing programs. This would include capacity development and involvement of bank personnel at local branch levels – more specifically, clarity of understanding of business models for EE market segments, customization of financing products, monitoring and verification systems with direct linkages to energy audit specialists, proof of concept for replication and scaling up, and determination of profitability which quantifies social, environmental and financial benefits*
- g. *EE funding mechanisms need to have clearly understood institutional arrangements, with those that are ‘light’ in terms of bureaucratic and administrative processes, and relatively free from external political influences*
- h. *Strategies to stimulate demand for EE financing need to be developed and implemented by a strong and credible investment fund manager. Promotional efforts will need to be focussed, and tailored to specific market segments. EE development programs recruit end users of energy, screen them for suitable EE measures (lighting retrofits, insulation upgrades) and connect them with finance programs and technical service providers. EE program development and EE program implementation may also be part of a single, unified program*
- i. *Considerable attention will need to be paid to communicating the benefits of the shared or deemed savings model of financing. This continues to be a constraining factor in the adoption of EE at the small and medium enterprise level*

(iv) Delio, Ella Aglipay et. Al. nd. “Powering Up: The Investment Potential of Energy Service Companies in India”. Washington, DC: World Resources Institute.

(v) Streiterdt, Verena and Surapon Chirarattananon. 2015. “Energy Efficiency Finance Support in Thailand: Lessons Learned from the Energy Efficiency Revolving Fund” in *Journal of Sustainable Energy and Environment*, 6: pp.13-16.

(vi) APEC Energy Working Group. 2005. “Thailand’s Energy Efficiency Revolving Fund: A Case Study” (prepared by Danish Management Group Thailand Co Ltd and Energy Futures Australia Pty Ltd).

- j. *An EE investment fund manager will need to have sufficient in-house capacity and business network relationships to originate sufficient and viable project and deal flow. This should be supplemented by credible track record, strong leadership team, and technical capabilities to:*
- *undertake due diligence*
 - *administer a multiplicity of contractual arrangements*
 - *support monitoring and verification of results*
 - *be able to recover operating costs in early years of fund operations, and*
 - *take adaptive management measures as needed.*

The installation, operations, maintenance and other services for project implementation would generally be provided by independent energy service providers (ESPs), which can be paid either directly by the fund manager, or the public sector institution.

An EERF can be replenished by the repayments from the project owners, developers or the public sector institutions, which serves as a way for the funds to revolve. However, when loan repayment periods are long (sometimes up to 7 to 10 years), it may be necessary to plan on periodic replenishments for operations after the initial capital has been deployed. EERFs may also have an equity base, which will help cover some of their start-up and early working capital needs, but will eventually need to cover costs from clients through principal and interest payments and fees.

In some countries, legislative action has been required to set up an EERF - either under existing laws, through creation of new laws, or subsidiary legislation. This varies by country. Sometimes funds are created under the auspices of existing Ministries, energy-related agencies, development banks, new corporations, or public-private partnerships with funding support coming from energy related taxes.

Management and governance of EERFs usually require: (i) oversight arrangements, (ii) dedicated fund manager, (iii) monitoring, reporting and verification systems, (iv) appropriate safeguard measures. Oversight arrangements depend on the nature of the fund organization, however, by and large, includes relevant stakeholder Ministries and departments with EE responsibility. Governing or management boards can also include a mix of public and private sector representatives. Functions would include, but not be limited to: (i) determining the investment strategy and policy of the fund, (ii) engaging a dedicated fund management team, (iii) establishing criteria for project selection, (iv) approving the annual business plans and budgets, (v) preparing annual financial reports to the government, and (vi) ensuring fund operations are aligned with national EE policies and priorities.

Options for identifying a fund management organization include: (i) an independent, newly created organization or enterprise, (ii) an existing non-independent public agency, (iv) a national development bank, (v) a utility, or (vi) other public enterprise.²⁷ There are pros and cons to whether the fund manager is public sector, private sector or possibly a PPP. Performance incentives may also be a feature of the fund manager engagement.

As the sources of funding will likely require periodic performance reports from the Board or fund management team, weighed against a set of pre-established output and process indicators. The fund management team therefore needs to establish a monitoring system that will collect and report the data needed to assess these indicators.

EE finance programs and project development feed the pipeline of well-prepared projects to the financing mechanisms. They are essential for this purpose, to drive the market and address the demand side of EE finance.

²⁷ World Bank. op. cit.

EE finance programs identify and organize resources to make financing (e.g., loans) available as needed for individual applications and to establish systems and procedures that facilitate financing arrangements for individual end users (e.g., technologies for meshing EE project development information with end-user credit score information). EE development programs recruit end users of energy, screen them for suitable EE measures (lighting retrofits, insulation upgrades, etc.) and connect them with finance programs and implementation providers. EE program development and EE implementation may also be part of a single, unified program. Development programs are often supported or run by interested agencies working with the commercial actors.²⁸

COMPONENT 2 - BUILDING MARKET DIVERSIFICATION

SUPER-EFFICIENT CEILING FANS

The Bureau of Energy Efficiency initiated the Super-Efficient Equipment Programme (SEEP) in January 2013, to accelerate the market transformation to super-efficient appliances and equipment in India. SEEP is designed to overcome the shortcomings of the present incentive structure, and create incentives for manufacturers as well as consumers to produce and purchase super-efficient Appliances (SEAs). SEEP would compensate the manufacturers for a major part of the incremental cost of producing SEAs, and encourage them to not just produce but also sell SEAs at an affordable price to consumers. In this manner, the programme would help to introduce appliances that are far more efficient than the ones currently available in India thus, narrowing the massive gap between the efficiency of the average purchase and that of the most efficient technology available internationally.

One its first initiatives under SEEP is to reduce the power rating of conventional ceiling fans from 70W to 35W by introducing super-efficient ceiling fans (SE fans). The SE fan generate savings of about 50 to 55% in energy consumption compared to a conventional fan, and 35% savings on 5 star ceiling fans. Under the proposed GEF project, EESL will expand existing market sectors and create markets for new and advanced technologies.

Possible reasons for low penetration of super-efficient fans

As such the government initiated a programme to promote SE fans however to date there has been little uptake of the SE fans because:

- *while some of the manufacturers have capacity and systems to develop super-efficient fans the capital cost is high compared to conventional and five star fans;*
- *although BEE has engaged Indian manufacturers to produce SE fans there have been limited demand /no procurement commitments, and therefore little production; and*
- *in turn there is a limited practical experience and awareness of these fans in the country.*

The cost barrier exists until costs can be brought down by market competition and consumer demand. The project will implement financing scheme to reduce costs of SE fans and promote early uptake of this technology in India.

Financial and energy savings potential of super-efficient ceiling fans

The cost benefit analysis for super-efficient ceiling fans is tabulated below. The Table 10 shows there is a saving potential of 105 kWh in a year by replacing a conventional fan of 70 W with a super-efficient fan of 35 W. The monetary savings at USD 0.075/kWh is around USD 7.9/year. The market cost of a conventional fan is around

²⁸ MacLean, J. and Purcell, D. op cit. pp 31-32.

USD 13 and cost of super-efficient ceiling fan under EESL's business model is around USD 30²⁹ which means the cost increment is around USD 17 per ceiling fan. The market cost of a super-efficient ceiling fan is around USD 47.

TABLE 10 - COST BENEFIT ANALYSIS OF SUPER EFFICIENT FAN

Parameters	Value	Unit
Power rating of conventional ceiling fan	70	W
Power rating of super-efficient ceiling fan	35	W
Power saved per ceiling fan	35	W
Operating hours per day per fan	10	Hrs
Number of days in a year	300	days
Energy saved per year	105	kWh/yr
Electricity tariff	0.075	USD/kWh
Cost saved per fan per year	7.875	USD/yr
Approximate cost of SE fan ³⁰	30	USD
Approximate cost of conventional fan	13	USD
Difference in cost	17	USD
Simple Payback period	2.2	Years
Equipment Life (SE Fans)	10	Years

The simple payback period considering the savings and incremental investment for a super-efficient ceiling fan for domestic usage is around 2.2 years³¹, with a lifetime for the technology of about 10+ years. Hence, the additional investment is being recovered in only about 25% of the lifetime of fans and for the remaining years there will be energy savings to the tune of USD 7.9 per year. For commercial consumers their simple payback is 1.3 years, since they have an electricity tariff 1.5 times high than the domestic tariff.

Even though the payback from these fans are around 2 years the high first costs still need to be defrayed to promote uptake, experience and awareness with the product and bring down the costs of production through competition and economies of scale. EESL will bulk procure the SE fans to bring down costs. India currently has the manufacturing capacity to produce SE fans and they are expected to respond to the market signal.

Research project initiated by EESL for super-efficient ceiling fans

EESL has signed an MOU with the Indian Institute of Technology Madras (IITM) to improve the efficiency and reduce the costs of super-efficient ceiling fans. This research is expected to see the development of SE fan technologies consuming only 30 W at a cost of around USD 26.5 each. The project is expected to complete during mid-2017, and if successful EESL will include this technology in its procurement specifications in the future.

²⁹ There was a recent tender by EESL to invite ceiling fan manufacturers to quote price of super-efficient ceiling fans. The total size of super-efficient ceiling fan requirement was 1 million. One manufacturer is to be given procurement commitment between 100,000-300,000 super-efficient ceiling fans. 6 manufacturers submitted bid for this tender. The lowest price quoted by manufacturers after incorporating EESL's distribution cost comes close to USD 30. Though the tender has been initiated for 1 million fans, the proposed GEF project will cover around 0.7 million super-efficient ceiling fans from this and the rest of the implementation will be managed by EESL from their own funds.

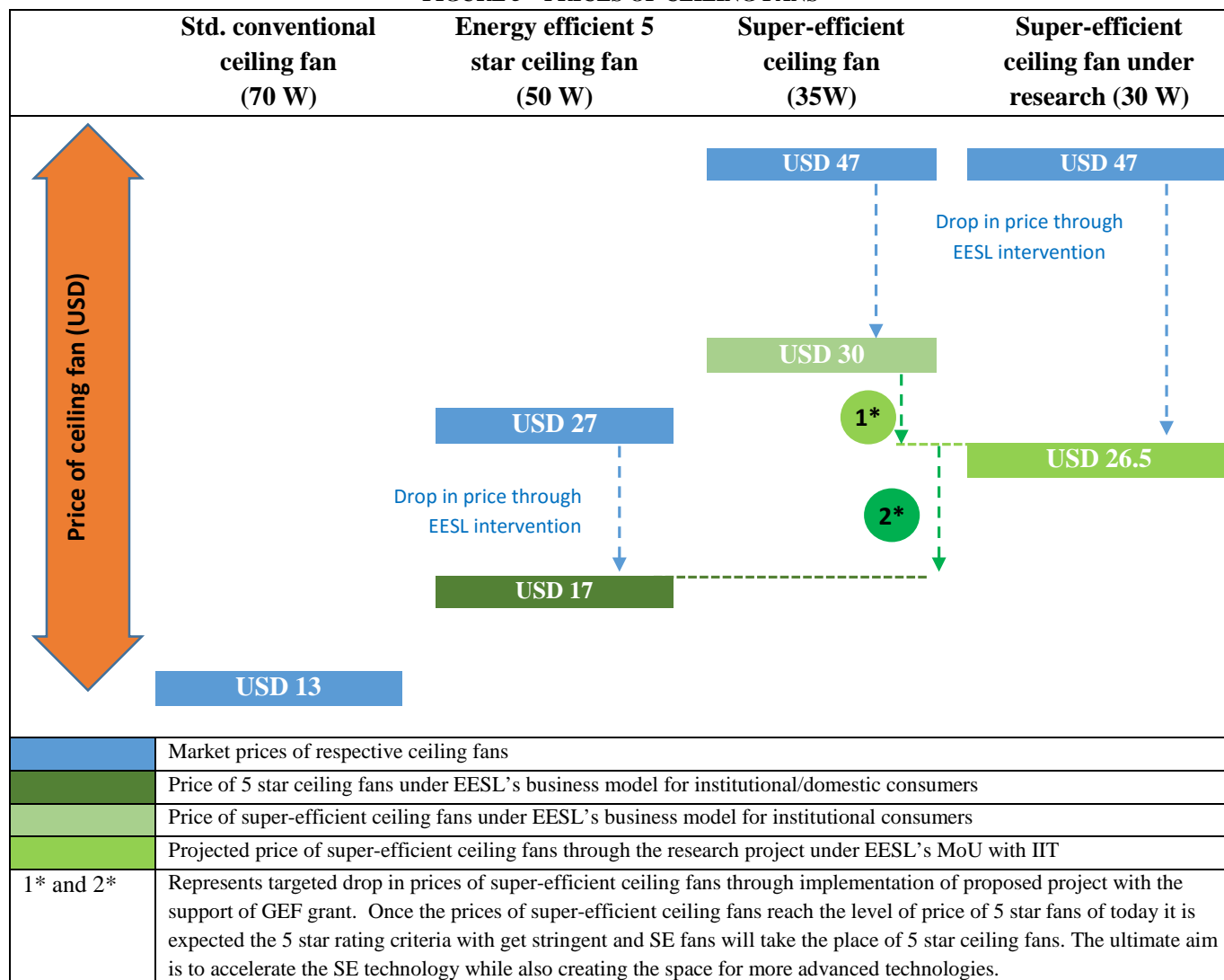
³⁰ Cost of SE Fan: The cost has been considered based on the bids received by EESL for super-efficient ceiling fans. The cost includes the distribution & marketing component for fans by EESL. Based on the Debt Service, Interest rate and Return on Equity for EESL, an upfront cost is arrived. This is an approximate upfront cost for consumers.

³¹ Here, the payback refers to the duration in which the consumer recovers the premium paid for energy efficient ceiling fan against the price of conventional fan.

Cost strategy for ceiling fans

The illustrative representation of various costs involved with ceiling fan projects is tabulated below. This will help in understanding the market situation for ceiling fans in terms of prices; the reduction in prices that could be achieved through EESL's aggregation during in the beginning of the project and the expected reduction of prices in near future targeted through the proposed GEF project.

FIGURE 5 – PRICES OF CEILING FANS



The representation of prices mentioned above is projected based on the market situation at present and the drop in prices achieved through the aggregation strategy. It is also expected that during the course of project execution the prices will drop further due to competitive bidding process adopted by EESL. The EESL will create awareness and market for super-efficient ceiling fans so that the prices could be reduced to a level of 5 star fans and the uptake of super-efficient ceiling fans could be accelerated.

Business models for super-efficient ceiling fans

At the beginning of the proposed project the SE fans will be costlier than a 5 star by approximately USD 13. EESL will target only the institutional consumers with the project who will pay these additional costs. EESL will keep the flexibility to invest in domestic sector as well, if prices drop sufficiently.

As part of government targets to promote energy efficiency, government institutions will be asked to participate in the EESL procurement exercise to create initial demand, build first experience with the technology, and drive down costs. EESL will charge institutions the full costs of USD 29.80 of the SE fans on delivery, but not get involved in installation. EESL will also offer institutions the option further reduce this cost to USD 26.4 in exchange for handing their used-conventional ceiling fans to EESL, reducing the payback period to 1.1 years.

Under the buy-back option, the fan vendor will be asked for a buy back price of an existing ceiling fan. In this case the consumers will hand over their existing ceiling fans to the vendor at the time of replacement. The financing mechanism under this clause is similar to the previously mentioned option, however the total cost to EESL will subsequently reduce due to the buy-back payment by vendor.

The old ceiling fans will be dismantled and scrapped. EESL will be setting globally accepted EHS guidelines in their procurement so that the vendors will dispose /reuse the old stock as per these guidelines at their own cost.

MRV for super-efficient ceiling fan and disposal of conventional fans that have been replaced under the programme

The MRV mechanism and the steps for safe disposal of conventional fans shall follow the same steps as mentioned in the baseline section for 5 star ceiling fans.

Number of Super-efficient ceiling fans to be considered under this programme

The overall budget is kept as USD 21,000,000. In order to estimate the quantity of ceiling fans, the following assumptions / cost have been considered:

TABLE 11 - ASSUMPTIONS FOR SUPER EFFICIENT CEILING FANS

Consumer Type	Unit	Value
Proportion of institutional consumer	%	100%
Capital cost for super-efficient ceiling fans	USD	26.8
Optional buy-back provision	USD	3.03

The number of super-efficient ceiling fans considered under the project is presented below at Table 12

TABLE 12 - NUMBER OF SUPER EFFICIENT FANS TO BE CONSIDERED

Budget proposed under GEF project	
Budget in USD	21,000,000
Total Ceiling fan under GEF budget	783,937

It is envisioned that the above quantity of ceiling fans will be distributed in 7 to 8 projects.

TRI-GENERATION

About the technology: Tri-generation involves the simultaneous production of electricity, space cooling/heating using absorption chillers and generation of hot water. Typically, this means a gas fired generator producing

electricity and heat with the exhaust heat going to an absorption chiller which produces chilled water and hot water for heating in a building.

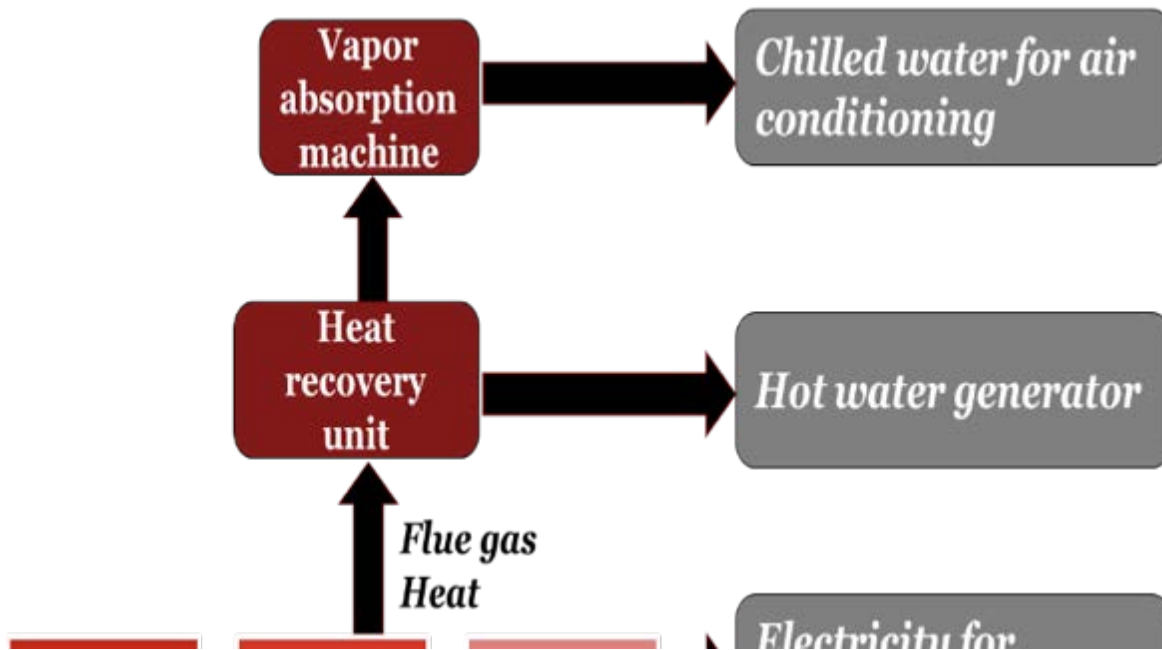


FIGURE 6 - TRI-GENERATION OPERATING PRINCIPLE

Typically electricity is supplied to facilities from the grid and supplemented by diesel back-up generators, although it is possible to have a dual fuel system where the engine can run on gas and diesel.

Cooling in a building is provided through vapour compression based air conditioning systems and heating is provided through hot water boilers. Tri-generation is up to 80-82% in converting energy compared to a diesel generator for electricity only which is 40% efficient.

For tri-generation to be retrofitted into a facility, the facility must have: central heating systems; enough base load for cooling and heating; easy access to natural gas grids and enough space for equipment installation-which is weatherproof, frost free, and pollution free.

*Potential energy savings*³²: The energy saving achieved through tri-generation is around 20%, from a 1 MW tri-generation case study, which is typical of the systems anticipated as a pilot for this project. Such a system would be able to offset 275 TR of cooling needs and 7.4 million kWh/yr of electricity. The electricity required with trigeneration is around 5.96 million kWh/yr (20% lower than the electricity required for a building without trigeneration) and the amount of gas required to generate this electricity is 1,334,230 SCM/yr.

*Present installation and market*³³: The first industrial gas based CHP – a 7.5 MW trigeneration facility – was installed at a picture tube manufacturing facility near Delhi in 1989. In the year 1996, a 27 MW trigeneration system was installed at Arvind Mills, an integrated textile mill in Gujarat. Since then, a number of facilities have

³² Energy generation analysis has been done in consultation with technology providers in India. Technology providers consulted are Thermax and Green power International Pvt. Ltd.

³³ GIZ- A report on tri-generation potential in India

been built particularly in the state of Gujarat driven mainly by gas availability and the establishment of a large network of both trunk and feeder lines. Almost all cogeneration/trigeneration systems operated in India are based on piped natural gas. There are few installations, which are based on biogas generated from bio-methanation systems, but most a based on piped gas, and this limits the market size.

It has been estimated that about 3000 MW gas based power systems are already installed in India. In the recent past, about 1000 MW of gas based projects have been added in the building and industrial sectors. Of the 1000 MW, a share of 522 MW is based on co- and trigeneration. Due to increasing demand for cooling, positive development of regulatory framework and increased availability of gas, the co- and trigeneration market is expected to grow rapidly

In 2010, there were only eight examples of tri-generation investments in the country (all of these were installed in either Delhi or Gujarat and by Deutz MWM or Clarke Energy). With only one exception, all these investments are in the industrial sector (such as sugar, chemicals, fertilizers, textiles). However, the commercial market is growing with rapid urbanization, growth in stock of buildings, increasing demand for cooling, and together with positive regulatory developments and expanding gas pipeline network the co- and tri-generation market is expected to grow rapidly to 6,042 MW in buildings and around 7,600 MW in industry.³⁴ The potential of tri-generation is maximum in office buildings (2590 MW) followed by airport buildings (1698 MW), retail buildings (754 MW), hotel buildings (731 MW) and hospital buildings (270 MW). As per the GIZ study, hospital, airports and hotels scores the highest marks in market and financial attractiveness.

Barriers and risks associated with tri-generation: factors affecting the viability of tri-generation as an energy saving technology in India are:

- *gas price;*
- *electricity tariff;*
- *high capital costs for tri-generation;*
- *limited market experience (and therefore high risk), of tri-generation in the commercial sector;*
- *the market size limited by the availability of a gas network;*
- *the non-standarised, highly customised nature of tri-generation (compared say to consumer appliances);*
- *the absence of service providers offering turn-key tri-generation solutions;*

The aim of this pilot demonstration will be to tackle each of these risks and show within the Indian market setting the returns on investment from this technology and provide EESL with sufficient experience to want to expand in this technology. A litmus test for this pilot will therefore be to meet ESSL’s financial benchmark of 21% internal rate of return (IRR). The end result will not be full market transformation, but if successful will position EESL for a second but larger phase of expansion into this technology.

City gas distribution network

TABLE 13 – GAS PROVIDERS

City/Cities	Service provider	Ownership
Duliajan, Sibsagar (Assam)	Assam Gas Company	Government of Assam
Ankleswar, Bharuch, Surat (Gujarat)	Gujarat Gas Company	British Gas (Private)
Vadodara, Ahmadabad (Gujarat)	Adani Energy limited	Private
Gandhinagar (Gujarat)	GSPC Gas	Government of Gujarat
Mumbai	Mahanagar Gas Limited	JV (GAIL, British Gas, Maharashtra Government)

³⁴ GIZ- A report on tri-generation potential in India

City/Cities	Service provider	Ownership
Delhi	Indraprastha Gas Limited	JV (GAIL, BPCL, ILFS, IDFC, Delhi Government)

Presently the above cities are covered by natural city gas distribution network. The Government of India has decided to aggressively pursue expansion of the gas network in view of expected higher availability of gas from domestic production expansion and LNG import, and this will expand the market potential for the commercial tri-generation market.

Gas prices at consumer side: Gas prices have reduced over the last two years in India and are expected to remain in the range of 0.32-0.44 USD/SCM in the future. Falling prices are supported by falling Indian production costs, and expectation about global gas prices. The Figure 7 below shows the World Bank/ IEA projections for regional gas prices. These are expected to rise gradually, but still making it important to stress test EESL’s business model against these anticipated changes.

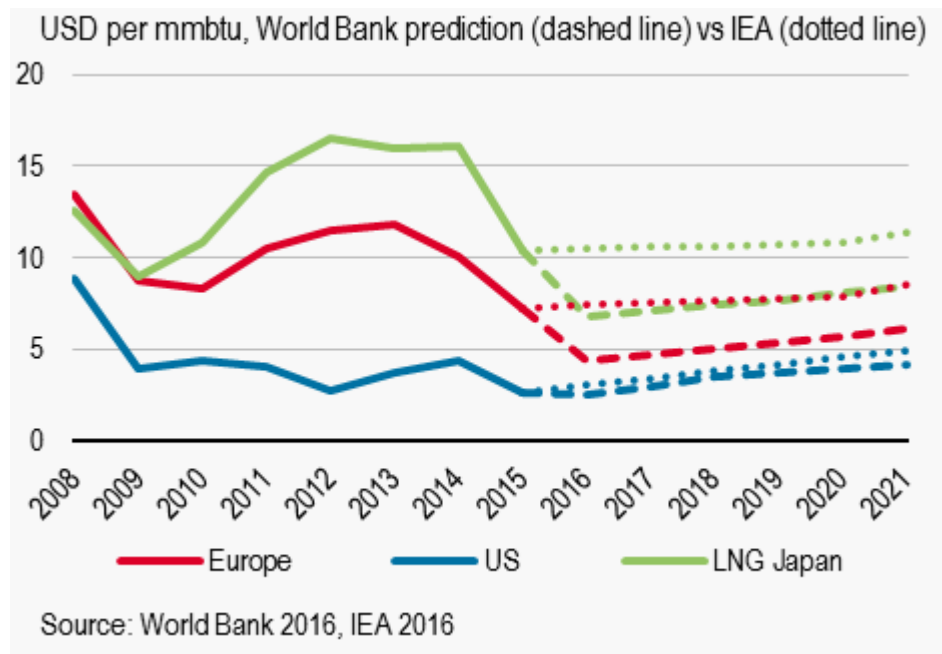


FIGURE 7 – GAS PRICES PREDICTIONS

Electricity tariff in India: the buildings where tri-generation has the potential to be an energy savings technology, such as offices, hospitals, and hotels are classified as commercial electricity consumers. The average commercial electricity tariff for commercial consumers is 0.1125 (USD/kWh).

Tariff of Diesel based systems: most commercial buildings in India use diesel to supplement grid power during grid power shortage. The amount of electricity they consume depends on the frequency of power shortages in each state. Power cuts typically vary from 20% to 50% of the total electricity requirement of a building, but in some states shortages go up to 60%-70% of building electricity consumption requirements. The table below shows a weighted cost of electricity with different levels of power shortage, where a consumer needs to supplement his power from a diesel generator.

TABLE 14 CALCULATION OF ELECTRICITY TARIFF FOR GRID BASED AND DIESEL BASED ELECTRICITY GENERATION SYSTEM IN INDIA

Grid Prices (Rs/kWh)	Diesel Prices (Rs/kWh)	% of Grid	% of Diesel	Weighted Electricity tariff (INR/kWh)	Weighted Electricity tariff (USD/kWh)
9	16	100%	0%	9.00	0.13
9	16	90%	10%	9.70	0.14

9	16	80%	20%	10.40	0.15
9	16	70%	30%	11.10	0.16
9	16	60%	40%	11.80	0.17
9	16	50%	50%	12.50	0.18

The weighted electricity varies from 0.13 USD/kWh to 0.18 USD/kWh depending on the % of electricity generated by grid and diesel generator in a building.

Cost of 1 MW of tri-generation system³⁵: the total equipment, balance of plant and commissioning cost of 1 MW trigeneration system is around 0.7 million USD. In addition, there will be costs related to project development and management charges. After considering these costs, indicative cost for 1 MW tri-generation system is around USD 0.75 million (50 million INR).

Business Models: Tri-generation projects can be set up under three different models: (1) as a dedicated captive plant, (2) group/district combined heat and power; (3) or an independent power project (IPP). Most of the projects developed up to now are dedicated captive plants. Few proposals are under way for development of the group/district combined heat and power. From the regulatory perspective the development of power plants is deregulated and power distribution of electricity supplied by district combined heat and power projects is possible under some provisions.

Together with emerging conditions all the barriers listed in this section can be addressed. The Government of India is expanding the network so the market size will continue to expand; the calculations undertaken show the financial viability of the trigeneration technology under current and anticipated gas and electricity prices. Using their procurement expertise; managerial capabilities and access to finances EESL is expected to be able to bring together both national and or international expertise in trigeneration to make a turn-key offer to commercial consumers at prices lower than the commercial consumer currently pays for his or her power. Note that it is standard in India for consumers to pay for their own gas in the industrial trigeneration models, and this will also be the case with EESL contracts. Changes in gas prices therefore will affect the cost of power to the consumer, not the internal rate of return to EESL. This condition is factored in below.

Financial feasibility analysis: The table below is a sensitivity analysis of gas and electricity prices on the internal rate of return for EESL investments. EESL is looking for a 21% rate of return from its investment, while the consumer is looking to pay less for his electricity under a contract with EESL than under his current weighted average. From Table 14 above commercial consumers' weighted cost of electricity runs from USD 0.13/KWh to USD 0.18 KWh depending on the levels he needs to supplement his power supply from a diesel generator (in the table this ranges from 10-50%). Bearing in mind that under a contract with EESL the consumer will also pay for the gas, we can use this table to look at viable scenarios for both the consumer and EESL.

TABLE 15: TABLE SHOWING IMPACT OF GAS AND ELECTRICITY COSTS TO THE CONSUMER UNDER THE EESL BUSINESS MODEL ON THE INTERNAL RATE OF RETURN OF INVESTMENT

Gas Prices	Rs/SCM	35	36	37	38	39	40	41	42	43	44	45
	USD/SCM	0.52	0.53	0.55	0.56	0.58	0.59	0.61	0.62	0.64	0.65	0.67
Electricity Tariff (USD/kWh)	0.13	23%	21%	19%	16%	14%	10%	5%	NA	NA	NA	NA
	0.14	27%	26%	24%	22%	20%	18%	15%	12%	8%		NA
	0.145	32%	30%	29%	27%	25%	23%	21%	19%	17%	14%	11%

³⁵ Cost has taken in consultation with technology providers in India. Technology providers consulted are Thermax and Green power International Pvt. Ltd.

	0.15	36%	35%	33%	32%	30%	28%	26%	25%	23%	21%	18%
	0.16	40%	39%	37%	36%	34%	33%	31%	29%	28%	26%	24%
	0.17	44%	43%	42%	40%	39%	37%	36%	34%	32%	31%	29%
	0.179	49%	47%	46%	44%	43%	41%	40%	38%	37%	35%	34%
	0.182	53%	51%	50%	48%	47%	45%	44%	42%	41%	39%	38%

The conclusion is that even when a consumer pays only USD 13/KWh for electricity, there is a financial case for the EESL tri-generation business model. Under this scenario gas prices would need to rise to USD 0.53/SCM to cost to the consumer financially unattractive, assuming everything else stays the same. Current gas prices in India are 0.32-0.44 USD/SCM, with only a slow rise in costs expected going forward.

MRV for Tri-generation

MRV for trigeneration is complex and for the contract to work EESL must measure the energy savings as a result of the investments and O&M changes they make at the facility to reduce energy consumption. This means EESL needs to establish a baseline of what the facility paid as electricity cost before the investment and compare this to the total gas cost after the installation of trigeneration system. Assuming there is a reduction, then the difference is shared between the two parties. The performance of trigeneration shall be evaluated by establishing the following parameters:

- Monthly electrical output per unit consumption of gas (kW/SM3);
- Monthly cooling produced per unit consumption of gas (TR/SM3);
- Monthly electricity generated (kWh) for every year;
- Annual energy performance index (kWh/sqm/yr);
- Monthly gas consumed (SCM) for every year;
- Monthly Tariff of gas (USD/SCM) for every year.

Parameters to be monitored

The parameters to be monitored for establishing the performance of Trigeneration are shown and listed below:

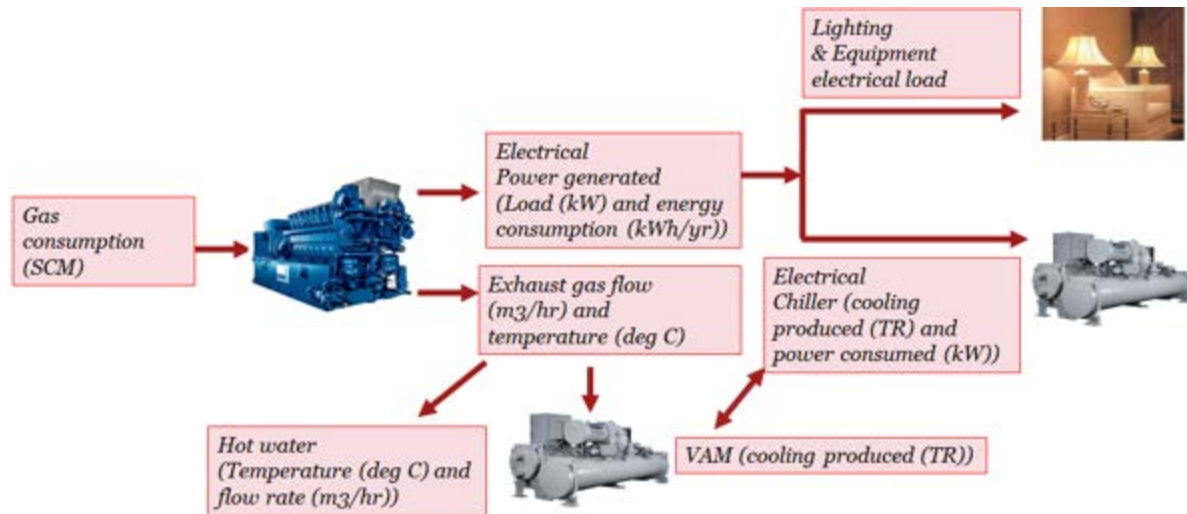


FIGURE 8 – TRI-GENERATION PARAMETERS TO BE MONITORED

TABLE 16 – LIST OF TRI-GENERATION PARAMETERS TO BE MONITORED

S. No.	Parameter to be monitored
1	Gas consumption (SCM)
2	Electrical power (kW) generated through gas engine
3	Energy consumption (kWh/yr) generated through gas engine
4	Gas engine loading (%)
5	Amount of exhaust gas generated (m3/hr)
6	Temperature of exhaust gas (deg C)
7	Amount of cooling produced through VAM
8	Amount of hot water generated (m3/hr)
9	Temperature of hot water generated (deg C)
10	Total lighting and equipment load (kW)
11	Total building electrical load (kW)
12	Cooling produced by chiller (TR)
13	Power consumed by chiller (kW)
14	Ambient temperature and RH
15	Occupancy schedule

Baseline Period

The baseline conditions for the facility needs to be defined for existing facility and green field projects as mentioned below:

TABLE 17 – BASELINE CONDITONS FOR EXISTING AND GREENFIELD FACILITIES

S. No.	Parameters	Existing facility	Greenfield
1	Baseline Period	Previous one year	Calibrated simulation model
2	Baseline energy consumption and demand data	Established using previous years electricity bills	Established using calibrated simulation model
3	Independent variable data coinciding with energy data	<ul style="list-style-type: none"> • Ambient temperature, • Cooling required • New addition of equipment 	<ul style="list-style-type: none"> • Ambient temperature, • Cooling required • New addition of equipment • Energy tariff
4	Static factors	<ul style="list-style-type: none"> • Number of people • Operating schedule (lighting, air conditioning and other utilities) 	<ul style="list-style-type: none"> • Number of people • Operating schedule (lighting, air conditioning and other utilities)
5	Adjustment details	<ul style="list-style-type: none"> • Adjustment due to change in ambient temperature and cooling required • Adjustment due to addition of new equipment 	<ul style="list-style-type: none"> • Adjustment due to change in ambient temperature and cooling required • Adjustment due to addition of new equipment
6	Equipment Inventory	<ul style="list-style-type: none"> • Number and type of electrical equipment installed in the facility 	<ul style="list-style-type: none"> • Number and type of electrical equipment installed in the facility

Baseline energy consumption is calculated based on table above. Gas consumption is then measured over the first year of operation of the tri-generation system once it has been installed and commissioned (reporting period).

The energy savings are then calculated as the difference between the baseline energy consumption and the electricity generated by trigeneration. The revenue saved is calculated as the difference between the electricity bill paid before trigeneration and the gas cost paid after the installation of trigeneration.

It is likely that during the EESL contract, weather conditions, building equipment and occupancy levels will change compared to the baseline, and this will have an impact on energy consumption, these changes need to be estimated and included in the calculation of energy savings.

The main responsibility of monitoring of the performance of trigeneration shall be the responsibility of EESL along with the engineering in charges of the facility where trigeneration would be installed. The overall budget of M&V should be lower than 10% of total project cost of trigeneration.

SMART GRID

Overview of Smart Grid

A smart grid is an electrical grid with automation, communication and IT systems that can monitor power flows from points of generation to points of consumption (even down to the appliances level) and control the power flow or curtail the load to match generation in real time or near real time basis. The increased visibility, predictability, and even control of generation and demand bring flexibility to both generation and consumption and enable the utility to better integrate intermittent renewable generation and also reduce costs of peak power.

Aggregate Technical & Commercial (AT&C) losses in India

Power theft and technical losses in the distribution system are adversely affecting the growth of power sector in India. The technical losses and commercial losses which capture the losses on account of theft also, are being measured as AT&C losses. The AT&C losses at national level during the year 2011-12, 2012-13 and 2013-14 (for 36 utilities only) were 26.63%, 25.39% and 23.04% respectively³⁶. These numbers are very high as compared to the developed economies such as US and UK, where they stand at an average of 6-7%³⁷.

The AT&C losses in the tune of 25% translates to losses of around 208 billion kWh of electricity every year which accounts for a loss of over USD 17 billion per year to distribution utilities (assuming Rs 5/kWh as average tariff).³⁸

The reduction in AT&C losses is one of the critical components for improving distribution segment which comes within the purview of the State Governments and State Electricity Regulatory Commissions. This is a big concern for the Government of India as it drives up consumer's costs and affects the quality of power provided to Indian consumers.

The transition to smart grids will enable the DISCOMs to monitor and control power flows in real time, assist in reducing losses as well as help in achieving the overarching objectives of the Government of India to provide 24x7 power for all households in the country. However, based on the to-date results of the existing pilot projects, there is a need for a strong business model which can give all relevant stakeholders, the confidence as well as required returns (wherever applicable). In this context, EESL will be able to fulfil the requirements through an innovative business model. A review of the existing schemes/policies targeting reduction in AT&C losses is provided below.

Existing policy landscape for catalyzing AT&C loss reduction

AT&C losses brings to India, a huge opportunity to leapfrog into the latest smart grid technologies as it has done in other sectors like telecommunications. To capitalize on this opportunity, the Government of India has set an

³⁶ Report on Performance of Power Utilities published by Power Finance Corporation (PFC)

³⁷ Report on Performance of Power Utilities published by Power Finance Corporation (PFC)

³⁸ Source: TERI Energy & Environment Data Dairy and Yearbook 2014-15

annual target for end of 12th five-year plan (2012-2017) for utilities to reduce AT&C losses by 3% annually for utilities with losses above 30% and 1.5% annually for utilities with losses less than 30%.³⁹

To achieve these targets, Central Government is supplementing the efforts of States through various schemes for improvement of the distribution sector of the state. Most of these schemes have as pre-requisites that DISCOMS reduce their AT&C losses to be eligible to access these programmes. DISCOMS are keen on accessing these schemes. There is a need to support DISCOMS to deal with their AT&C losses so that they can be enabled to access these schemes and not only bring energy efficiency gains but also modernise their grids. DISCOMS do not have the initial capital needed to reduce their AT&C losses. To reduce AT&C losses, DISCOMS need to be able to understand where and why the losses are occurring, so that they can take action. The current grids have meters that are not 'smart' and therefore are not connected to an IT system that allows the DISCOMS to track the changes in their power supply on a real-time basis. DISCOMS need 'smart meters' in their grids to be able to track their supply and identify sudden changes in consumption patterns (AT&C losses). Smart meters are costly (USD 150/each) and they need to be installed in the grid. They also have to be linked to an IT system that will collect, store, and analyse the data and provide real time information on any deviations to DISCOMS so that they can take action.

In light of the above and keeping in mind the targets set by the Government for reducing AT&C losses in India, there is a need for *aggregators* to bring the technical know-how to procure, install, manage and analyse data from the meters (via system integrators / technology providers) but more importantly to provide the required capital for implementation of the projects. Considering this, EESL is placed in a very good position to extend its ESCO business model to Smart Grid technology as well.

The Government of India under the National Smart Grid Mission had rolled out 14 projects in different areas across India. These smart grid pilot projects are financed through a subsidy based model with Central Government providing 50% of the funding through Restructured Accelerated Power Development and Reforms Programme (R-APDRP) innovation budget line, and the rest complemented by matching funds from the respective state governments. Current status shows delays in many projects and a few of them have already been cancelled. The primary reason for failure is the lack of an aggregator that will help DISCOMS with an integrated offer.

DISCOMS do not have the needed capacity to design the right technical specifications, procure the smart meters and the IT system, understand where are the best locations to install them, operate the IT system with the real-time information and most importantly to analyse the information to take action. DISCOMS do not only need the initial capital to invest in the smart meters, but they also need an aggregator so that the analysis from the losses can be provided to them, and they can take action on how to reduce these losses. They also need then to find out if the cost of their actions can be off-set by the monetized energy savings or increased income that the actions will bring in comparison with the cost of grid or billing improvements. In addition, the government counterparts (at federal and state level) that are offering these 'subsidies' to DISCOMS do not have an understanding of how DISCOMS operate and lack a working relationship with them, which hampers as well the pilots' success.

Nonetheless, these pilots bring to light a number of barriers that this project can help to address, they are summarised below:

³⁹ Source: http://powermin.nic.in/upload/pdf/Re_Structured_APDRP_during_XI_Plan.pdf

- *Lack of system integrators (entities who can combine the entire project and take all the stakeholders along towards the successful implementation)*
 - *Lack of standard specifications for smart meters and related equipment*
 - *Legacy style procurement and lack of capacity in designing: as the procurement is being done in isolated pockets, there is a difficulty in terms of integration of the entire network, which is supposed to communicating two-way. So currently the designing part of the system is completely missing.*
 - *Current contracts are installation led in comparison to the hidden requirement of DISCOM for service led contracts.*
 - *Lack of transparency in showcasing investment spending dashboard to management, leading to flags/issues getting missed*
 - *Non-availability of real-time data and analysis of super critical/critical parameters, which if acted upon within time, could save on the fronts of money as well as losses.*
 - *Delay in timely identification of the exact problem and the respective location*
 - *Lack of confidence in existing vendors / technology players as there are no successful case studies to be relied on*
 - *Lack of accountability and corresponding responsibility due to non-availability of real-time data*
 - *Lack of real-time data/information on the operational performance of the grid*
 - *Lack of transparency / real-time dashboards with flagging features*

To cater to the above barriers/issues, this project will propose a business model where EESL will make the initial capital investment in the smart meters and will work with an (or as an) aggregator to provide a turn-key solution for the DISCOMs. EESL will then re-cover the initial investment based on a deemed savings model resulting from monetised potential actions being taken by the DISCOM on the triggers/alerts when energy losses are identified by the proposed smart grid infrastructure.

With this proposed model, EESL will fulfil not only the need for the required upfront capital for the smart grid implementation, but also the entire technical consultancy to support the implementation. EESL will also make use of its close relationships with DISCOMs to engage with them and get their support and buy-in to the project pilots.

EESL is already working with two pilot smart grid projects but with not the same business models. These two pilots are small in size and are not necessarily representative of the smart grid investments that EESL will like to expand in the future. However, they will allow EESL to get the needed insights on the technical aspects of an integrated system design and how to transfer this technical specifications for an aggregator procurement specifications. These pilots will also support the project with an MRV protocol based on deemed savings. Given the very initial phase of the technology deployment in India and that the savings are deemed and therefore real energy savings are contingent on action by DISCOMs which will require DISCOMS to actually bear the costs of grid related repairs, this is perceived by EESL as a risky approach. Most of the DISCOMs in India are not in a sound financial situation and EESL will prefer to have a two-phase deployment approach under this project to (i) understand the financial feasibility of the proposed business model from EESL and DISCOMs perspectives, and (ii) acquire the needed experience in aggregating the procurement demand for smart grids.

Phase 1 will be a pilot project that will draw resources from the GEF grant allocation, while Phase 2 will incorporate lessons learned from Phase 1 and will draw resources from the co-financed KfW concessional loan allocation.

Business Model

In both phases the business model will be similar and will be based on shared deemed savings. The pilots will involve the installation of basic smart grid technology such as smart meters and then their associated infrastructure as well as architecture for displaying results through a dynamic dashboard. Such a dashboard reflects the performance of the system as per data gathered through installed smart meters as well as provide different triggers configured into the system.

A key point to be highlighted here is that the smart grid projects by virtue of their design provide various action triggers in the dashboard, however, the intervention required for taking action on those triggers is undertaken by the utility itself. Hence, achievement of energy savings through smart grid project requires high degree of coordination and cooperation between EESL providing smart grid solution and the DISCOMs.

The energy savings estimation for smart grid projects are based on reduction in AT&C (technical and commercial losses) losses that will be achieved through implementation of the project. Minimum technical losses are inherent in electrical systems, however outdated management techniques, old equipment, poor maintenance and long transmission distances these technical losses can increase substantially. Commercial losses are caused by non-technical or commercial factors namely pilferage, theft, defective meters, errors in meter reading, estimating un-metered supply of energy etc.

Considering that some losses entail high investments and/or can be politically sensitive (such as disconnecting non-paying customers), this project will target loss areas that will not have high initial investment and that will bring energy savings. The Table 18 below highlight some of the areas and the respective potential for savings vis-à-vis investment.

TABLE 18 – INVESTMENT & SAVINGS POTENTIAL ⁴⁰

Losses (Technical)	Potential
Network Reconfiguration	Medium Investment; Medium Savings
Network reconductoring	Medium – High Investment; Medium Savings
Preventing leakages at insulators	Medium – High Investment; Low Savings
Automatic voltage booster	Medium Investment; High Savings
Better management of distribution transformers	Low Investment; Medium-High savings
Augmentation/ addition of distribution transformers	High Investment; Medium-High savings
Relocation of distribution transformers at load centres	Medium Investment; Medium-High savings
Load balancing and load management	Low Investment; Medium Savings
Improving joints and connections	Low Investment; Low Savings
Losses (Commercial)	Potential
Measures for controlling direct tapping by noncustomers and customers (theft)	Low Investment; High Savings
Measures for controlling pilferage of energy by existing customers	Low Investment; High Savings
Measures for reducing defective metering	Medium Investment; High Savings
Measures for improvement in billing and collection	Low Investment; High Savings
Stuck up meters	No investment; Low Savings

Low Investment – Payback less than 1 year
 Medium Investment – Payback b/w 1-3 years
 High Investment – Payback more than 3 years

Low Savings: < 0.5%
 Medium Savings: 0.5 – 1.5%
 High Savings: > 1.5%

The Figure below shows which areas can provide revenue to DISCOMs if they act upon the system triggers/alerts.

⁴⁰ Source: Existing Pilot Projects and Global Case Studies

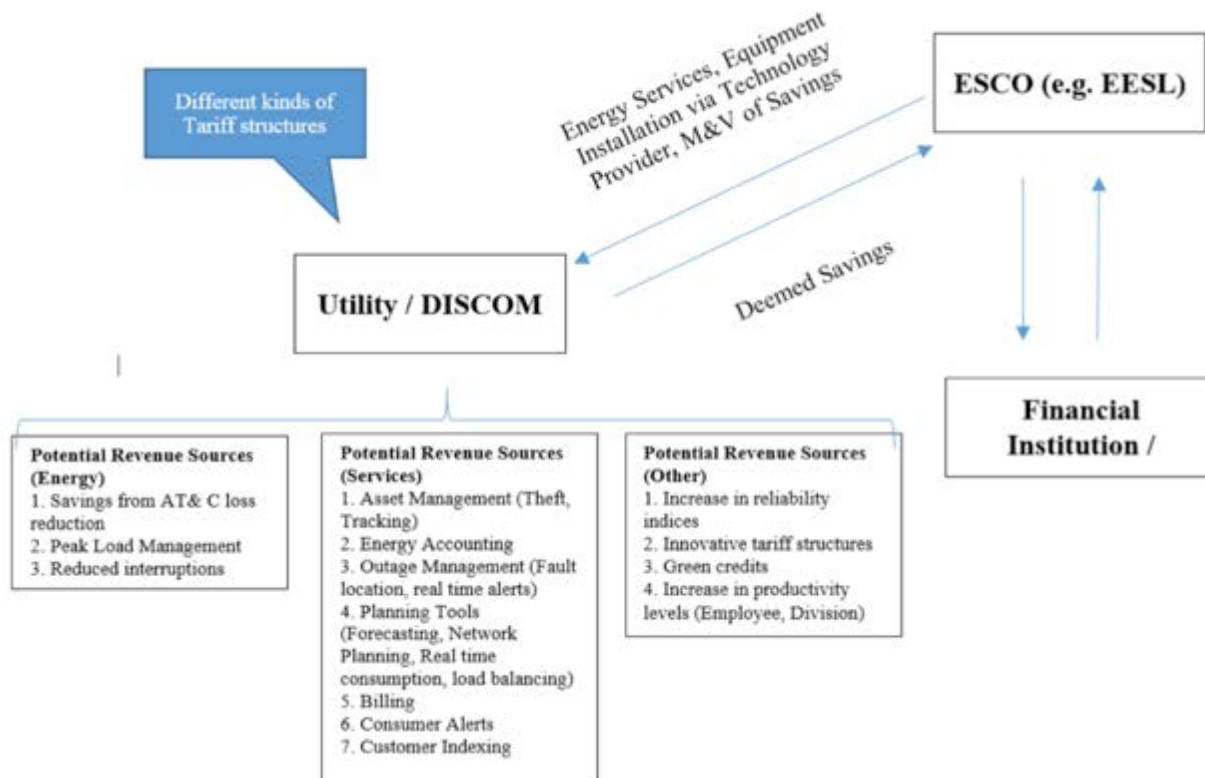


FIGURE 9 – DISCOMS REVENUE SOURCES

Even if DISCOMs cannot frontload the investment costs of a large deployment of smart meters, they will be in a position to act upon the triggers of low cost actions. The other incentives for them to take action are detailed below:

- *Mandate by Ministry of Power, Government of India to individual DISCOMs for reducing AT & C losses (3% annually for those with existing losses greater than 30%; 1,5% annually for those with existing losses less than 30%)*
- *Entire project being scrutinized under the lens of public audit*
- *To adhere to the service contract with EESL, payment has to be done by the DISCOM. At the same time, they would also look for reduction/energy savings/additional money. To cater to this, DISCOM will try very hard to capitalize on the triggers (considering the current financial condition of the DISCOMs)*

Phase 1: ESCO Based Business Model

- *To be funded through investment from GEF TF (over a period of 5 years)*
- *EESL will recover its investment through monthly payment on deemed savings approach*

The Phase I of the project will then use USD 4,000,000 of the GEF grant and the features considered are below:

TABLE 19 – FEATURES OF SMART GRID PHASE 1⁴¹

Clients (No. of smart meters)	25,000 (approx.)
Technologies	Smart meters and associated infrastructure as well as communication architecture
Investment cost	USD 4 million
Energy savings potential*	12,129,797 kWh/year

⁴¹ Based on existing pilots and global case studies

Tariff	USD 0.071/kWh
Cost of Energy saved	USD 0.86 Million/Annum
Assumptions	
Smart meter Acquisition Cost	USD 150/unit
Average Load per Consumer	3.30 kW
Project Development Charges	4%
Project Management Charges	3%

*The energy savings in the above table have been estimated through reduction in AT&C losses from 30% to 25%

The main operating features of the model are detailed below:

- EESL will fund and the respective system integrator / technology provider (system/service procurement done by EESL) will build, operate and maintain smart grid for the utility/DISCOM on a revenue sharing business model
- The respective utility/DISCOM will provide on ground facilities & support for implementing the Smart Grid; action on alerts & event response teams
- No investment in smart meters is expected to be done by the respective utility/DISCOM
- Mode of calculation of savings to be deemed based on triggers from the smart grid implementation. Deemed savings to be shared between the utility/DISCOM and EESL
- EESL's responsibility via system integrator / technology provider will be to provide alerts to the respective utility/DISCOM.
- It will be the responsibility of the utility/DISCOM to act on the alert
- EESL will get credited on the saving amount irrespective of whether action is taken by utility/DISCOM or not (based on the pre-signed energy savings contract)
- Parties to contract:
 - EESL and the utility/DISCOM to sign an agreement / MoU
 - System Integrator / Technology Provider and EESL will set up Joint Venture (JV) entity and the contract will be assigned to JV entity
 - Utility/DISCOM shall pay for the insurance of the Smart Grid equipment installed on the grid by EESL through system integrator / technology provider
 - All delays due to utility/DISCOM cost over-runs will be paid by utility/DISCOM. Any delay by EESL will only affect EESL's earning.

In year 2 (or 3) of the project, a stocktaking exercise will be carried out to draw lessons from the implementation of Phase 1; and Phase 2 will be designed and implemented with KfW co-financing.

PHASE 2: Procurement (Demand Aggregation) Led Deemed Savings Model

Learnings from Phase 1 will be used to refine the business model and modalities of the proposed Phase 2. The Phase 2 will be a mix of demand aggregation and ESCO based business model. That means it will aggregate the demand based on the successful/tested business model of Phase-1 which will eventually reduce the cost of the smart meters. EESL will deploy the same in the DISCOMs and payment recovery will be through the ESCO route.

In this model, EESL will replace the conventional meters with smart meters at its own costs (without any need for DISCOMs to invest) and the consequent reduction in energy and maintenance cost of the DISCOM is used to repay EESL over a period of time. The contracts that EESL enters into with DISCOMs are typically of 5 to 7

years' duration where it not only guarantees a minimum energy saving (of-typically 50%) but also provides free replacement and maintenance of meters at no additional cost to the DISCOM.

Under this model, DISCOM considers energy savings as a resource and procures the same from EESL at a predetermined price. The repayments to EESL are within the present level of expenditure. Thus there is no additional expenditure required to be incurred by the distribution company for change over to smart meters. This is very much on the realistic side as the DISCOMs are under a mandate to reduce their AT&C losses, by the Ministry of Power, Government of India.

COMPONENT 3 - REPLICATION AND SCALING-UP

Almost all the business of EESL till now was driven by lighting sector through its Domestic Efficient Lighting Program and Efficient Street Lighting Program. In the last few years, EESL has developed sustainable business models and created networks to ramp up activities in these areas. The huge targets for these areas have also led to strain on human and financial resources of EESL. The market for these areas would become saturated in the following years which might affect EESL's growth trajectory if it does not develop other market opportunities. Some of the other major challenges identified that can hamper EESL's growth have been listed below:

- *Small size/capital/equity*
- *Limited trained human capital*
- *Overdependence on lighting sector which is facing increased competition as client's eagerness to do projects independently. EESL may also face supply challenges which could lead to cheaper and inferior goods*
- *Ability to raise low-interest bilateral and multilateral funding is key for EESL to maintain competitive advantage*
- *Development of robust monitoring and verification framework along with a strong payment security mechanism is a key to protect EESL's investments*

EESL has set big targets for scaling-up installation of existing technologies (DL, SL, Ag-DSM and 5 star ceiling fans) which have been defined in earlier sections. Also, EESL it is planning to venture into newer technology areas to diversify their market base. EESL, to achieve the envisaged targets, need to upgrade its operations so that none of the functional areas becomes a bottleneck for its expansion. EESL has identified in its business plan as a response to the weakness above the following areas: internal organization restructuring, decentralization, training of human resources, adequately skilled human resources, expansion into other geographies, automation of various processes, awareness raising and capacity building of key stakeholders for new technologies and additional technologies (State Governments, ULBs, utilities, facility owners).

Growth strategy

Consolidation and diversification. To meet targets on DL, the current strategy of EESL is to reach out to all State Governments to deploy DELP. EESL has learned that the best approach to gain market entry is to first engage with the State Governments and then with the DISCOMs. The engagement with the State Governments entails that the Ministry of Power send letters to Chief Secretaries of States requesting them to identify cities for DELP deployment. After consent from state government, engagement with DISCOMs will follow for the necessary documentation including filings before state regulatory commission. With regard to SL sector, EESL is engaging with different Urban Local Bodies (ULBs) and showcase their experience in SL sector and present an offer to them for replacement. Thereafter, through discussions and negotiations; EESL gets a nod to initiate SL replacement under ULB's jurisdiction. Similar strategy can be adopted for replicating SL projects in future as

well. With regard to ceiling fans, EESL's strategy would be similar to DL. In order to upscale investment in Ag-DSM, EESL can utilize its experience in implementing similar programmes in Andhra Pradesh and Karnataka⁴².

However, with respect to new technologies (super-efficient ceiling fans, tri-generation and smart grids); EESL needs support from the GEF-TF project to develop experience and viable models for replication for larger deployment. EESL needs a concrete strategy to replicate and scale-up investments in existing, new and additional 5-7 technology areas beyond the project period.

Decentralisation and manpower. To deal with the problems related to rapid growth, EESL is establishing regional offices to better develop and manage its projects across India. In view of this, EESL is developing a decentralization strategy that will categorize EESL's operations into Corporate Office, Zonal Office, Regional/State Office and Project wise Site Offices. The intent of the decentralization strategy is to facilitating quick responsive action on various projects as well as to ensure smooth functioning of projects. As part of decentralization strategy, EESL is planning to segregate entire Indian geography in four major zones. Few challenges that may arise during implementation of decentralization strategy include: (i) streamlining EESL processes for seamless operation across different locations; (ii) augmenting existing human resources to meet regional requirements; and (iii) limited availability of adequately qualified human resources at local level for which transfers will be required from corporate office to other offices to augment skilled human resources requirement.

For EESL to expand into new technologies, it needs to appoint professionals with specific skill set such as smart grid expert, tri-gen expertise and financing expert for managing marketing for raising additional funds, etc. EESL is taking progressive steps towards enhancing capabilities of its staff on technical aspects through training programs on topics covering new technologies, their technical features, program management for large scale deployment, etc. However, in view of increasing human resources of EESL at corporate office as well as other offices; it is imperative to develop a robust training schedule for recent recruits to prepare them for managing large scale project work.

Business automation

EESL is proactive in automation of its processes and is set to launch ERP system on April 2017. However, it does require support in terms of IT tools or application software to facilitate business development as its personnel require ready information in form of dashboards or mobile apps which can be showcased to the potential clients to encourage them.

Awareness raising, sharing of lessons learned and capacity building

The potential clients for EESL for existing and new technologies are ULBs, DISCOMs, facility owners/managers. However, these stakeholders have limited knowledge and sometimes pose a challenge for generating potential business from them.

⁴² EESL has implemented Ag-DSM projects across following three utilities in Karnataka and AP:

- In Karnataka (HESCOM & CESC) – 1927 pumps

- In AP, APEPDCL – 2496 pumps

Also, EESL has recently issued LoAs to pump manufacturers and PMC for 150,000 pumps in both DISCOMs of AP and EESL is planning for 100,000 pumps in Maharashtra as well.

To deal with limited awareness levels of potential clients, EESL, presently, conducts a number of visits to them in order to make them understand the benefits of the proposition of any technology which EESL wants to deploy for that client. Thereafter, EESL has to convince the top management of clients by explaining the financial model adopted by EESL for deployment and then probably the deal achieves closure through signing of contract. This approach by EESL requires high level of involvement of senior resources of EESL to close the deal than what is actually required just on account of limited awareness levels of potential clients.

The present GEF-TF project can address this issue in an effective manner through providing support in awareness creation of potential clients through conducting orientation and awareness enhancement/capacity building programs targeted at ULBs for SL/DL/CF programs, DISCOMs in case of smart grid as well as Ag-DSM programs and hotel groups/ hospitals/malls, etc. for tri-generation projects.

In addition to this, EESL needs to strengthen its technical capabilities to ensure a sustained expansion including a robust network of technical service providers to cater to regional requirements and a review of energy auditing firms to validate assumptions for the deemed savings models.

Financing

EESL has access to a number of lines of credits from different funding organizations for supporting expansion of distribution of established technologies. EESL has raised debt from multi-lateral and bilateral agencies.

The present GEF-TF project is supporting to an extent for conducting pilot projects for identified new technologies, however, considering the large scale-up plan of new technologies; EESL would have to explore different sources of funding for such projects. So, this GEF-TF project through technical assistance would also support EESL in identification/ screening of possible investment opportunities and potential sources of finance for the same.

A.1.3 THE PROPOSED ALTERNATIVE SCENARIO, GEF FOCAL AREA⁴³ STRATEGIES, WITH AN OBJECTIVE, DESCRIPTION OF EXPECTED OUTCOMES AND OUTPUTS, AND ACTIVITIES OF THE PROJECT

Globally, one of the challenge for implementing Energy efficiency measures is incorporating the performance of energy efficient measures in the business model. ESCOs globally use various performance contracting models for implementation of energy efficient measures. To address this challenge number of different types of performance contracting models are being used by ESCOs. Few of these models include: a) shared savings, in which the savings are shared between the ESCO and consumer, b) guaranteed savings are the savings in which 100% saving is given to ESCO company so that they can get the money for the work carried out by them, c) deemed savings, and d) energy supply/management. The “deemed savings” approach has been the one effectively used and successfully demonstrated by EESL for most of their projects. The “deemed savings” approach features: a) an energy services agreement (ESA) between the ESCO and host facility with a fixed price for services defined, b) A Financing Agreement (FA) between the ESCO and a financial institution, c) an agreement between ESCO and government or utility under which ESCO receives payments based on deemed

⁴³ For biodiversity projects, in addition to explaining the project’s consistency with the biodiversity focal area strategy, objectives and programs, please also describe which [Aichi Target\(s\)](#) the project will directly contribute to achieving.

savings. The ESA specifies the services provided by the ESCO and a fixed payment by host facility for ESCO services. The FA specifies an ESCO equity investment, financial institution debt investment, with interest rate and term of loan. The ESCO makes loan repayments from host and utility/government payments (USAID, 2014).

Over last few years EESL has gained extensive experience in street lighting and domestic lighting projects. They have replaced around 208 million domestic lamps with LEDs in DELP and around 1.65 million LEDs in SL under these programs. These established successful business models are further being replicated for BEE 5 star ceiling fan and agricultural pump technology. The success of EESL in executing these projects is reflected in increase of its turnover from USD 1 million in 2012, to USD 15 million in 2014, with anticipated turnover of USD 100 million by 2016. The proposed GEF project will build on the experience that EESL has gained in the lighting sector in terms of application of energy efficiency business models and seek to: a) scale up investments in these established sectors through additional financial support from an ADB loan, and b) demonstrate widespread success in ESCO project implementation through projects targeting municipal, commercial and domestic consumers that can be leveraged to expand EESL's operations into ceiling fans, tri-generation and smart-grid technologies.

The GEF project will: a) leverage investments for high impact, b) be transformative, c) generate multiple benefit streams, d) have considerable potential for replication and scaling up, and e) strengthen capacity for the GOI to address obligations under the UNFCCC. The project will be built on LED model (Domestic as well as municipal lighting) which has transformed the energy efficient lighting market. The overall objective is to reduce greenhouse gas (GHG) emissions through energy efficiency through scaling up and new technology applications. It will be organized around three interlinked components:

Component 1 will use GEF funds to leverage debt and expand EESL business in existing domestic and municipal lighting programs for rapid and large scale emissions reductions. This component will expand EESL's business in domestic as well as street lighting, replacement of conventional with established five star ceiling fans, replacing inefficient pumps with efficient pumps in agriculture sector. GEF funds along with ADB co-financing will provide technical assistance in reviewing the existing business models of EESL and methods for their improvisation. Further, it also provides investment funds for rapid and large scale deployment of the improvised business model for large scale deployment of this technology.

Under Component 2, GEF funds will combine technical assistance (TA) and investments to assist EESL in diversifying its business lines into three new technology areas, including "super-efficient" ceiling fans, smart grids, and tri-generation and establish a business case for ESCO.

Component 3 will focus on TA to support replication and scaling up of all 7 technologies, (i.e. Street light, Domestic light, BEE 5 Star Ceiling Fan, Agricultural pumps, Super-efficient Ceiling Fan, Tri-generation and Smart Grid) with a view to leveraging additional investments. The project will be jointly implemented by ADB and UNEP, and guided by a formal agreement between the parties, while EESL will be the local executing agency.

COMPONENT 1 – EXPANDING AND SUSTAINING INVESTMENTS IN EXISTING MARKET SECTORS

This component helps EESL in expanding its existing market areas. Under this component, GEF TF will support EESL for distribution of around 40 million LED lamps under DELP, 1.5 million street lights, 229,532 agricultural pumps and 2 million 5 star ceiling fans. This section provides the fund allocation for each of the

technology under the project component. It will also provide the list of activities to be carried out for implementation of various project outputs proposed in this component. The total fund allocated for this component and its distribution is provided below:

GEF TF: USD 1,765,806

Co-financing: USD 400,000,000

TABLE 20 - COMPONENT 1 - FINANCING DETAILS

Financing Type	GEF Contribution (USD)	Co-financing Contribution (USD)
Technical Assistance	399,000 (UNEP)	1,000,000
Investment/Technical Assistance	1,366,806 (ADB)	399,000,000
Total	1,765,806	400,000,000
Source of Co-finance (USD)		
Source of Fund	Co-financing amount (USD)	
TA co-financed by ADB	1,000,000	
Investment co-financed by ADB	200,000,000	
Investment co-financed by EESL	199,000,000	
Total Co-financing	400,000,000	

The distribution of the total funds allocated for investment in component 1, towards various technologies, is provided in the table below:

TABLE 21 - TECHNOLOGY WISE INVESTMENT DISTRIBUTION

Technology	Investment by Co-financing (USD)
Street lighting	139,650,000
Domestic lighting	55,860,000
Agricultural pumps	171,570,000
BEE 5 star Ceiling Fan	31,920,000
Total Investment	399,000,000

Expected Outcomes

ENERGY EFFICIENCY IMPROVED THROUGH INSTALLATION OF DOMESTIC LEDs (DL), STREET LIGHTING (SL), AGRICULTURAL PUMPS AND BEE 5 STAR CEILING FANS

This component will support investments in EESL core proven business of energy savings in domestic LED lighting, street lighting, agricultural pumps and 5 star ceiling fans. ADB will also include USD 1 million in TA together with USD 399,000 of GEF funds to undertake sector and market assessments, financial analysis, relevant due diligence of new projects and management of relevant procurement processes (using the appropriate ADB guidelines). The investment under this component will be from ADB in the form of a USD 200 million loan which will be supported by the USD 199 million in the form of loan and equity by EESL. The component aims to deliver rapid and large scale energy savings impacts.

A number of TA and capacity-development activities will ensure that the investment proposed under this component is ‘investment ready’, following which, the component will use the EESL’s established approach of tendering contracts to equipment suppliers to distribute energy efficient LEDs to domestic clients and install energy efficient street lights for municipal clients. EESL will finance costs of the installation of all equipment’s for street lighting and agricultural pumps program. For all Domestic Lighting and Ceiling fans projects, EESL will sign deemed savings contracts with power distribution companies (DISCOMs) for peak power savings under

the DELP program wherein the DISCOMs will make payment as per the fixed annuity and recover the same from the consumers. In order to procure the energy efficient equipment's EESL will enter into a procurement contract with suppliers to install and maintain energy savings equipment for municipal clients and service lamp warranty obligations for households..

EESL experience suggests that contracts with suppliers that include after sales services which include maintenance and spare parts, are not optimal. As such EESL will split up the tenders into a) procurement and installation, and b) after sales service /maintenance. This will require a review of existing models, inclusive consultations with relevant stakeholders, possible organizational changes / re-structuring and capacity development for providers of after sales services and maintenance. These activities will be covered under the TA element of the component.

Before tendering equipment contracts, signing and executing *deemed savings contracts* with DISCOMS, and suppliers/households, the project will need to execute some internal corporate level preparations, and sensitize suppliers and consumers on the proposed program. In this connection, the component will finance the costs of a social marketing campaign to help consumers understand the potential benefits from EESL-supported products (street lighting and domestic lighting). Activities will be sequenced such that ADB TA will be used first to promote end-user behaviour change, followed by GEF-supported campaigns which target consumers, DISCOMs, urban local bodies (ULBs) and suppliers. Both sets of campaigns will incorporate gender considerations. The profiles of CSO India will be reviewed to involve potential candidates in various aspects of the GEF funded campaign.

Under this component, EESL will ensure that all subprojects are appraised, selected and approved in compliance with the requirements of "Subproject Selection Criteria and Approval Procedures", to the satisfaction of ADB. The EESL's business model will be reviewed in domestic and street lighting. In particular funds will be used to design and conduct MRV protocols that may include AMS-II.J and AMS-II.L CDM methodologies, to estimate actual savings from these investments and help EESL to calibrate its own deemed savings contracts. The results of this will be fed into Component 3 to support the development of a revised business plan for EESL. To be eligible for inclusion in investment projects under Component 1, a candidate subproject will need to qualify the following:

- A Detailed Project Report completed in format and with a level of detail;
- It should have all necessary counterparty arrangements agreed, including implementation schedule and repayment terms;
- The schedule should be for completion no later than December 2020;
- It should be financially feasible (i.e. acceptable economic internal rate of return)
- It should meet Category "C" of ADB's Safeguards Policy Statement 2009 for environment, indigenous people and involuntary resettlement; and
- Use no funds from other bilateral and multilateral sources to co-finance the projects allocated to ADB unless complementary arrangements will clearly be agreed beforehand and avoid duplication and double counting.

Based on the subproject, three main outputs from the component are mentioned below:

- Street lighting efficiency in one or more municipalities in Rajasthan, Maharashtra, Goa, and Telangana enhanced;
- Electric bulbs and fans efficiency in households in utility service areas in Rajasthan, Maharashtra, Andhra Pradesh, and Uttar Pradesh enhanced;

- Efficiency of agricultural water pumps in utility service areas of Rajasthan, Andhra Pradesh, and Karnataka improved.

The above outputs will be supported by ADB loan. In order to achieve these main outputs, GEF TF will support the key outputs to be performed under this component. These outputs supported by GEF TF are mentioned below:

- Due diligence on the EESL investment conducted
- Energy savings contracts signed and executed with ULBs, DISCOMs, suppliers and consumers
- Gender sensitive social marketing campaigns scaled up to target consumers, DISCOMs, ULBs, and suppliers
- Review and recommendations of business models for each market sector conducted (SL and DL), including MRV protocols.
- Supply tenders for installation and maintenance awarded and contracts signed
- Revolving fund, or similar mechanism, designed and operationalized

The activities to implement this output are mentioned in the succeeding output sub-section for this component. End-user awareness programs will be conducted to maximize gains, and a women-led ‘energy clinics’ program will be adapted to the relevant project activities.⁴⁴

The proposed GEF project will review various options to establish a sustainable financing mechanism, in the form of a “revolving fund” which would be managed and controlled by EESL. Details about revolving fund are provided in subsequent section,

Outputs of Component 1

The technologies under this component are already established and EESL has been successful in their implementation. This project component will act a catalyst for expanding EESL’s existing market sectors. Key outputs under this component are defined below:

OUTPUT 1: DUE DILIGENCE CONDUCTED (ADB led)

The activities to be implemented under Output 1 are mentioned below:

- 1.1 Review of existing financial models used by EESL for project feasibility study
- 1.2 Review of existing technical specifications being followed by EESL
- 1.3 Review of payment security mechanisms being followed by EESL
- 1.4 Review international best practices for project implementation
- 1.5 Prepare gap-analysis on practices adopted by EESL and international best practice
- 1.6 Conduct technical due diligence
 - 1.6.1 Assess sector development plan and policy environment to support its implementation

⁴⁴ The referenced energy clinics are by women for women and educate about energy conservation practices that can be undertaken in the home: http://www.keralaenergy.gov.in/emc_energy_efficiency_16.html

- 1.6.2 Evaluate EESL's project implementation process, portfolio performance, project sustainability and scaling potential
- 1.6.3 Develop monitoring framework for project performance tracking
- 1.6.4 Provide inputs in design of GEF funded investment in new technologies
- 1.7 Conduct financial due diligence
 - 1.7.1 Conducting review of cost estimates and project financial viability while following ADB's requirements
 - 1.7.2 Conduct economic analyses following ADB's requirements based on demand and supply forecasts and least cost alternatives
- 1.8 Conduct procurement due diligence
 - 1.8.1 Conduct review of EESL's procurement system
 - 1.8.2 Drafting of risk assessment and mitigation measures
 - 1.8.3 Identification of areas of further assessment or modifications
- 1.9 Conduct social and environment due diligence
 - 1.9.1 Conducting gender and socioeconomic analysis
 - 1.9.2 Assist in preparation of all required social safeguards while ensuring conformity with ADB policy and governance guidelines
 - 1.9.3 Review feasibility studies and conduct site visits to assess conformity with ADB Safeguard Policy Statement and Government requirements for ADB loan and GEF grant
 - 1.9.4 Prepare documents and/or templates, as required, to facilitate compliance with environmental requirements during project implementation

OUTPUT 2: ENERGY SAVINGS CONTRACTS SIGNED AND EXECUTED WITH ULBS, DISCOMS AND CONSUMERS (ADB led)

The activities to be implemented under Output 2 are mentioned below:

- 2.1 Facilitate in identification of ULBs, DISCOMs, suppliers & consumers
- 2.2 Support in complete process to ensure signing of letter of Intent
 - Domestic Lighting: for DELP projects, EESL will sign an MoU or letter of Intent with DISCOMs
 - Street lighting: for SL projects, EESL will sign an MoU with ULB/MC or state level municipal body
 - Agricultural Pumps: for AgDSM projects, EESL will sign an MoU or letter of Intent with DISCOMs
 - BEE 5 Star Ceiling Fans: for Ceiling Fan projects, EESL will sign an MoU or letter of Intent with DISCOMs or institutional consumers on a project basis
- 2.3 Conducting baseline study within the project boundary
- 2.4 Preparation of detailed project report
 - Domestic Lighting: Assess the requirement of potential DISCOM area for project implementation. Also, review the load research studies to understand the usage pattern in residential space. Based on this a detailed project report would be developed to explain technical feasibility and financial viability of the

project

- Street lighting: Based on the baseline assessment and potential for energy savings, the ULB specific assessment of technical feasibility and financial viability would be carried out in the detailed project report
- Agricultural Pumps: Similar to street lighting, based on the baseline study and assessment of energy saving potential the detailed project specific report will be prepared to evaluate the technical feasibility and financial viability
- BEE 5 Star Ceiling Fans: Similar to domestic lamp, based on the assessment of DISCOM requirement for project implementation and review of the load research studies a detailed project report would be developed to explain technical feasibility and financial viability of the project. This would be different for institutional consumers

2.5 Develop technical specifications for potential replacement/ distribution with project boundary

2.6 Estimation of energy savings potential

- Domestic Lighting: Based on the proposed solutions i.e. replacement of incandescent lamps (ICLs) with LED lamps, the project specific wattage savings would be estimated
- Street lighting: Estimating potential for energy saving potential in comparison to existing situation
- Agricultural Pumps: Estimating potential for energy saving potential in comparison to existing situation
- BEE 5 Star Ceiling Fans: Based on the proposed solutions i.e. replacement of conventional ceiling fan with 5 star ceiling fans, the project specific wattage savings would be estimated

2.7 Preparation of energy savings agreement depicting project requirements, final terms & conditions and estimated annuities

2.8 Facilitating signing of energy savings agreement

OUTPUT 3: GENDER SENSITIVE SOCIAL MARKETING CAMPAIGNS SCALED UP FOR TARGET CONSUMERS, DISCOMS, ULBS AND SUPPLIERS (ADB led)

Limited knowledge about the EE technologies and market, among the potential consumers and stakeholders (DISCOMS, ULBs, suppliers, distributors) can be one of the impeding factors for expanding and sustaining investments in existing market sectors. Hence targeted and customized social marketing programs including orientations for technology specific consumers, suppliers and business associates will be developed and implemented to enhance awareness and knowledge on EE technologies.

The Government of India has determined that increased end-use efficiency is critical to contain energy demand without jeopardizing growth. In 2015, the government pledged to reduce the emissions intensity of its gross domestic product by at least 33% below 2005 levels by 2030. The strategic plan of MNRE (2011-2017)⁴⁵ also states that ‘the effective implementation of renewable energy programs and the success of these programs will depend on the awareness and acceptability of end-users’.

⁴⁵ Strategic Plan for New and Renewable Energy Sector for The Period 2011-17, February 2011 Ministry of New and Renewable Energy, Government of India.

Awareness programs for end users that are part of the ADB project will contribute to maximizing energy efficiency gains and help to ensure that end-users adopt and sustain the use of the improved technologies. Along with stakeholder consultations, orientations specific outreach campaigns using various communications tools, including media, electronic, print, out-of-home media, internet and social media, would be needed for spreading awareness about benefits of energy efficient technologies. Thus the social marketing campaigns will be scaled up to target consumers, DISCOMs, ULBs and suppliers.

The activities for Output 3 are the following:

- 3.1 Provision for human resources, i.e., an EERF Marketing Communications Specialist and a short term Gender Equality Specialist. (cross reference Output 6 under GEF)
- 3.2 Review EESL's current media strategy (for Ceiling fans, DL, Agri pumps), particularly existing content (print, audio, video messages to avoid gender stereotypes) and conduct revision if required
 - For example, suggestions for gender sensitive approaches which ensure that the campaign materials should not propagate gender stereotypes and should portray women in empowering roles wherever possible
- 3.3 Conduct formative research and pretesting of materials (through focus group discussions (FGDs), individual interviews or other qualitative methodologies) to assess current awareness, behaviour, drivers and barriers to adopting desired behaviour of the target audience
 - Ensure equal participation of women to ensure that their opinions, beliefs and practices are heard and taken into account in message and materials development
- 3.4 Develop and implement a gender sensitive awareness generation program/communication plan for both institutional and domestic consumers for wider publicity and sensitization
 - The communication plan and tools will be customized for the type of technology (DL, CFs, HH appliances, SL, and Agri-pumps). Among others, this would include communication tools and IEC content using multi-media, print, flyers, project brochures and presentations; social media, online/websites; and localized advertising campaigns using media channels popular among consumers e.g., regional TV, All India Radio, FM radio, billboards, hoardings, posters and pamphlets/flyers.
 - Awareness creation will be an essential component of overall design and roll out of capacity development, training workshops, seminars etc., for EESL's regular stakeholders in the energy value chain. The aim will be to ensure that men and women have sound rationale for making consumer choices. (refer to Gender Action Framework in Table 38 below)
 - To illustrate, a session on gender sensitive communication during the existing training for sales staff of the kiosks, over the counters (OTCs) and mobile vans with the objective of enhancing sales and distribution
- 3.5 If necessary seek approvals from Media Advisory Committee in Ministry of Power, Government of India
- 3.6 Provide guidance and coaching to the EESL's Public Relations and Marketing unit, as well as any externally engaged public relations firms, for communication planning, implementation and monitoring and evaluation activities conducted both nationally and at the state level
- 3.7 Support monitoring and evaluation by installing a GEF project-level sex-disaggregated data collection system

OUTPUT 4: REVIEW AND RECOMMENDATIONS OF BUSINESS MODELS FOR EACH MARKET SECTOR CONDUCTED (SL, DL, BEE 5 STAR CEILING FAN AND AGRICULTURAL PUMPS), INCLUDING MRV PROTOCOLS (UNEP led)

Below is a list of activities to be carried out under Output 4:

- 4.1 Review of existing business model and aligning it with the changing market scenario
 - 4.1.1 Review of the roles of each vendor engaged by EESL for project implementation
 - Domestic Lighting: key vendors engaged by EESL are (1) LED lamp supplier, (2) LED lamp distributor; and (3) Communication agencies
 - Street lighting: key vendors engaged by EESL are (1) Street light supplier; (2) CCMS supplier; and (3) Communication agencies
 - Agricultural Pumps: key vendors engaged by EESL are (1) Pump Manufacturer; and (2) Communication agencies
 - BEE 5 Star Ceiling Fans: key vendors engaged by EESL are (1) BEE 5 Star Fan supplier; (2) Distribution agency; and (3) Communication agencies
 - 4.1.2 Review of existing Operation & Maintenance practice followed by EESL
 - 4.1.3 Designing the new business models based on the input of above two activities
- 4.2 Review of the existing MRV methodologies followed by EESL as laid out in baseline section of component 1
- 4.3 Aligning the existing MRV methodology with proposed suggestions/recommendations and also align with the GHG emission reduction calculation based on the GEF GHG emission estimation tool
- 4.4 Review of existing reporting framework followed by EESL for reporting energy savings and monetary savings
- 4.5 Develop, discuss, validate and finalize revised MRV protocols for each investment sector / sub-sector based on above activities
- 4.6 Support monitoring, verification and reporting for each investment sub-project

OUTPUT 5: SUPPLY TENDERS FOR INSTALLATION AND MAINTENANCE AWARDED AND CONTRACT SIGNED (ADB led)

The activities to be implemented under Output 5 are provided below:

- 5.1 Development of model tenders for equipment installation and maintenance, to support investments in SL, DL, APs and CFs
 - Domestic Lighting: Based on the savings estimate and detailed project report prepared under output 4, the tender document would be prepared after aggregating the requirement across project
 - Street lighting: The project specific tender document would be prepared. This tender document would cover the following aspects: (1) Supply, Installation, Testing and Commissioning of LED street lights; (2) Supply, Installation, Testing and Commissioning of CCMS; and (3) Operation & Maintenance of the street lighting infrastructure (Optional). The third tender document would depend upon the outcome of activities for output 1 wherein the separation of Supply and maintenance contract would be decided
 - Agricultural Pumps: Based on the baseline study and signed agreement with DISCOMs or state bodies,

the model tender document would be prepared. The specification of this tender would be project specific depending upon the need of the projects

- BEE 5 Star Ceiling Fans: Based on the savings estimate and detailed project report prepared under output 4, the tender document would be prepared after aggregating the requirement across project

5.2 Conducting seminars and meetings with industry stakeholders in four technology areas (SL, DL, APs and CFs)

5.3 Preparation of Request for Proposal documents for procurement and maintenance of technologies

- Depending upon the review of existing business model, the RFP document proposed under this activity could be segregated and two separate RFPs could be floated for Procurement/ Supply and Maintenance contract

5.4 Facilitate in inviting bidders against the RFP document

5.5 Support in bid evaluation process

5.6 Negotiation with the successful bidders (might be separate for Installation and maintenance work) and signing of Contract

5.7 Project Monitoring during implementation phase

OUTPUT 6: REVOLVING FUND, OR SIMILAR MECHANISM, DESIGNED AND OPERATIONALIZED (ADB led)

The main objective of a proposed ‘energy efficiency revolving fund’ (EERF) mechanism will be to support ‘proof of concept’ investments and scale up energy efficiency financing and program development to help cover the initial investment costs of identified EE projects/programs in the country. GEF grant and technical assistance resources will help to address some of the upfront risks in such investments.

The detailed design, structuring and operationalization of the fund would be undertaken during the early stages of project implementation, as described in activities under Component 1. While there a number of ways in which EE financing is organized, it will be useful to visualize a typical fund structure as presented below.

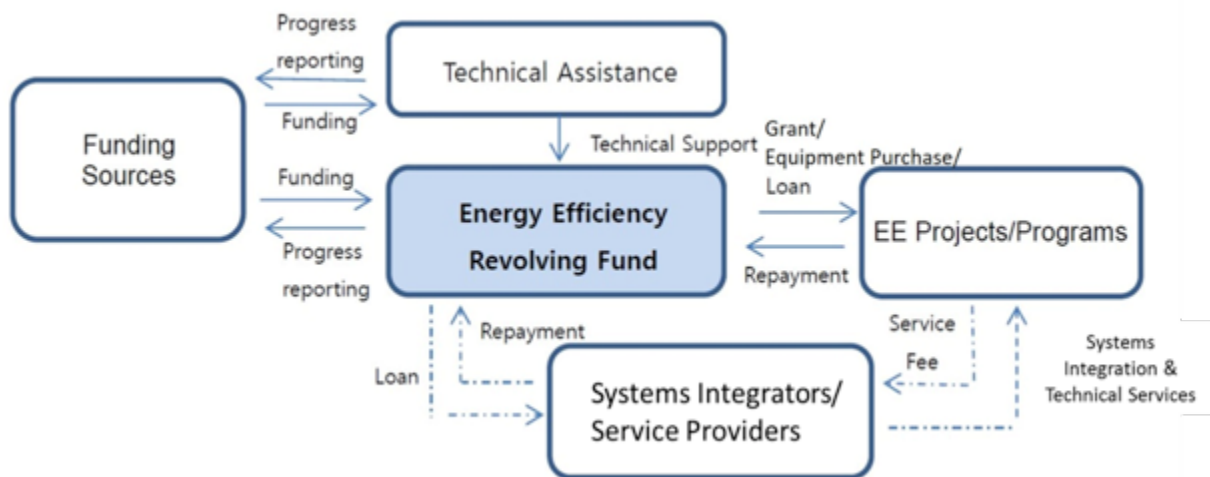


FIGURE 10 - POTENTIAL EE REVOLVING FUND STRUCTURE

Domicile and Legal Personality for Proposed EERF

During project preparation a number of options for domicile and legal personality for the EERF were given due consideration. These options included: a) establish an escrow account, b) create a trust, c) set up a new company / enterprise, and/or d) engage a third party such as a national development bank. Pivotal among the concerns is the need to “ring fence” the EERF so that it can continue to meet objectives consistent with the GEF mandate. Should the EERF remain on the EESL balance sheet it could potentially be: a) subject to dividend payments, b) exposed to liabilities, and c) subject to diversion of funds for uses other than originally intended. As such there is a need to create a secure, yet flexible mechanism.

a. Escrow account within EESL

This option is the fastest and easiest to create, and could serve as a logical first step in establishing a sustainable financing mechanism for EE investments. The account could be set up with a financial institution, pursuant to Section 33 of the EESL Articles of Association, and subject to EESL Board approval. A Memorandum of Understanding or similar agreement would outline the terms and conditions of how the fund would be governed, managed, monitored etc. Existing EESL financial management systems would apply, noting that EESL has just recently completed a financial management assessment (FMA) in preparation for the ADB loan project. The FMA focused on funds flow, staffing, accounting policies and procedures, budgeting system, payments, policies and procedures, cash and bank, contract management and accounting, internal controls, and internal and external audit, reporting and monitoring, and information systems in relation to administering the proposed loan.

b. Trust Fund

A trust fund is a viable option, which will require some due diligence and assessment. Private trusts are governed by the Indian Trusts Act (1882), with a few amendments, most recently in 2016. Public trusts include charitable and religious organizations and need to conform to several other pieces of legislation. Trusts which are used as pooling vehicles for investments, such as mutual funds and venture capital funds are governed by a separate set of regulations: the Securities and Exchange Board of India (Mutual Funds) Regulations and Securities and Exchange Board of India (Venture Capital Funds) Regulations. Creation of a trust would require EESL Board approval under Sections 25-28 of its Articles of Association. A Trust Deed would identify a Board of Trustees and define terms and conditions under which the trust would be governed and managed. Under a Trust Fund arrangement, current EESL financial management systems could still be applied. A team of professionals could manage the fund as a legal entity distinct from EESL. Potential constraining factors, for example regulatory issues, fund flow arrangements, treatment of assets, ability to borrow, lend or issue equity will need to be further considered prior to setting up a trust.

There are few precedents in the Indian context for trust funds with commercial and environmental goals similar to those of EESL. More recently however, the Government of India accorded approval for expanding the mandate and scope of the National Industrial Corridor Development and Implementation Trust for integrated development of industrial corridors in the country, including the Delhi-Mumbai corridor.⁴⁶

c. New corporation

⁴⁶ F. No 11/1/2016-IC Department of Industrial Policy and Promotion, Ministry of Commerce and Industry.

Long term of objectives of the GOI with respect to its energy efficiency mission could be best served by the creation of a new company, possibly a 100% subsidiary of EESL, which would be eligible to receive and issue grants, loans and equity. This option would require considerable due diligence, and would be covered under Section 2 of the EESL Articles of Association. A new company could be formed under the Indian Companies Act, Chapter II, 3; and subject to articles defined under Chapter II, 5, and subject to various Reserve Bank of India and other guidelines. A distinct Board of Directors would provide oversight and guidance, complemented by a Fund Manager and operational team with relative independence in decision-making with newly created policies. Financial management systems would need to be created and assessed anew, although aligned with EESL systems in general. An upside from setting up a new company is that it may be more amenable to investors and financiers, and also allow for clear exit options, for example, an initial public offering (IPO). However, a new company may not benefit from the emerging EESL 'brand', and could still be subject to influence in direction and decisions taken by the Board of Directors of the parent company

d. Third party financial institution (or other government agency)

Although this might be the least attractive of the options, some consideration has been given, especially since several previous GEF-supported projects have used this model. These types of arrangements are possible under Section 18 of the EESL Articles of Association, subject to EESL Board approval. There are a number of challenges associated with creating a fund management entity outside the ESCO framework and current EESL sphere of influence. Sometimes arrangements with banks are set up as model to induce them to get engaged in EE market, based on demonstrated profitability. Experience in India suggests that financial institutions would not have sufficient technical expertise to build up a project viable project portfolio, and if investments are distributed across the country, there will continue to be reliance on central offices of financial institutions to contribute to design, management and staffing of projects. Other factors which inhibit participation of financial institutions include: i) relative small project size, and high transaction costs, ii) limited profitability, iii) insufficient attention to contracting arrangements and monitoring mechanisms (given that this is the basis of determining savings, iv) limited ability to change mind set of SMEs to understand business case for energy savings, v) few incentives on how to internalize into business as usual operations of banks.

It was decided during project preparations that the most prudent and circumspect way forward is to establish an escrow account, undertake further due diligence to assess the viability of options (including a hybrid option which could well consist of all, or any combination of the first three options), and then take appropriate steps towards creation of a special purpose vehicle that best serves the interests of the concerned Parties.

The activities to be implemented under Output 6 are provided below:

- 6.1 Develop detailed terms of reference for key long term personnel dedicated to the EERF
 - 6.1.1 Investment Fund Manager, with primary responsibilities to include day to day operations of the EERF and project pipeline development
 - 6.1.2 Financial Management Specialist, to establish and implement the financial architecture for the fund
 - 6.1.3 Marketing Communications Specialist, to strengthen and adapt the current EESL communications plan, to promote new investments, and contribute to resource mobilization efforts
- 6.2 Engage Investment Fund Manager
 - 6.2.1 Initiate executive search process in line with ADB procurement guidelines as amended from time to time

- 6.2.2 Negotiate terms, including performance milestones, incentives etc and sign contract for appropriate period (with remuneration to be covered initially by the GEF funds and then graduate to coverage by the EERF)
- 6.3 Establish a framework for escrow account
 - 6.3.1 Identify appropriate financial institution
 - 6.3.2 Draft detailed escrow 'terms and conditions' between the parties, in line with objectives of the EERF
- 6.4 Draft terms of reference and initiate procurement process to support the conduct of a thorough and comprehensive due diligence assessment of the most appropriate special purpose vehicle (SPV) to support the long term objectives of the proposed EERF and sustained growth of EESL; whether escrow account, trust fund, new corporation or other arrangement
- 6.5 Conduct due diligence assessment to include, but not be limited to
 - 6.5.1 Analysis of regulatory, legal and financial framework, for SPV to host an Efficiency Revolving Fund (EERF), which would cover Companies Act, Indian Trust Fund Act, Securities and Exchange Commission Act, Income Tax Act, Foreign Contributions Regulation Act, Reserve Bank of India guidelines and other subsidiary central and state level legislation
 - 6.5.2 Research and consultations on institutional, legal, financial, economic, social, technical and political barriers and constraints to creation of SPV
 - 6.5.3 Assessment of potential risks, liabilities and proposed mitigating measures for SPV
 - 6.5.4 Elaboration on detailed processes for development an EERF including
 - *domicile /legal personality*
 - *shareholding structure*
 - *governance*
 - *advisory board or investment committee selection process*
 - *criteria for engagement of fund management team*
 - *terms of reference for key personnel*
 - *required agreements with relevant central and state government bodies and financial institution(s) and/ or trustees /directors / advisors*
 - *financial management systems, including sub-funds⁴⁷ and sub-accounts with suitable credit risk management practices*
 - *business transaction modalities*
 - *exit options / strategies for investors*
 - *comparative cost structures*
 - *dispute resolution mechanisms*
- 6.6 Develop staffing plan to include terms of reference and engagement process and timeline for selected full time specialists (e.g. financial management, marketing communications) as well as short term specialists (e.g. referenced in the provisional organization chart below)

⁴⁷ In particular the fund identified as an output under the GEF 5 project "Promoting Market Transformation for Energy Efficiency of Micro, Small and Medium Enterprises" (GEF ID 4893) for which UNIDO is the GEF Agency, and EESL as implementing partner.

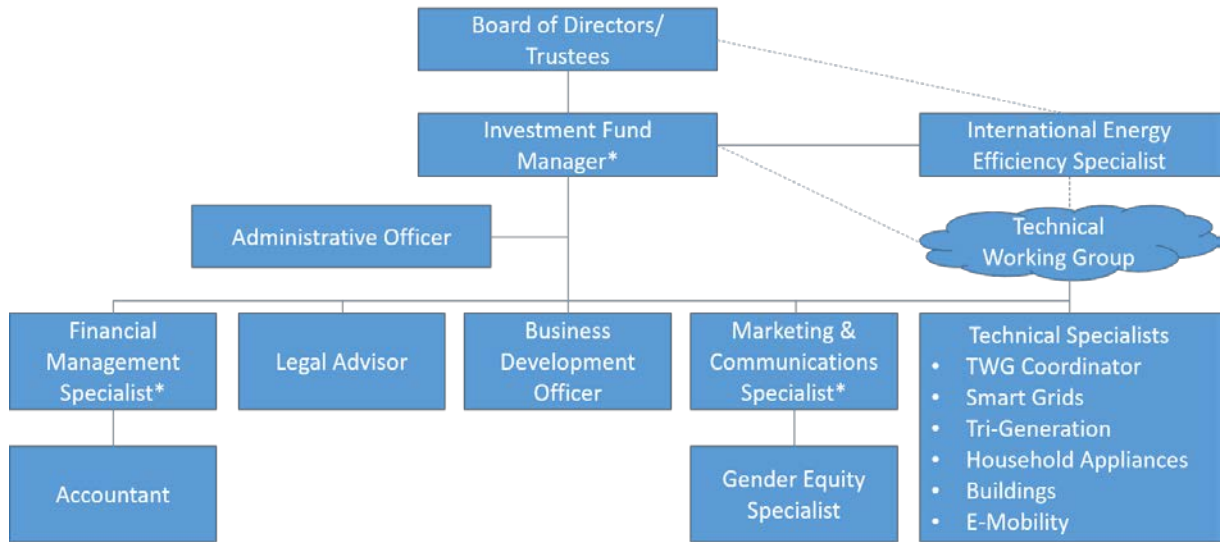


FIGURE 11 - PROVISIONAL ORGANIZATIONAL STRUCTURE FOR EERF

* Denotes fulltime positions; others are part-time/intermittent

6.7 Prepare an EERF Operations Manual to include, but not be limited to

- 6.7.1 Articulate a clear vision and mission for the fund entity
- 6.7.2 Confirm locus and support for EERF Secretariat
- 6.7.3 Define delegation of authority and powers of the Board / Investment Committee
- 6.7.4 Install a financial management system to oversee and govern income, expenses and assets in line with EERF objectives
- 6.7.5 Elaborate roles and responsibilities of the Investment Fund Manager and all key personnel, including roles and responsibilities related to due diligence for investment projects
- 6.7.6 Enable an organizational culture conducive to learning and staying on top of cutting edge technological developments in EE
- 6.7.7 Outline a process for development and execution of annual business plans, including resource mobilization, sub-project performance targets and milestones, project pipeline development
- 6.7.8 Present a logic with respect to investment sub-project review and approval processes, including contractual, documentary, legal and other requirements
- 6.7.9 Provide clear guidance and policies with respect to procurement, environmental and social safeguards, and occupational health concerns
- 6.7.10 Internalize potential selection criteria for investments in sub-projects, such as
 - *Relevance to EERF mission*
 - *Technical and economic feasibility assessed in Detailed Project Reports (DPRs) (based on pre-investment activities outlined under Output 7)*
 - *Business model validated (e.g. pre-tax IRR of roughly 21%, interest charges recovered etc)*
 - *Energy savings are measurable*
 - *Reasonable capital costs*
 - *Track record, financial management capacity and dedication of client is demonstrable*
 - *GHG emissions reductions will be achieved*
 - *Scalability*
 - *Potential job creation*
 - *Monitoring, reporting and verification system is created*

- 6.8 Participate in international and national conferences and exhibitions driven by energy-related industries, to promote awareness and understanding of the Indian ESCO-led EE financing and development model. This would also include actions to support resource mobilization in support of an investment pipeline (linked to Component 3).
- 6.9 Support workshops and seminars to assist international and national financing institutions in understanding EE demand side management, with a view to encouraging awareness, understanding and customized financing products and services, as well as investment facilitation services
- 6.10 Collaborative meetings / seminars with DISCOMS, ULBs, equipment manufactures / service providers/ systems integrators, end users and other stakeholders to orient on fund operations and develop potential pipeline of projects, to include, but not limited to, three technology areas (SECF, TG, SG)
- 6.11 Undertake due diligence, including market research, performance review of vendors / suppliers, value chain analysis, environmental and safeguards assessment, site visits, study tours etc for proposed investments and pipeline development
- 6.12 Package and disseminate knowledge products, guidance documents, information briefs, investor prospectus and technical reports. This would include documentation of best practice, tool kits and other educational materials to support smaller, emerging ESCOs
- 6.13 If required by GEF, draft an ‘end of project plan’ for reflows to be retained by the SPV and re-invested in areas consistent with the objectives of the EERF. This would also include consideration of the number of repayment cycles in relation to the closure of the GEF project

COMPONENT 2 – BUILDING MARKET DIVERSIFICATION

This component aims to help EESL to diversify its business into energy savings contracting for super-efficient ceiling fans, tri-generation and smart grid technologies. The allocated funding for this component is mentioned in the table below:

GEF TF: USD 14,750,099

Co-financing: USD 31,200,000

TABLE 22 - FINANCING DETAILS FOR COMPONENT 2

Financing Type	Trust Fund Contribution (USD)	Co-financing Contribution (USD)
Technical Assistance	1,750,099 (UNEP)	-
Investment	13,000,000 (ADB)	31,200,000
Total	14,750,099	31,200,000
Source of Co-finance (USD)		
Source of Fund	Co-financing amount (USD)	
Investment co-financed by KfW	31,200,000	
Total Co-Finance	31,200,000	

The proposed distribution of total funds under Component 2, towards investment for various technologies is provided in the table below:

TABLE 23 - INVESTMENT DISTRIBUTION FOR COMPONENT 2⁴⁸

Technology	Investment by GEF TF (USD)	Investment by Co-financing (USD)	Total investment (USD)
S.E Ceiling Fans	6,000,000	15,000,000	21,000,000
Tri-generation	3,000,000	6,200,000	9,200,000
Smart Grids	4,000,000	10,000,000	14,000,000
Total Investment	13,000,000	31,200,000	44,200,000

Note: All the Co-financing for this component will be sourced through the USD 31.2 million loan provided by KfW

Output 7 will constitute pre-investment activities, which intend to develop technical specifications for new technologies, improve stakeholder awareness, validate business models and assess demand. Technical committees will be established for each technology domain, which will establish standards based on accepted international protocols such as those of the International Electrotechnical Commission (IEC)⁴⁹, and ultimately, drive the procurement process for EESL. Composition of technical committees will vary by technology, but would logically include EESL, BEE and other relevant GOI agencies, manufacturers, industrial research and design organizations (such as the Indian Institute of Technology), accredited laboratories and the Bureau of Indian Standards. The figure below illustrates the relationships between various actors.

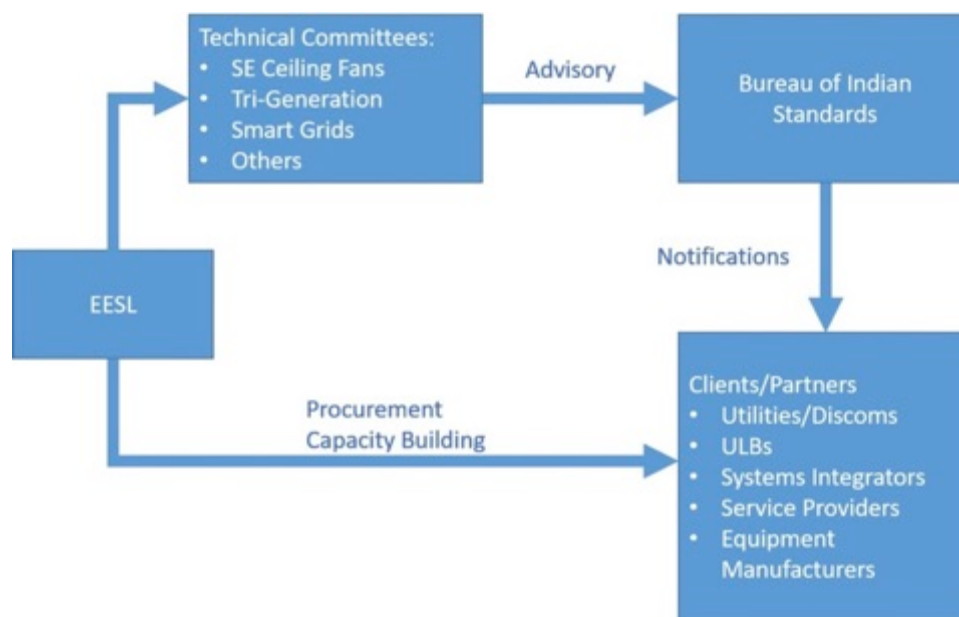


FIGURE 12 – RELATIONSHIPS BETWEEN ACTORS

Activities under the various outputs will lead up to actual investment processes related to Output 8. A conceptual scheme for the EERF is presented below – to show how activity sets are interlinked under the GEF project.

⁴⁸ Note: The distribution of fund among technologies is based on the project financing sheet of PIF

⁴⁹ <http://www.iec.ch/dyn/www/f?p=103:6:0##ref=menu>

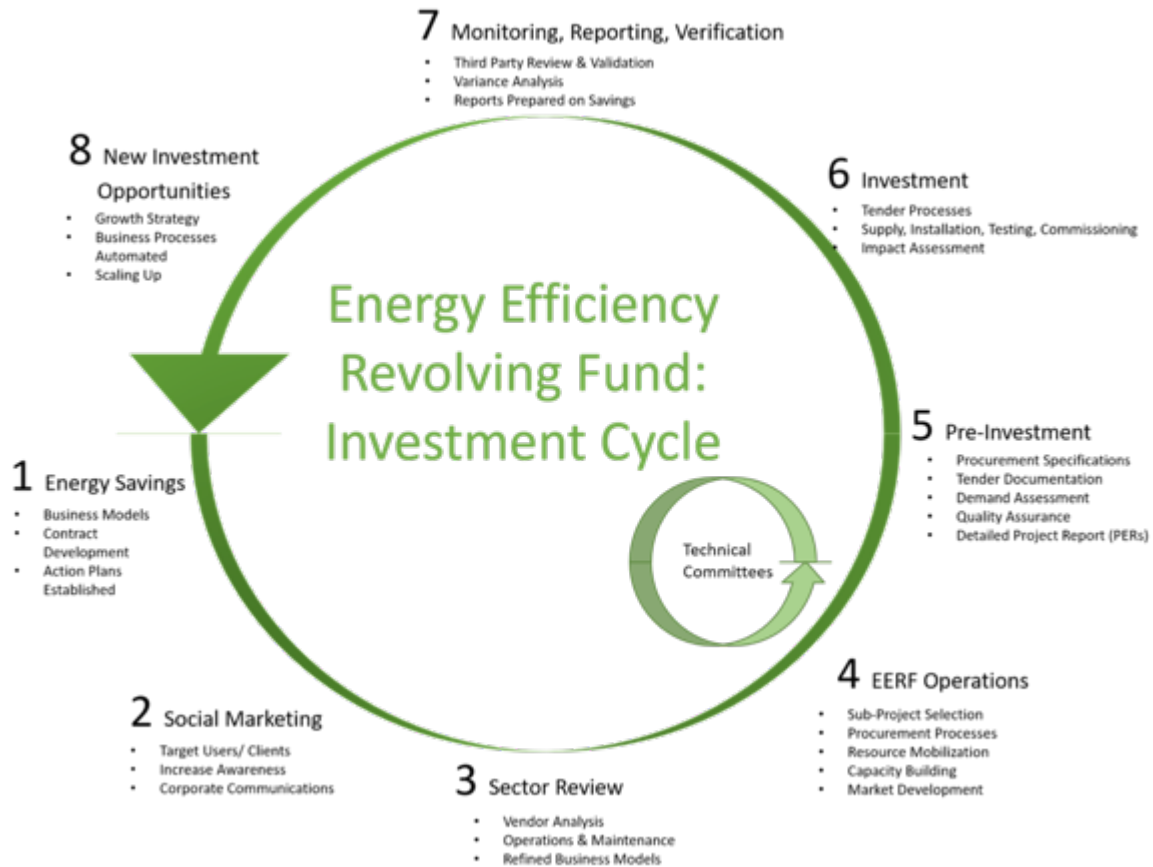


FIGURE 13 - CONCEPTUAL SCHEMA FOR EERF: INTERCONNECTIVITY OF GEF ACTIVITY SETS

SUPER-EFFICIENT CEILING FANS (OUTPUTS 7, 8, 9, 10)

This component aims to help EESL to diversify its business into energy savings contracting for super-efficient ceiling fans. EESL has an important role to play here to transform the market.

For super-efficient ceiling fans, EESL will reach out to its existing client base including Oil & Natural Gas Corporation Limited (ONGC), Coal India Limited (CIL), Central Public Works Department (CPWD), DISCOMs, state governments; and new clients like hospital chains (Max, Fortis, Manipal etc.) and hotel chains (ITC, Taj, Crown, Obreo etc.), defence and railway establishment to build demand for a large-scale procurement.

EESL will bundle demand to bring down the costs of super-efficient ceiling fans as it has done with LEDs. This would result in price reduction and thereby increase the market for super-efficient ceiling fans.

OUTPUT 7: STANDARDS AND SPECIFICATIONS FOR TECHNOLOGY TENDERS DEVELOPED (PRE-INVESTMENT) (UNEP led)

This output will involve developing the technical specifications for the identified technologies with the support from technical experts and stakeholders.

The activities under Output 7 related to Super-Efficient Ceiling Fans are the following:

- 7.1 Develop tender documents including procurement specifications
 - 7.1.1 Review of the tenders developed by EESL for the domestic LED and ceiling fan programme
 - 7.1.2 Conduct meetings with super-efficient ceiling fan manufacturers to understand the capability to produce; the warranty services provided by them; and meeting with IIT Madras for results of research project. The specifications such as sweep size, input wattage for the minimum prescribed air delivery for super-efficient ceiling fan, and preferable colour shall be defined. About 4 nos. of meetings have been envisaged.
 - 7.1.3 Preparation of tender documents by EESL including the detail specification of super-efficient ceiling fan, services to be provided by the vendor (manufacturer/supplier of fan) for warranty, implementation schedule, penalty criteria in case of any conformities, provision for inclusion for buy-back model and measures for ensuring environmental compliance.
- 7.2 Conduct stakeholder awareness workshops
 - 7.2.1 Leveraging the existing network of EESL with various institutions across India to identify consumers who are interested in the implementation of ceiling fan projects in their premises.
 - 7.2.2 Identification of potential sites and consumers by EESL likely for project implementation.
 - 7.2.3 Hiring of a consultancy firm to conduct 10 national or state level workshops for spreading awareness towards the proposed SE fan project. The location for the workshops shall be decided by the project implementation unit. Each workshop shall be attended by a minimum 20 representatives combined from local regional DISCOMs, institutions, state designated agencies, etc.
- 7.3 Demand assessment and establishing the baseline for MoUs
 - 7.3.1 Review of existing pipeline of MoUs of EESL and simultaneously approach potential institutions to understand their demand for super-efficient ceiling fans
 - 7.3.2 Validate the business models (deemed savings) with most recent information on preferred approach (upfront payment), the project size, cost of super-efficient ceiling fans, and technical specification of fans, energy savings, timeline for implementation, tendering schedule, and returns for the project beneficiary.
 - 7.3.3 Discussion between EESL and institutions to finalize whether to go ahead with the implementation and establish MoU
- 7.4 Tender specification for supply of super-efficient ceiling fans
 - 7.4.1 The finalized specifications & business model approach for each super-efficient ceiling fan project shall be incorporated in the tender documents of EESL.
 - 7.4.2 The list of suppliers which are manufacturing /selling /trading super-efficient ceiling fans and are willing to participate in the project of EESL shall be identified and listed.
- 7.5 Sign MoU with definition of MRV data and protocols
 - 7.5.1 Sign MoU with the identified institutions with information on MRV methodology.
 - 7.5.2 Preparation of implementation schedule highlighting various phases like procurement, supply, and MRV.
- 7.6 Design and implement quality assurance system for ceiling fan projects

OUTPUT 8 – SUPER-EFFICIENT CEILING FANS INVESTMENTS (ADB led)

The activities under Output 8 related to Super-Efficient Ceiling Fans are the following:

- 8.1 Tender inviting bids from the super-efficient ceiling fan manufacturers
 - 8.1.1 Tenders will be floated by the EESL for inviting bids from the super-efficient ceiling fan manufacturers
 - 8.1.2 The technical bids received will be evaluated by the EESL as per the requirements mentioned in the tender
 - 8.1.3 The bids qualified for financial evaluation shall be opened to calculate the financial score
 - 8.1.4 The bid with maximum score (technical and financial) will be awarded with the project. The unit price for SE fan shall be discovered
 - 8.1.5 The selected bidder shall be awarded the letter /contract agreement for supply of super-efficient ceiling fans. The contract agreement shall include the ‘bill of quantity’ as per the agreed plan between EESL and the potential institution
 - 8.1.6 Qualified manufacturers of super-efficient ceiling fans shall be empaneled with EESL
- 8.2 Supply of super-efficient ceiling fans
 - The selected supplier shall supply, at the site as per the schedule mentioned in the tender document

OUTPUT 9: FINANCIAL AND ENERGY SAVINGS PERFORMANCE OF SUPER-EFFICIENT CEILING FANS INVESTMENTS MONITORED, MEASURED AND REPORTED (UNEP led)

The activities under Output 9 related to Super-Efficient Ceiling Fans are the following:

- 9.1 Implement the quality assurance process by picking samples from field as per the quality control plan from project location.
 - The samples shall be tested as per the defined process and qualification for compliance shall be established.
 - The quality assurance expert shall submit a consolidated report for the quality assurance check conducted every month during the implementation.
- 9.2 Review the protocol for MRV and design a MRV plan. Hire an independent third party to conduct the MRV for the ceiling fan project. Follow the procedure mentioned in baseline section to conduct MRV (deemed saving approach)
- 9.3 Submission of MRV report to EESL highlighting any deviation in the actual situation with respect to desired process.

OUTPUT 10: NEW ESCO BUSINESS MODELS FOR SUPER-EFFICIENT CEILING FANS TECHNOLOGIES VALIDATED (UNEP led)

The activities under Output 10 related to Super-Efficient Ceiling Fans are the following:

- 10.1 Assess the long-term viability of super-efficient ceiling fan technology including the following parameters:
 - Price reduction in terms of % of baseline

- Market penetration
- Participation % of the manufacturers
- Increase in manufacturing base
- Employment generation
- Revalidation of strategy
- Institutional impact – increase in capacity
- Energy saving potential
- Net revenue saved through the technology
- Project IRR and monetary benefits to the institutions

10.2 Recommendations from the above assessment shall be presented to EESL

TRI-GENERATION (OUTPUT 7, 8, 9, 10)

OUTPUT 7: STANDARDS AND SPECIFICATIONS FOR TECHNOLOGY TENDERS DEVELOPED (PRE-INVESTMENT) (UNEP led)

The activities under Output 7 related to Tri-generation are the following:

- 7.7 Identification of potential sites for implementation of Tri-generation projects
 - 7.7.1 Leveraging the existing network of EESL with various corporates across India to identify corporates who are interested in the implementation of tri-generation projects in their facilities
 - 7.7.2 Identification of other sites by creating an awareness about the GEF project on tri-generation through national platforms like workshops/conferences organized by EESL, BEE, FICCI and other organizations.

- 7.8 Selection of sites for the pre-feasibility study on tri-generation
 - 7.8.1 Assessment of the identified sites on pre-requisites for tri-generation technology. This shall be done by EESL through mails/phone with the concerned persons from the identified sites.
 - 7.8.2 Finalization of sites by EESL to be taken up for pre-feasibility study on tri-generation.
 - 7.8.3 Hiring of a consultancy firm by EESL to conduct pre-feasibility study on the sites finalized by EESL

- 7.9 Pre-feasibility study to assess the potential of tri-generation and benefits of tri-generation for the potential sites
 - 7.9.1 Collection of data for each site by the consultancy firm to estimate the building energy demand, cooling demand, hot water demand, availability of fuel, operation of building, energy consumed in the building, type air conditioning system proposed/installed at the building
 - 7.9.2 Analysis of Tri-generation technology for each site to establish land requirement, energy reduction, fuel required to meet the energy requirement of the facility, total energy generation by the tri-generation and net revenue saved through the tri-generation technology
 - 7.9.3 Submission of report by the consulting firm to EESL including analysis of analysis of tri-generation technology
 - 7.9.4 Discussion between EESL and sites owners to finalize whether or not to proceed with feasibility study

- 7.10 Feasibility study to finalize the potential of tri-generation and benefits of tri-generation for the sites
- 7.10.1 Hiring of a consultancy firm by EESL to conduct feasibility study on the sites finalized post prefeasibility study at the sites finalized by EESL.
 - 7.10.2 Preparation of DPR including the following
 - *Hourly energy demand of the building (kW)*
 - *Hourly cooling demand of the building (TR)*
 - *Hourly hot water requirement of the building*
 - *Hourly energy required in the building lighting system, air conditioning system and others energy consuming equipment.*
 - *Hourly loading (%) of the gas engine*
 - *Natural gas required to meet the energy requirement of the building*
 - *Cooling generated by VAM and cooling generated by electrical chiller*
 - *Energy saving potential through trigeneration*
 - *Net revenue saved through the trigeneration technology*
 - *Trigeneration schematic showing the installation location and distribution network across the building*
 - *Development of the Business model to establish the project IRR and value for customer for 15 years*
 - *Detail specification of various components of trigeneration technology*
 - *Preparation of implementation schedule highlighting various phases like procurement, supply, installation, testing and commissioning of trigeneration technology.*
 - 7.10.3 Design of MRV system to monitor the performance of Trigeneration system as per IPMVP
 - 7.10.4 Submission of DPR including the MRV system by the consulting firm to EESL
 - 7.10.5 Discussion between EESL and sites owners to finalize whether to go ahead with implementation or not.
- 7.11 Procurement of tri-generation contractor for the supply, installation, testing and commissioning of trigeneration system
- 7.11.1 Global review of the experiences with tenders developed for the procurement of trigeneration integrator
 - 7.11.2 Meetings with trigeneration integrators to understand the services provided by them
 - 7.11.3 Preparation of tender documents by EESL including the detail specification of various trigeneration components and efficiency of various components, services to be provided by the integrator (supply, installation, testing and commissioning, post installation operation and Maintenance), implementation schedule, penalty criteria in case the systems doesn't meet the efficiency requirements and MRV system for trigeneration system.
- 7.12 Facilitation in development of regulations for Tri-generation technology
- 7.12.1 Discussion with policy makers to integrate trigeneration as one of the energy efficient technology options in building codes and smart city framework
 - 7.12.2 Discussion with State Electricity Regulatory Commission and Central Electricity Regulatory Commission for developing the framework for feed-in-tariff for trigeneration systems

OUTPUT 8: TRI-GENERATION INVESTMENTS (ADB led)

The activities under Output 8 related to Tri-generation are the following:

- 8.3 Tender inviting bids from the tri-generation integrators for the implementation of tri-generation technology
- 8.3.1 Tenders will be floated by the EESL for inviting bids from the tri-generation integrators
 - 8.3.2 The technical bids received will be evaluated by the EESL as per the requirements mentioned in the tender
 - 8.3.3 The bids qualified for financial evaluation shall be opened to calculate the financial score
 - 8.3.4 The bid with maximum score (technical and financial) will be awarded with the project
- 8.4 Supply, Installation, Testing and Commissioning of Tri-generation system
- 8.4.1 Tri-generation integrator will supply, install, test and commission the tri-generation system at the site as per the schedule mentioned in the tender document
 - 8.4.2 Implementation of MRV system as per the MRV system proposed in DPR

OUTPUT 9: FINANCIAL AND ENERGY SAVINGS PERFORMANCE OF TRIGENERATION INVESTMENTS MONITORED, MEASURED AND REPORTED (UNEP led)

The activities under Output 9 related to Tri-generation are the following:

- 9.4 Hiring of a consultancy firm to conduct the MRV for the trigeneration system
- 9.5 The consulting firm shall conduct the MRV activities as per the MRV developed for the trigeneration system.
- 9.6 Submission of MRV report to EESL highlighting any deviation in the actual performance and desired performance of trigeneration system

OUTPUT 10: NEW ESCO BUSINESS MODELS FOR TRI-GENERATION VALIDATED (UNEP led)

The activities under Output 10 related to Tri-generation are the following:

- 10.3 The consultancy firm hired for the MRV will validate the performance of trigeneration technology by establishing the following based on the data collected
 - *Calculation of building energy demand, cooling demand and hot water demand*
 - *Calculation of energy consumed by the building and in different systems like lighting, air conditioning and others*
 - *Calculation of amount of electricity generated*
 - *Calculation of Cooling generated by VAM and cooling generated by electrical chiller*
 - *Evaluation of the performance of gas engine, VAM and other supporting auxiliaries*
- 10.4 The viability of the Trigeneration technology shall be assessed by establishing the following
 - *Energy saving potential through trigeneration*
 - *Net revenue saved through the trigeneration technology*
 - *Project IRR and monetary benefits to the building owners*
 - *Availability of the technology providers and technology integrators*
 - *Availability of gas*

- 10.5 Recommendations on the viability of tri-generation technology from the above assessment shall be presented to EESL

SMART GRID (OUTPUT 7, 8, 9, 10)

This component aims to help EESL to diversify its business into energy savings contracting for Smart Grids. EESL has an important role to play here to transform the market. EESL with its presence can help to develop comprehensive policy framework for Smart Grids in India, which would be an ultimate driver including the following components:

- Standardization in creating the guidelines for the definition of Information Sharing groups within Smart Grids
- Design component to include interoperability so that the fast-evolving Smart Grid is prevented from a catastrophic cyber-attack
- Triggering a market mechanism for the players in the supply/value chain and many other components.

For Smart Grids under this component, EESL will act as the front face for the DISCOM, acting as the system integrator through procurement of the entire setup (software, hardware, and supporting infrastructure) through technology providers via a procurement process. For the same, specifications will be finalized after careful considerations and learnings from pilot projects and also from experiences of EESL's own ongoing projects in this area.

As mentioned in the baseline, EESL will do an energy savings contract with the DISCOM and a back-to-back agreement with the technology provider/system integrator, and the modus operandi for the DISCOM would be to take actions on triggers/alerts generated by the implemented system.

To start with, EESL will do a pilot project demonstration (discussions have already taken place with 2 utilities in Delhi; both have shown considerable amount of interest) with the selected utility. Procurement model to be similar with the existing ones for lighting, as EESL will firstly try to give a comprehensive one-stop solution to the entire scope and secondly, bring down the prices by bulk procurement. Specific expected outputs and the respective activities to achieve those are listed below:

The outputs of this component have been explained separately for different technologies and are explained below in 2 phases.

OUTPUT 7: STANDARDS AND SPECIFICATIONS FOR TECHNOLOGY TENDERS DEVELOPED (PRE-INVESTMENT) (UNEP led)

The activities under Output 7 related to Smart Grids are the following:

The activities to be implemented under output 7 are listed below and will be repeated for Phase 1 and Phase 2.

7.13 Identification and Finalization of the Client

7.13.1 Identification of DISCOMs based on a weighted ranking system comprising of following selection criteria:

- *Targets of reduction in AT&C losses*
- *Status of load research studies, DSM action plan and established DSM cell*

- Existing investment in energy efficiency related activities in the last 3-4 years
- Existing projects in the area of Smart Grids

7.13.2 Development and use of the weighted ranking system

7.13.3 Dissemination of results from the weighted ranking system in a forum comprising of utilities

7.13.4 Consent form followed by first-come, first-served basis or as decided by the competent authorities

7.13.5 Signing of Memorandum of Understanding (MoU) by EESL with DISCOM

7.13.6 Signing of Non-Disclosure Agreement (NDA)

7.13.7 Macro level secondary data analysis

7.13.8 Feasibility report based on the above analysis

7.14 Prepare list of key technology /equipment suppliers, system integrators along with an assessment of their abilities to provide warranty, servicing and maintenance support

7.15 Proposal making process

7.15.1 Primary data collection (sample monitoring and feeders)

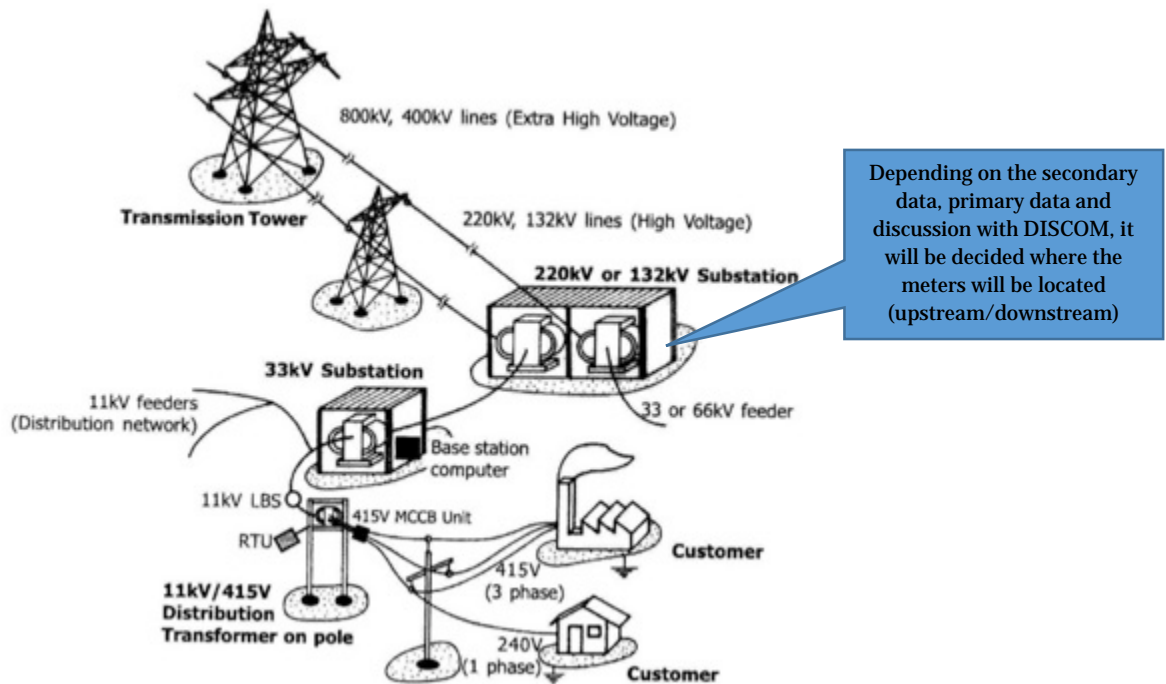


FIGURE 14 – METERS LOCATION

7.15.2 Initiate consumer indexing like consumer categories, number of consumers, number of distribution transformers catering to consumer categories, etc.

7.15.3 Select the project location with highest losses and good replicability characteristics

7.15.4 Undertake a GIS survey, map the area, tag the assets digitally

7.15.5 Estimation of network conditions and AT&C losses

7.15.6 Finalizing the technical specifications

- For this activity, project will support formation of technical committee whose role will be to review and recommend technical specifications for Smart Grids

- *Committee will comprise of representatives from major equipment manufacturers, IITs, EESL, Government of India, BIS, NABL accredited laboratories, any other as deemed fit*
- *Specifications developed from this activity will be sent to BIS for vetting. The same will be used in Phase 2 of the Smart Grid implementation*

7.15.7 Define a project plan (staffing, technology (meters), system integrator, network operating centre, hardware, software)

7.15.8 Development of Detailed Project Report (DPR)

7.16. Negotiation and Contract

7.16.1 Discussion and agreement on the DPR by the DISCOM

7.16.2 Development of the business model

7.16.3 Negotiation with the identified DISCOM

7.16.4 Signing of contract

7.16.5 Procurement of the respective technology

OUTPUT 8 –SMART GRID INVESTMENTS (ADB led)

The activities under Output 8 related to Smart Grids are the following:

8.5 Smart Grid turn-key contracts delivered

8.5.1 Development of draft procurement specifications to select the system integrator/technology provider (technical specifications of meters, system integrator, network operating centre, hardware and software provider)

8.5.2 Invitation of bids as per finalized procurement specifications

8.5.3 Bid management and selection of winning bid

8.5.4 Signing of contract between EESL and the selected technology provider (system integrator)

8.5.5 Installing and commissioning

8.5.6 Operations and maintenance

OUTPUT 9: FINANCIAL AND ENERGY SAVINGS PERFORMANCE OF SMART GRID INVESTMENTS MONITORED, MEASURED AND REPORTED (UNEP led)

The activities under Output 9 related to Smart Grids are the following:

9.7 MRV for monetization of energy savings benefits

9.7.1. Finalization of MRV framework in discussion with the relevant stakeholders

9.7.2. Finalization of data collection methodology (survey, questionnaire, interviews, calculation methodology and sharing mechanism)

9.7.3. Third party verification of meters on sample basis

The activities shall result in verified financial and energy savings performances for the projects under this technology. The results will justify the assumptions considered under the deemed savings approach for business models of EESL.

OUTPUT 10: IMPACT ASSESSMENT & RECOMMENDATIONS (UNEP led)

The business models for the identified new technologies have been illustrated in this project document. These business models have been prepared considering the ongoing project operations of EESL and the inputs received from technology stakeholders during the PPG phase. During the implementation phase, it would be important for the project management team to validate these business models using the real-time information from the technology suppliers such as cost of equipment, finalised project location, project size, benefits to the consumer /facility owner etc. Based on each finalised project location detailed project reports shall be prepared. These reports shall provide the technical and financial viability for the projects based on which tender documents for each technology specific project shall be prepared.

The activities under Output 10 related to Smart Grids are the following:

10.6 Assessment of Success factors so that the expected results are achieved

10.6.1. Area specific AT&C losses reduction: analysis of the collected data on monthly/quarterly/yearly basis

10.6.2. Study on cost effectiveness of SG projects (comparison of utility investment vs EESL investment)

10.6.3. Assessment on power shortage, power failure rates, unscheduled outages, un-accounted areas of losses

10.7 Re-assessment of baseline after 2-3 years

In this phase, key learning from Phase 1 will be used to refine the same set of activities in Phase 2. Key considerations in this would be the value add to be taken to the next phase and further replication and scaling-up, which are as follows:

- *Standardization of technical/procurement specifications*
- *Validation of the deemed savings approach through actual savings*
- *Developing interest of System Integrators / Technology Providers for this kind of proposition*
- *Able to build the capacity of the DISCOM operator*
- *Establishment of the business model*
- *Development of successful case studies for further replication*

10.8 Identifying and operationalising lessons learned from Phase 1 to Phase 2

COMPONENT 3 - REPLICATION AND SCALING-UP

GEF TF: USD 1,742,155

Co-Financing: USD 2,000,000

TABLE 24 - COMPONENT 3 - FUNDING DETAILS

Financing Type	Trust Fund Contribution (USD)	Co-financing Contribution (USD)
Technical Assistance	1,742,155	2,000,000
Total	1,742,155	2,000,000
Source of Co-finance (USD)		
Source of Fund	Co-financing amount (USD)	
TA co-financed by EESL	2,000,000	
Total Co-Finance	2,000,000	

Expected Outcomes: Enabling conditions created to support EESL growth strategy targeting USD 300 million in investments across all 7 technologies (SL, DL, Super-Efficient Ceiling Fans TG, SG, 5 star ceiling fans and agricultural pumps)

This component will get funds of USD 1,742,155 from GEFTF supported by co-financing from EESL through in-kind contribution of USD 2 million.

This component is mainly TA to support EESL in developing its growth strategy targeting USD 300 million in investments across the identified 7 technologies, including process automation processes, energy savings plans and capacity-building for identified ULBs, DISCOMs, facilities owners and managers for implementation of energy savings plans; and identification of potential sources of finances for identified investment opportunities through addressing the barriers/ bottlenecks identified in baseline section.

Specific experiences gained through implementation of projects in Component 1 and 2 will be captured and documented and used to support EESL's business decisions for the future. For example, this will include a comparative review of different ESCO and energy savings models, financial and energy savings data collected through the investments under Components 1 and 2. These experiences will also lead to the revision and improvements in standards and specifications for new technology tenders.

The work will address barriers and constraints to adopt these EE technologies (building on work in the previous two Components) and support assessment and validation of a pipeline of investment projects, and financing sources for projects.

OUTPUT 11: GROWTH STRATEGY DRAFTED, BASED ON COLLECTED EXPERIENCE, LESSONS, DATA FROM COMPONENTS 1 & 2, ON ENERGY AND FINANCIAL SAVINGS AND A REVIEW OF OTHER TECHNOLOGIES EESL COULD EXPAND INTO IN THE MEDIUM TO LONG TERM (UNEP led)

Activity 11.1 Develop growth strategy modular reports (for mid-term and end of project) for DL, SL, AgPumps and ceiling fans to be included in a consolidated growth strategy for EESL

11.1.1 Develop a plan to, collate and analyse lessons learned and data (MRV data, savings and financial savings) from the DL, SL, AgPumps and 5-star ceiling fans projects in Component 1 and Super-Efficient ceiling fans in Component 2.

11.1.2 Based on the collated lessons learned and data, conduct a clear analysis of what works and what does not work in each technology, including a comparative review between the business models and a stakeholder analysis.

11.1.3 Based on the recommendations from Component 2 and upon validation by EESL, develop a workplan and budget plan to implement selected recommendations for improving the business model for each technology.

Activity 11.2 Improve quality control practices in EESL for DL, SL, AgPumps and ceiling fans technologies

11.2.1 Review and rank existing laboratories used for testing and certificate issuing for DL, SL, AgPumps and ceiling fans with a focus on accuracy and quality of service.

11.2.2 Establish a web-based network of laboratories per product.

11.2.3 Review and recommend testing procedures for the different products.

11.2.4 Review and recommend improvements on the procedures for quality assurance including sampling based on BAP.

- Activity 11.3 Build capacity of EESL staff for a sustained growth
 - 11.3.1 Summarize planned activities by EESL to assess staffing needs. (co-finance)
 - 11.3.2 Assess future EESL staff training needs and develop a costed plan for building staff capacity.
 - 11.3.3 Develop and deliver training to build staff capacity to undertake large scale projects.
 - 11.3.4 Develop a software for training needs assessment as well as schedule training programs based on requirements
 - 11.3.5 Revise the staff appraisal guidelines by providing weightage to training hours completed by the staff

- Activity 11.4 Develop growth strategy modular reports (at mid-term and end of project) for Smart Grids and Tri-generation for the project to be included in a consolidated growth strategy for EESL
 - 11.4.1 Develop a plan to, collate and analyse lessons learned and data (MRV data, savings and financial savings) from the SG and TG projects in Component 2.
 - 11.4.2 Based on the collated lessons learned and data, review the experience with these two new technologies and make decisions whether EESL will expand into these new technologies in other sectors.
 - 11.4.3 If decision is positive, produce a set of budgeted options (workplan and budget) for the optimal business models adopted for selected technologies and sectors.

- Activity 11.5 Establish agreements with service providers and audit firms
 - 11.5.1 Establish a robust network of TG aggregators and SG System Integrators for expansion.
 - 11.5.2 Empanel suitable energy audit firms to validate MRV and related energy savings models.
 - 11.5.3 Capacity building of empaneled energy audit firms, TG aggregators and SG System Integrators.

- Activity 11.6 Assess options for EESL to expand into other technologies
 - 11.6.1 Undertake an assessment, including a SWOT analysis for 5-7 additional technologies EESL could expand to.
 - 11.6.2 Based on the SWOT analysis, rank the most suitable technologies for EESL to expand.
 - 11.6.3 Upon selection and validation by EESL of the technologies to be taken forward, produce a set of recommendations for EESL, with workplan and budget, to be included in the consolidated EESL growth strategy.

- Activity 11.7 Develop a consolidated growth strategy report (at mid-term and end of project) for EESL
 - 11.7.1 Develop an outline for the growth strategy, collate all technology reports and inputs including from this component (from all relevant outputs and activities) and draft the growth strategy for EESL.
 - 11.7.2 Publish electronically the consolidated growth strategy report (at mid-term and end of project) for EESL.

OUTPUT 12. BUSINESS PROCESSES AUTOMATED AT EESL (UNEP led)

- Activity 12.1 Development of suitable application software/ module to help propagate business models for all identified technologies
 - 12.1.1 Develop a prototype of the application software/ module
 - 12.1.2 Validation of prototype of application software/ module by EESL
 - 12.1.3 Development of application software/ module

- Activity 12.2 Development of e-diary for all technologies
- 12.2.1 Finalize the data to be captured in e-diary (contact database of suppliers, vendors, expertise for example)
 - 12.2.2 Develop a prototype of the e-diary
 - 12.2.3 Validation of prototype of e-diary by EESL
 - 12.2.4 Development of e-diary
 - 12.2.5 Periodically update the information contained in e-diary
- Activity 12.3 Development of dashboards for project activities and data analytics module (monitoring progress and impact, prototype, validate by EESL and finalize)
- 12.3.1 Develop a prototype of the dashboards
 - 12.3.2 Validation of prototype of dashboards by EESL
 - 12.3.3 Development of the dashboards
- Activity 12.4 Pilot actual savings and compare with deemed savings model (only for internal purpose and analysis) for technologies where this practice is absent
- 12.4.1 Install meters on sample of data-points to assess actual energy savings
 - 12.4.2 Compare the pilot actual savings and deemed savings for the purpose of internal analysis of EESL
- Activity 12.5 Develop and maintain GEF project specific webpage (project synopsis, progress, stakeholders, GEF page, updating information on periodic basis, linking to dashboards)
- 12.5.1 Finalize the content to be displayed in the GEF project specific webpage
 - 12.5.2 Finalize the design of GEF project specific webpage
 - 12.5.3 Validation of design and content of GEF project specific webpage by EESL
 - 12.5.4 Development of GEF project specific webpage
 - 12.5.5 Periodically update the information contained in GEF project specific webpage
- Activity 12.6 Development of IT tool for prioritizing and selection of DISCOM for Smart Grid project and related analysis
- 12.6.1 Develop a prototype of IT tool
 - 12.6.2 Validation of prototype of IT tool by EESL
 - 12.6.3 Development of IT tool based on finalized prototype
 - All data on beneficiary related parameters dis-aggregated by sex

OUTPUT 13. ENERGY SAVINGS PLANS AND CAPACITY-BUILDING FOR ULBS, DISCOMS, FACILITIES OWNERS AND MANAGERS FOR IMPLEMENTATION OF ENERGY SAVINGS PLANS CONDUCTED (UNEP led)

- Activity 13.1 Develop and implement a gender inclusive plan for awareness raising and outreach of ULBs, DISCOMS, facility owners and managers, state governments, suppliers and technical providers
- 13.1.1 Based on a similar model under Output 3, design and implement a gender sensitive social marketing strategy on each of the new technologies for target consumers, ULBs, DISCOMS integrators and suppliers. This would also include communication tools and IEC content for using varied communication tools-multi-media, print, online, websites, flyers, project brochures and presentations, about multiple benefits of super-efficient ceiling fans, tri-generation and smart grids to promote and enhance demand for the technology

- 13.1.2 If necessary seek approvals from Media Advisory Committee in the Ministry of Power, Government of India.
- 13.1.3 Design and carry out a recognition program for 'good practice' pilots
- 13.1.4 Identify outreach/awareness needs and draw up a plan aligned with EESL growth strategy/identified needs per stakeholder
- 13.1.5 Identify target audiences per technologies
- 13.1.6 Develop gender inclusive outreach/awareness materials/training modules for each target audience and per technology
- 13.1.7 Identify priority regions for awareness/outreach
- 13.1.8 Develop outreach/awareness schedule
- 13.1.9 Deploy the outreach/awareness plan (co-finance)
- 13.1.10 Participate in relevant events (national/ international events)

Activity 13.2 Develop and implement a capacity building programme for of ULBs, DISCOMs, facility owners and managers, state governments, suppliers and technical providers

- 13.2.1 Identify training needs and draw up a training programme aligned with EESL growth strategy/identified needs per stakeholder group.
- 13.2.2 Identify target audiences per technology.
- 13.2.3 Develop training materials/packages for each target audience and per technology.
- 13.2.4 Identify 3-4 training agencies to be capacitated to deploy training on behalf of EESL
- 13.2.5 Conduct Training of trainers (ToT) for selected agencies
- 13.2.6 Develop training schedule, targets and cost the deployment of the 36 number of training programs in every two years and 2 national level programs (total 74 programs)
- 13.2.6 Deploy the training programme.

Activity 13.3 Develop and implement energy savings plans for ULBs

- 13.3.1 Develop energy savings plans for a 25 number of ULBs.
- 13.3.2 Develop training packages for ULBs on energy savings plans.
- 13.3.3 Deploy 2 personnel in each of selected ULBs for assisting ULBs in implementing energy savings plan

OUTPUT 14. INVESTMENT OPPORTUNITIES AND POTENTIAL SOURCES OF FINANCE IDENTIFIED / AND SCREENED FOR THE GROWTH STRATEGY (ADB led)

The business growth aspiration for EESL under this Component is USD 300 million in investments. The actions under the EERF will cover some, but not all, of the requisite resource mobilizations measures. As EESL transitions to a highly matrixed organizational structure, there will be a need to continually search for and cultivate opportunities into viable, scalable business propositions.

Activity 14.1 Building an investment pipeline

- 14.1.1 In collaboration with the EERF, support scaling up of promising opportunities in super-efficient ceiling fans, tri-generation and smart grids
- 14.1.2 Work with Urban Local Bodies and relevant government agencies to identify and qualify energy investment needs under their energy savings action plans

14.1.3 Collaborate with international energy research and development institutions to advance innovative ideas and prototypes in energy efficiency (and if possible, alternative energy). This would entail support for exploratory studies.

14.1.4 Support investment round table meetings with industry associations and business organizations, energy sector stakeholders etc. to identify and quality potential investment opportunities

Activity 14.2 Developing project preparation facility

14.2.1 In conjunction with EERF resource mobilization activities (Output 6), support additional resource mobilization efforts for investment classes outside those covered by the EERF.

14.2.2 Establish / confirm a dedicated business development unit within EESL, aligned with the business growth strategy, and staffed by qualified professionals that have appropriate finance, business and technical expertise.

14.2.3 Assess the global financial ecosystem for energy efficiency and identify a diverse range of potential public and private funding / investment sources (linked with activities under Output 6).

14.2.4 As part of the growth strategy, develop a strategic approach for each class of funder, supplemented by development of customized investment prospectus and templates.

A.1.4 INCREMENTAL/ADDITIONAL COST REASONING AND EXPECTED CONTRIBUTIONS FROM THE BASELINE, THE GEFTF, LDCF, SCCF, AND CO-FINANCING

The ESCO model employed in this project assumes that the installation and operation of all 7 energy efficient technologies will yield both energy and financial savings, with varying payback periods as detailed elsewhere in the document. Therefore, under stable economic conditions these technologies should have been adopted in a free market already. The degree of market penetration varies according to technology, again this detailed elsewhere in the document, but the aim of this project is to speed up that market penetration by removing barriers identified in the baseline preventing or slowing the rates of up take. EESL will act as the main driver to promote rapid uptake of the 7 technologies.

Under component 1, EESL will use the project to scale up penetration of street lighting, domestic lighting, agricultural pumps and 5-star ceiling fans. With these technologies (with the exception of 5-star ceiling fans), EESL has a proven business model and experience. Under this component, the ADB loan will provide EESL (together with its own co-financing), to expand their levels of penetration with these technologies and strengthen its bottom line for future business.

In component 2, EESL will be pilot testing new technologies with the aim of gaining market experience in these new areas, allowing them to assess the viability of these technologies and their business models options to include these technologies as core areas of these businesses in the future. GEF funding will there be used as risk capital to help EESL gain this experience. The GEF will finance the incremental costs of technical assistance in developing and refining EESL's business in these areas, and provide USD 13 million in grant to leverage USD 31.2 million from KfW as debt to invest in these mentioned new technologies. The project will take EESL into new energy efficient and high impact business ventures, which it would otherwise not enter into; without the risk capital.

Recognising that EESL is the market driver for these technologies, and further recognising the rapid growth that EESL has been under-going, component 3 aims to consolidate EESL combined project (and non-project) experiences to position itself for future continued growth. By helping EESL to make the right business model and technology choices, will be to help them secure a strong business future, and therefore a strong market driver for these technologies.

A.1.5 GLOBAL ENVIRONMENTAL BENEFITS (GEFTF) AND/OR ADAPTATION BENEFITS (LDCF/SCCF)

This GEF project would contribute towards global environmental benefits by reducing the GHG emissions. The implementation of energy efficient technology through this project will lead to energy savings which will further contribute towards GHG emission reduction. This section provides an estimate of the avoided and reduced amount of GHG emissions resulting out of this project.

Summary of overall Direct GHG emission savings

Indicative calculations show that the project will allow for more than 10.5 million tCO_{2eq} of direct emissions reductions by the end of project implementation (year 2022), and over 37.9 million CO_{2eq} 10 years after the end of the project (year 2032) – the latter figure leading to a cost effectiveness ratio of 0.497 US dollars per CO_{2eq} mitigated. A summary of direct GHG emission reductions per technology and per period is provided in the table below:

TABLE 25 - DIRECT GHG REDUCTION ESTIMATES

Technology	In tonnes of CO _{2eq}		
	Direct GHG savings by 2022 ⁵⁰	Direct GHG savings between 2023 and 2032	Total Direct GHG savings by 2032 ⁵¹
Domestic lighting	6,340,219	14,793,844	21,134,063
Street Lighting	1,241,832	2,897,613	4,139,445
BEE 5 Star Ceiling Fans	380,106	886,913	1,267,018
Agricultural Pumps	2,293,573	7,645,287	9,938,860
Super-Efficient Ceiling Fan	245,014	571,700	816,713
Smart Grid	42,123	421,227	463,349
Tri-generation	13,215	132,155	145,370
Grand Total	10,556,082	27,348,738	37,904,820

The detailed calculations supporting the results presented in Table 25 above is given in Annex J-2 of the CEO Endorsement Document.

Summary of overall Indirect GHG emission savings

Indicative calculations show that the project will allow for more than 22.35 million tCO_{2eq} of indirect emissions reductions 10 years after the end of the project (year 2032).

⁵⁰ End-of-project targets

⁵¹ End of the considered “Analysis period” (i.e. 10 years after the end of the project)

TABLE 26 - INDIRECT GHG REDUCTION ESTIMATES

Technology	In tonnes of CO ₂ eq
	Indirect GHG savings by 2032
Domestic lighting	11,250,767
Street Lighting	5,291,327
BEE 5 Star Ceiling Fans	1,381,738
Agricultural Pumps	2,747,923
Super-Efficient Ceiling Fan	572,996
Smart Grid	842,460
Tri-generation	264,300
Grand Total	22,351,511

Further details on the assumption supporting the indirect GHG emission reductions are provided in the next paragraphs.

Detailed description of the GHG emissions savings

As explained in the previous sections, Component 1 contributes through investments in energy efficient domestic lighting, street lighting, BEE 5 star ceiling fans and agricultural pumps, whereas Component 2 contributes through the investments in super energy efficient ceiling fans, smart grid and trigeneration technologies.

In order to estimate the Direct GHG emission savings, the following implementation schedule was considered for the 7 categories of technologies:

TABLE 27 - TECHNOLOGY IMPLEMENTATION SCHEDULE

Technology	2018	2019	2020	2021	2022	Total
Domestic Lighting	7,955,259	7,955,259	7,955,259	7,955,259	7,955,257	39,776,293
Street lighting	301,188	301,188	301,188	301,188	301,190	1,505,942
Agricultural Pumps	45,906	45,906	45,906	45,906	45,908	229,532
BEE 5 Star Ceiling fans	425,660	425,660	425,660	425,660	425,658	2,128,298
Super efficient Ceiling fans	156,787	156,787	156,787	156,787	156,789	783,937
Smart Grid facility	0	0	0	0	1	1
Tri-generation facility	0	0	0	0	1	1

For the 5 first appliances-type of technologies, it was assumed that 20% of total units would be implemented every year – starting year 2018. As for the Smart Grid and the Tri-generation pilot projects, it is assumed they will be commissioned and fully operational during year 5 of the project (i.e. 2022).

For all calculations performed, the following assumptions have been considered:

TABLE 28 – KEY PARAMETERS

Parameter	Assumption
Project “analysis period”	10 years following end of implementation (i.e. up to 2032)
Average grid T&D loss rate	21 % ⁵²
Average grid emission factor	0.82 tCO ₂ /MWh ⁵³

⁵² Source: CEA report, 2015

⁵³ Source: CO₂ baseline data, CEA

The following paragraphs describe the global environmental benefits for each of the 7 technologies promoted through the project:

Domestic lighting

The overall budget for LED domestic lights is US\$ 56.86 million which would allow for the procurement and installation 39,776,293 units domestic LED lights. The following table provides the key assumptions and parameters that were considered to estimate the GHG emission reductions:

TABLE 29 - CALCULATION PARAMETERS/ASSUMPTIONS FOR DOMESTIC LIGHTING

Parameters	Value	Unit
Power rating of conventional domestic lamp	60	Watt
Power rating of LED domestic lamp	9	Watt
Power saved per LED domestic lamp	51	Watt
Operating hours per day	3.5	Hours
Number of operating days in a year	300	Days
Energy saved per year per lamp	53.55	kWh/yr
Annual CO ₂ saved per LED lamp	0.0439	tonnes/year
Number of LED lamps distributed	39,776,293	Units
Life of Domestic LED	10	Years

Based on the above assumptions and on the implementation schedule provided earlier, the replacement of conventional domestic lighting by LED lighting will allow for 6,340,219 tCO_{2eq} of direct emissions reductions by the end of project implementation (year 2022), and 14,793,844 tCO_{2eq} 10 years after the end of the project (by year 2032).

Regarding indirect benefits, it is assumed that another 0.5% of EESL's objective in terms of domestic LED lighting replacement is achieved each year after project completion (i.e. +3.85 million LED lamps per year between 2023 and 2032). These would account for 11,250,767 tCO_{2eq} of indirect emissions reductions 10 years after the end of the project (by year 2032).

Street lighting

For estimating the emissions reduction from street lighting project, a sample project of 25,000 street light were considered, which varied in terms of their wattages and LED replacement. The details of the sample street lighting project is provided in the table below:

TABLE 30 - SAMPLE ANALYSIS FOR STREET LIGHTING

Sr. No.	Particulars of existing street light	Numbers	Wattage (W)	Losses (W)	TOTAL Power (W)	Proposed LED Equivalent (W)
1	100 W ICL	3,600	100	-	110	12
2	40 W FTL	10,200	40	12	52	20
3	40 W DFTL	2,400	80	24	104	40
4	HPSV-70 W	3,600	70	15	85	40
5	HPSV-150 W	2,300	150	20	170	72
6	HPSV-250 W	2,100	250	25	275	120
7	HPSV-400 W	550	400	25	425	200
8	MH - 400 W	250	400	25	425	200
	Total	25,000				

The overall budget for LED street lights technology is US\$ 139.65 million, which would allow for the procurement and installation of 1,505,942 units of LED street lights. The following table provides the key assumptions and parameters that were considered to estimate the GHG emission reductions:

TABLE 31 - CALCULATION PARAMETERS/ASSUMPTIONS FOR STREET LIGHTING

Parameters	Value	Unit
Average power rating of conventional street lamp	112	Watt
Average power rating of LED street lamp	43	Watt
Power saved per LED street lamp	69	Watt
Operating hours per day	11	Hours
Number of operating days in a year	365	Days
Average energy saved for unit street light per year	277	kWh /yr
Annual CO ₂ saved per street light	0.227	tonnes/year
Number of Street lights under this project	1,505,942	Units
Life of LED street light	10	Years

Based on the above assumptions and on the implementation schedule provided earlier, the replacement of conventional street lighting by LED lighting will allow for 1,241,832 tCO_{2eq} of direct emissions reductions by the end of project implementation (year 2022), and 2,897,613 tCO_{2eq} 10 years after the end of the project (by year 2032).

Regarding indirect benefits, it is assumed that another 1% of EESL's objective in terms of street LED lighting replacement is achieved each year after project completion (i.e. +350,000 LED lamps per year between 2023 and 2032). These would account for 5,291,327 tCO_{2eq} of indirect emissions reductions 10 years after the end of the project (by year 2032).

BEE 5 Star Ceiling Fans

The overall budget for BEE 5 Star ceiling fans technology is US\$ 31.92 million, which would allow for the procurement and installation of 2,128,298 units of BEE 5 Star ceiling fans. The following table provides the key assumptions and parameters that were considered to estimate the GHG emission reductions:

TABLE 32 - CALCULATION PARAMETERS/ASSUMPTIONS FOR BEE 5 STAR CEILING FANS

Parameters	Value	Unit
Power rating of conventional ceiling fan	70	W
Power rating of BEE 5 Star ceiling fan	50	W
Power saved per ceiling fan	20	W
Operating hours per day	10	Hours
Number of operating days in a year	300	Days
Energy saved per year per fan	60	kWh/yr
Annual CO ₂ saved per ceiling fan	0.0492	tonnes/year
Number of BEE 5 star ceiling fans under this project	2,128,298	Units
Life of a BEE 5 Star ceiling fan	10	Years

Based on the above assumptions and on the implementation schedule provided earlier, the replacement of conventional fans by BEE 5-star ceiling fans will allow for 380,106 tCO_{2eq} of direct emissions reductions by the end of project implementation (year 2022), and 866,913 tCO_{2eq} 10 years after the end of the project (by year 2032).

Regarding indirect benefits, it is assumed that another 1% of EESL’s objective in terms of BEE 5-star ceiling fans replacement is achieved each year after project completion (i.e. +422,000 BEE 5 star ceiling fans per year between 2023 and 2032). These would account for 1,381,738 tCO_{2eq} of indirect emissions reductions 10 years after the end of the project (by year 2032).

Agricultural Pumps

The overall budget for agricultural pumps technology is US\$ 171.57 million, which would allow for the procurement and installation of 229,532 units of efficient agricultural pumps. The following table provides the key assumptions and parameters that were considered to estimate the GHG emission reductions:

TABLE 33 - CALCULATION PARAMETERS/ASSUMPTIONS FOR AGRICULTURAL PUMPS

Parameters	Value	Unit
Power rating of conventional agricultural pumps	7.5 / 5,995	hp / W
Average existing system efficiency	60	%
Power rating of energy efficient agricultural pumps	5 / 3,730	hp / W
Operating hours per day per agricultural pump	6	Hours
Number of days in a year	300	Nos.
Energy saved per agricultural pump per year	4,500	kWh/yr
Annual CO2 saved per agricultural pumps	3.69	tonnes/year
Number of agricultural pumps under this project	229,532	Units
Life of agricultural pumps	15	years

Based on the above assumptions and on the implementation schedule provided earlier, the replacement of conventional pumps by efficient agricultural pumps will allow for 2,293,573 tCO_{2eq} of direct emissions reductions by the end of project implementation (year 2022), and 7,645,287 tCO_{2eq} 10 years after the end of the project (by year 2032).

Regarding indirect benefits, it is assumed that another 1% of EESL’s objective in terms of agricultural pumps replacement is achieved each year after project completion (i.e. +15,000 pumps per year between 2023 and 2032). These would account for 2,747,923 tCO_{2eq} of indirect emissions reductions 10 years after the end of the project (by year 2032).

Super-Efficient Ceiling Fans

In order to estimate the quantity of ceiling fans to be procured, the following assumptions and cost have been considered:

TABLE 34 - ASSUMPTIONS FOR SUPER EFFICIENT CEILING FANS

	Unit	Value
Proportion of Commercial Consumer	%	60
Proportion of Domestic Consumer	%	40
Capital Cost of Super-efficient ceiling fan	USD	26.8
Buy back discount	USD	3.03

Based on the type of business models, below is the distribution of super-efficient ceiling fans:

TABLE 35 - DIFFERENT BUSINESS MODELS FOR SUPER EFFICIENT CEILING FANS

Type of Business model	Proportion	Capital Expense (USD)	Total Ceiling Fan	Assumption
Commercial Consumer paying upfront	42%	26.78	329,254	70% of commercial consumer will be covered via this business model
Commercial consumer paying upfront with Buy-back provision	18%	23.75	141,109	30% of commercial consumer will be covered via this business model
Domestic Consumer Paying upfront	24%	26.78	188,145	60% of domestic consumer will be covered via this business model
Domestic Consumer Paying through On-bill recovery	16%	26.78	125,430	40% of domestic consumer will be covered via this business model

Based on the above and given the fact that the overall budget for super-efficient fan technology is US\$ 21 million, this would allow for the procurement and installation of 783,937 units of super-efficient ceiling fans. The following table provides the key assumptions and parameters that were considered to estimate the GHG emission reductions:

TABLE 36 - CALCULATION PARAMETERS/ASSUMPTIONS FOR SUPER EFFICIENT CEILING FANS

Parameters	Value	Unit
Power rating of conventional ceiling fan	70	W
Power rating of super-efficient ceiling fan	35	W
Power saved per ceiling fan	35	W
Operating hours per day	10	Hours
Number of operating days in a year	300	Days
Energy saved per fan per year	105	kWh/yr
Annual CO2 saved per ceiling fan	0.0861	tonnes/year
Number of SE ceiling fans under this project	783,937	Units
Life of super energy efficient ceiling fans	10	Years

Based on the above assumptions and on the implementation schedule provided earlier, the replacement of conventional fans by super-efficient ceiling fans will allow for 245,014 tCO_{2eq} of direct emissions reductions by the end of project implementation (year 2022), and 571,700 tCO_{2eq} 10 years after the end of the project (by year 2032).

Regarding indirect benefits, based on the lessons learned from the project, it is assumed that EESL's is able achieve a replacement rate of 100,000 super-efficient ceiling fans per year after project completion (i.e. +100,000 super-efficient fans per year between 2023 and 2032). These would account for 572,996 tCO_{2eq} of indirect emissions reductions 10 years after the end of the project (by year 2032).

Smart Grid pilot

The estimate for GHG emission reduction for the Smart Grid pilot project is provided in the table below. The calculations are based on the assumption that the activities and investment of this project will reduce technical and commercial losses in India. Also, to consider a conservative approach for estimation, it is assumed that the GHG savings will be realised only in the last year of this GEF project, when the Smart Grid pilot is

commissioned and fully operational. The following table provides the key assumptions and parameters that were considered to estimate the GHG emission reductions⁵⁴:

TABLE 37 - CALCULATION PARAMETERS/ASSUMPTIONS FOR SMART GRID

Parameters	Value	Unit
Average load per consumer	3.30	kW
Total no. of consumers	88,050	Consumers
Total consumer load	290,780	kW
Existing AT&C losses	30%	
AT&C losses after implementation of smart grid measure	25%	
Annual usage of equipment (8 hours / day for 365 days)	2,920	Hours
Total energy saved per year	42,453,807	kWh/yr
Life of Smart Grid technology	15	Years

Based on the above parameters and assumptions, the Smart Grid pilot project will allow for 42,123 tCO_{2eq} of direct emissions reductions by the end of project implementation (year 2022), and 421,227 CO_{2eq} 10 years after the end of the project (by year 2032).

Regarding indirect benefits, it is assumed that 4 additional Smart Grid projects of the same size will be commissioned in India 5 years after project's completion. These would account for 842,460 tCO_{2eq} of indirect emissions reductions 10 years after the end of the project (by year 2032).

Tri-generation pilot

Size of tri-generation projects under GEF program

The total funding available under the project from tri-generation technology is USD 9.2 million. Considering the cost of 1 MW tri-generation system as USD 0.75 million, the total size of tri-generation that could be installed under GEF program is approximately 12.27 MW. The typical size of a tri-generation facility varies from 2 MW to 5 MW. The decision on actual number of projects to be implemented will be taken at a later stage. For the purpose of this proposal, the conservative assumption of having only one 12.5 MW facility implemented by the end of the 4th year of the project has been considered.

GHG emission reduction through Tri-generation

Similarly, to the approach followed for smart grid technology, it was assumed that the GHG savings would be only realized in the last year of the project's implementation, when the Tri-generation pilot is commissioned and fully operational. The calculations are based on the discussion with technology provider. The following table provides the key assumptions and parameters that were considered to estimate the GHG emission reductions:

TABLE 38 - CALCULATION PARAMETERS/ASSUMPTIONS FOR TRI-GENERATION

S. No.	Description	Unit	Tri-generation	Conventional system
1	Genset rating	kWe	1,000	-
2	Operating hours/year	Hrs/year	8,000	8,000
3	Power requirement including chillers + Auxiliary	kWe	875	1,025
4	Chilling requirement	TR	275	275

⁵⁴ The calculations are based on the energy savings coming from smart grid pilot by West Bengal State Electricity Distribution Company (WBSEDCL)

S. No.	Description	Unit	Tri-generation	Conventional system
5	Engine Loading	-	88	-
6	Units generation/consumption per year	kWh/year	13,319,361	-
7	Energy savings	kWh/year	13,319,361	-
9	CO2 emission reduction per MW of tri-generation	tonnes	10,922	-
10	CO2 emission reduction per MW of tri-generation (factoring in the grid T&D loss rate)	tonnes	13,215	-
11	Total size of tri-generation	MW	12.5	-
12	Life of Tri-generation plant	years	20	-

Based on the above parameters and assumptions, the tri-generation pilot project will allow for 13,215 tCO_{2eq} of direct emissions reductions by the end of project implementation (year 2022), and 132,155 CO_{2eq} 10 years after the end of the project (year 2032).

Regarding indirect benefits, it is assumed that 4 additional Tri-generation projects of the same size will be commissioned in India 5 years after project's completion. These would account for 264,300 tCO_{2eq} of indirect emissions reductions 10 years after the end of the project (by year 2032).

A.1.6 INNOVATION, SUSTAINABILITY AND POTENTIAL FOR SCALING UP

This project features an innovative mix of technical assistance and investment grant for demonstration along with equity/loan for existing technologies to ***scale-up***. A part of the funding will also be used as equity, which will have high impact as more co-financing could be leveraged, particularly because of the significant co-financing attached to the baseline projects. It will be transformative in the sense that it seeks to address key issues in energy demand management, which will be accompanied by parallel changes in consumer behaviour over the long term. Multiple benefit streams will be stimulated, which include real ***GHG emissions reduction, increase in ESCO operational effectiveness*** to support energy markets, ***enhanced awareness of energy efficiency*** at various levels in the energy value chain, and ***create the enabling conditions for high impact scaling up***. The project is being envisaged as the game changer in the space, owing to the following:

- 1. ESCO based business models have been tested for few technologies by EESL in the past. However, the scale of operations has been very limited. Considering the country's target and roadmap for clean energy / energy efficiency, this project will prove to be a test bed to successfully implement similar projects at large scale.*
- 2. Secondly, through component 2, this project will produce business models for those technologies which have not been explored yet. Through the planned pilots for the new technologies, project is targeting to solve some of the most critical problems being faced at the moment, by the largest democracy in the world.*

Overall, this project of market development and policy support will provide an even larger platform to spread the established business case in order to support the national energy efficiency programmes, ultimately achieving ***environment sustainability*** which is the need of the hour.

One of the biggest contribution from this project would be to have a defined nomenclature i.e. defined specifications and standards for each of the technology.

EESL, through this project, will emphasise on implementing projects and programmes to promote clean energy/energy efficient technologies through *innovative policy based business model* among end users.

Work under Component 1, linked to the ADB loan project, will help put India on a low carbon path, with local governments taking the lead as early adopters. Central government, State governments and ULBs can develop economic policy instruments to assist the owners of assets of existing technologies to overcome any barriers to scaling up. Furthermore, re-consideration and development of new standards for the existing technologies can form one element of a much broader “*Smart Cities*” initiative.

The project will strengthen EESL capabilities to invest in its core business and expand / diversify business lines into three new market segments, namely, super-efficient ceiling fans, tri-generation and smart grid. With a strong financial position and corresponding business models, EESL is likely to become a primary driver for energy efficiency investments in India. All profits generated by EESL after loan repayments will be re-invested in their energy savings business through *Energy Efficiency Revolving Fund* (EERF).

Applying an ESCO based model to tri-generation and smart grid technologies require innovation and risk. Under the Component 2, project will be able to demonstrate *innovative and workable models under the identified new technologies* and respective business case for their further replication and sustenance.

To mitigate the risks, EESL would venture into these new sectors only if its financial risk is contained. However, the potential savings from tri-generation and smart grid technology are significant. The Indian power sector has on average 30% aggregate technical and commercial losses with a potential for reduction, down to around 8%⁵⁵. For tri-generation the market size is between 5,000 and 13,000 MW with a savings potential of 55%⁵⁶.

Under the Component 3, project will contribute towards the standardization/automation of processes, adherence to best-in-class standards, adoption of internationally benchmarked technical specifications, streamlining the entire project management methodology, and ultimately identification of **5-7 new technologies** to further venture into, to meet the long-term objectives of the country. Outcomes from this component will provide a long-term impact on the existing business/energy landscape and future policy interventions, as the baseline will be changed based on the results at the end of tenure of this project.

EESL has implemented energy efficiency programs in domestic and street lighting, buildings, agriculture, etc., at a scale, which no organization has been able to achieve. The growth of the company during FY 2015-16 has been 10 times in terms of turnover as compared to FY 2014-15. The growth is built on careful design of projects in consultation with stakeholders, robust business models, structured strategy of market aggregation, transparency in operations, addressing barriers for different programs and a professional team of dedicated officers. With financial, technical and project management support through this project, EESL aims to unlock the energy efficiency (EE) and demand side management (DSM) market valued at Rs. 1.5 Lakh crore⁵⁷, and further implement large-scale EE projects and also trigger similar buzz in the market for others to participate. It seeks to create market access, implement innovative business models, handhold private sector Energy Service Companies (ESCOs) in an effort to ensure **replication**.

⁵⁵ Source: Internal Research

⁵⁶ Source: Internal Research

⁵⁷ Source: EESL

A.2. CHILD PROJECT

If this is a child project under a program, describe how the components contribute to the overall program impact.

Not applicable

A.3. STAKEHOLDERS

Will project design include the participation of relevant stakeholders from [civil society](#) and [indigenous people](#)? (yes /no) If yes, identify key stakeholders and briefly describe how they will be engaged in project design/preparation.

Below is a description of the main stakeholders to be involved as well as their expected contributions to the project’s components/outputs for each main type of technology:

Street Lighting and Domestic Lighting

Stakeholder category	Stakeholder description	Role and expected contribution to the project
Governmental / Public institutions	Urban Local Bodies (ULB), Public Works Department (State/Central), State Municipalities	<ul style="list-style-type: none"> • Urban Local Bodies shall be partners in execution of the energy efficiency upgrade projects for LED street lighting projects, and also benefit from awareness creation and social marketing actions. • The streetlights are the infrastructure for each of the ULB which constitutes a good amount of their electricity charge. Under the proposed energy efficient measure, EESL will enter into a contract with the ULB for replacement of their existing street lights with LEDs leading to energy savings. A standard offer price would be determined based on the cost of debt, EESL’s return on equity, annual maintenance charges and monitoring & verification charges. Based on the energy savings realized, EESL will receive an annuity payment as per the determined standard offer price. • Will be contributing to Component 1 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 2 – support for signing of energy savings agreements and finalization of technical specifications ○ Output 3 – support in facilitating the gender sensitive social marketing campaign ○ Output 4 – inputs for finalization of MRV methodology ○ Output 5 – support for smooth execution of implementation of project

Stakeholder category	Stakeholder description	Role and expected contribution to the project
Distribution Companies	State DISCOMs	<ul style="list-style-type: none"> • Electricity Distribution Companies shall be partners in execution of the domestic lighting program in various states. EESL will get into an agreement with the distribution company for on-bill recovery of the LED bulb price. Under this program, EESL will distribute the bulb to the domestic consumers at a minimal upfront cost and the balance of the bulb amount will be recovered through consumer's electricity bill. EESL, based on agreement with DISCOM, will recover an annuity payment from these distribution companies. Further, these DISCOMs will recover the same from the monthly bills of their domestic consumers. • Will be contributing to Component 1 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 2 – support for signing of energy savings agreements ○ Output 3 – support in facilitating the gender sensitive social marketing campaign ○ Output 4 – inputs for finalization of MRV methodology ○ Output 5 – support for smooth execution of implementation of project
Private sector	Lighting product/equipment manufacturers, distributors, vendors and suppliers	<ul style="list-style-type: none"> • <i>These will include national and international manufacturers, vendors & suppliers for domestic lighting and street lighting projects. Various project specific vendors involved in domestic lighting and street lighting programs would be in the following categories:</i> <ul style="list-style-type: none"> ○ Vendors for LED lights and Luminaires ○ Vendors for CCMS ○ Vendors for distribution & storage of LED lamps, inventory management, marketing & awareness campaign under domestic lighting ○ Vendor for developing software for domestic lighting • Will be contributing to Component 1 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 2 – support for signing of energy savings agreements and finalization of technical specifications ○ Output 5 – support for smooth execution of implementation of project (availability of the equipment along with timely service and maintenance)
Beneficiaries	Local Communities / Consumers	<ul style="list-style-type: none"> • Will be contributing to Component 1 of the GEF project as per the following • <i>Output 3 – participating in the gender sensitive social marketing campaign (workshop/capacity building)</i>

Agricultural Pumps

Stakeholder category	Stakeholder description	Role and expected contribution to the project
Distribution Companies	State DISCOMs	<ul style="list-style-type: none"> • Electricity Distribution Companies shall be partners in execution of the AgDSM projects in various states. • Will be responsible for purchase of power, distribution and retail supply of electricity to its consumer. Also, responsible for repayment of energy savings to EESL • Will be contributing to Component 1 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 2 – support for signing of energy savings agreements ○ Output 3 – support in facilitating the gender sensitive social marketing campaign ○ Output 4 – inputs for finalization of MRV methodology ○ Output 5 – support for smooth execution of implementation of project
Governmental / Public institutions	Urban Local Bodies (ULB), Public Works Department (State/Central), State Municipalities	<ul style="list-style-type: none"> • Local Bodies shall be partners in execution of the energy efficiency upgrade projects for agricultural pumps, and also benefit from awareness creation and social marketing actions. • Will be contributing to Component 1 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 2 – support for signing of energy savings agreements and finalization of technical specifications ○ Output 3 – support in facilitating the gender sensitive social marketing campaign ○ Output 4 – inputs for finalization of MRV methodology ○ Output 5 – support for smooth execution of implementation of project
Industry Associations	Indian Pump Manufacturers' Association (IPMA)	<ul style="list-style-type: none"> • Industry associations for providing inputs on behalf of individual vendors during discussions related with pumps in India • Will be contributing to Component 1 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 2 – support for finalization of technical specifications ○ Output 4 – inputs for finalization of MRV methodology
Private sector	Energy Efficient Pump Manufacturers	<ul style="list-style-type: none"> • Responsible for supply of different varieties of energy efficient pumps • Will be contributing to Component 1 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 2 – support for signing of energy savings agreements and finalization of technical specifications ○ Output 5 – support for smooth execution of implementation of project (availability of the equipment along with timely service and maintenance)
Beneficiaries	Farmers	<ul style="list-style-type: none"> • Will be contributing to Component 1 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 3 – participating in the gender sensitive social marketing campaign (workshop/capacity building)

BEE 5 Star Ceiling Fans

Stakeholder category	Stakeholder description	Role and expected contribution to the project
Distribution Companies	State DISCOMs	<ul style="list-style-type: none"> • Electricity Distribution Companies shall be partners in execution of the energy efficient ceiling fan projects in various project locations across the country. • Will be responsible for purchase of power, distribution and retail supply of electricity to its consumer. Also, responsible for repayment of energy savings to EESL • Will be contributing to Component 1 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 2 – support for finalising the signing of energy savings agreements ○ Output 4 – inputs for finalization of MRV methodology ○ Output 3 – support in facilitating the gender sensitive social marketing campaign
Governmental / Public institutions	Urban Local Bodies (ULB), Public Works Department (State/Central), state Municipalities	<ul style="list-style-type: none"> • Local Bodies shall be partners in execution of the energy efficiency ceiling fan projects, and also benefit from awareness creation and social marketing actions. • Will be contributing to Component 1 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 2 – support for finalising the signing of energy savings agreements ○ Output 4 – inputs for finalization of MRV methodology ○ Output 3 – support in facilitating the gender sensitive social marketing campaign
Industry Associations	Indian Fan Manufacturers' Association (IFMA)	<ul style="list-style-type: none"> • Industry association for providing inputs on behalf of individual vendors during discussions related with energy efficient ceiling fans in India • Will be contributing to Component 1 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 5 – support for finalization of technical specifications ○ Output 4 – inputs for finalization of MRV methodology
Private sector	Energy Efficient Ceiling Fan Manufacturers	<ul style="list-style-type: none"> • Responsible for supply of different varieties of energy efficient ceiling fan • Will be contributing to Component 1 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 2 – support for signing of energy savings agreements and finalization of technical specifications
Beneficiaries	Consumers (Commercial and Residential)	<ul style="list-style-type: none"> • Will be contributing to Component 1 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 3 – participating in the gender sensitive social marketing campaign (workshop/capacity building)

Super-Efficient Ceiling Fans

Stakeholder category	Stakeholder description	Role and expected contribution to the project
Distribution Companies	State DISCOMs	<ul style="list-style-type: none"> • Electricity Distribution Companies shall be partners in execution of the energy efficient ceiling fan projects in various project locations across the country. • Will be responsible for purchase of power, distribution and retail supply of electricity to its consumer. Also responsible for repayment of energy savings to EESL • Will be contributing to Component 2 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 7 – support for finalising the signing of energy savings agreements ○ Output 8 – support for impact assessment /validation ○ Output 9 – inputs for finalization of MRV methodology ○ Output 10 – support in facilitating the gender sensitive social marketing campaign
Governmental / Public institutions	Urban Local Bodies (ULB), Public Works Department (State/Central), state Municipalities	<ul style="list-style-type: none"> • Local Bodies shall be partners in execution of the energy efficiency ceiling fan projects, and also benefit from awareness creation and social marketing actions. • Will be contributing to Component 2 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 7 – support for finalising the signing of energy savings agreements ○ Output 8 – support for impact assessment /validation ○ Output 9 – inputs for finalization of MRV methodology ○ Output 10 – support in facilitating the gender sensitive social marketing campaign
Industry Associations	Indian Fan Manufacturers' Association (IFMA)	<ul style="list-style-type: none"> • Industry association for providing inputs on behalf of individual vendors during discussions related with energy efficient ceiling fans in India • Will be contributing to Component 2 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 7 – support for finalization of technical specifications ○ Output 9 – inputs for finalization of MRV methodology
Private sector	Energy Efficient Ceiling Fan Manufacturers	<ul style="list-style-type: none"> • Responsible for supply of different varieties of energy efficient ceiling fan • Will be contributing to Component 2 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 7 – support for signing of energy savings agreements and finalization of technical specifications
Beneficiaries	Consumers (Commercial and Residential)	<ul style="list-style-type: none"> • Will be contributing to Component 2 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 13 – participating in the gender sensitive social marketing campaign (workshop/capacity building)

Smart Grid

Stakeholder category	Stakeholder description	Role and expected contribution to the project
Distribution Companies	State DISCOMs	<ul style="list-style-type: none"> • <i>Electricity Distribution Companies shall be partners in implementing smart grid projects in various states.</i> • Will be contributing to Component 2 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 13 – support in facilitating the gender sensitive social marketing campaign ○ Output 9 – inputs for finalization of MRV methodology ○ Output 8 – support for smooth execution of implementation of project
Private sector	<ul style="list-style-type: none"> • Manufacturers and suppliers of smart meters • Vendors for distribution & storage of smart meters 	<ul style="list-style-type: none"> • These will include manufactures, vendors & suppliers for smart meters and associated infrastructure (hardware/software) • Will be contributing to Component 2 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 7 – support for signing of energy savings agreements and finalization of technical specifications ○ Output 8 – support for smooth execution of implementation of project (availability of the equipment along with timely service and maintenance)
Strategic Advisory Groups	Power Grid Corporation of India Limited	Being the Central Transmission Utility, POWERGRID will provide guidance in implementing smart grid projects at distribution utility level.
	India Smart Grid Forum (ISGF) and India Smart Grid Task Force (ISGTF)	Being a PPP initiative of Ministry of Power, ISGF and ISGTF will provide guidance in implementation of smart grid projects drawing experience from its 10 focused working groups.

Tri-generation

Stakeholder category	Stakeholder description	Role and expected contribution to the project
Utilities	IPGCL, GAIL (gas suppliers)	<ul style="list-style-type: none"> • Gas suppliers shall partner in execution of the Tri-generation projects. • Will be responsible for supply of gas to its consumer. • Will share information on gas prices with EESL • Will be contributing to Component 2 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 9 – inputs for finalization of MRV methodology ○ Output 8 – support for smooth execution of implementation of project
Distribution Companies	State DISCOMs	<ul style="list-style-type: none"> • Electricity Distribution Companies shall be partners in execution of the tri-generation projects. • Will be responsible for purchase of power, distribution and retail supply of electricity to its consumer. • Will be contributing to Component 2 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 9 – inputs for finalization of MRV methodology ○ Output 8 – support for smooth execution of implementation of project
Governmental / Public institutions	Urban Local Bodies (ULB), Public Works Department (State/Central), state Municipalities and building owners	<ul style="list-style-type: none"> • Local Bodies shall be partners in execution of the Tri-generation projects also benefit from awareness creation and social marketing actions. • Will be contributing to Component 2 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 2 – support for signing of energy savings agreements and finalization of technical specifications ○ Output 13 – support in facilitating the gender sensitive social marketing campaign ○ Output 9 – inputs for finalization of MRV methodology ○ Output 8 – support for smooth execution of implementation of project
Private sector	Tri-generation equipment manufacturers	<ul style="list-style-type: none"> • Responsible for supply of different components of tri-generation • Will be contributing to Component 2 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 8 – support for smooth execution of implementation of project (availability of the equipment along with timely service and maintenance)
Beneficiaries	Building owners	<ul style="list-style-type: none"> • Will be contributing to Component 2 of the GEF project as per the following <ul style="list-style-type: none"> ○ Output 13 – participating in the gender sensitive social marketing campaign (workshop/capacity building)

A.4. GENDER CONSIDERATIONS

Are *gender considerations* taken into account? (yes /no). If yes, briefly describe how gender considerations will be mainstreamed into project preparation, taken into account the differences, needs, roles and priorities of men and women.

India's Twelfth Five Year Plan (2012-2017) positions women as primary stakeholders of energy resource management especially for domestic use⁵⁸. This positioning reflects not only the recognition of the potential benefit of energy efficiency investments for women, but also the necessity of proactive interventions (e.g., ensuring women's substantive participation and men's support) to realize these benefits. The India Gender Equality Diagnostic of Selected Sectors⁵⁹ (IGEDSS, ADB) corroborates this need with its assessment that energy access policies and programs generally do not pay sufficient attention to women's needs and priorities, and therefore, do not always benefit women. Proactive enabling measures thus need to be considered.

Energy is a key variable in empowering women and promoting gender equality. Among others: (i) electricity enables access of women, who are more likely than men to be illiterate, to educational information and information communication; (ii) street-lighting improves safety of women and girls at night, allowing them to attend night schools and participate in community activities; and (iii) energy efficiency may also result in time and energy savings thus providing women more chance to explore opportunities traditionally assigned to men such as skill building, employment engaging in economic activities etc.

A number of new directions have increased the scope to support gender equality in energy investments through, initiatives that address the particular energy needs of women at the household level and further steps to encourage women's participation as energy entrepreneurs and service providers. However, some studies also show that energy efficiency does not always lead to women's empowerment and gender equality due to constraints to women's participation in decision-making. Hence participation of women in decision making roles is essential. The GEF project will support efforts towards gender focused awareness creation and education as well as efforts to engage women in project related activities.

The proposed GEF project will continue to promote gender inclusiveness. The project will have gender actions/activities towards maximizing project benefits to women and contribute to gender equality. A Gender Action Framework has been proposed (refer to Table 39 below) to guide gender mainstreaming activities during project implementation.

Key economic and social benefits of the program include energy savings and resulting decrease in energy bills thus contributing towards increasing household disposable income; increased security and safety and mobility on the roads (especially for women); increased productivity (for night time studying, work, leisure, etc.). The project will maximize its outreach through engagement with existing women groups, collectives and self-help groups and/or other institutional mechanisms for social mobilization identified at the state level for each component.

The project will adopt communication and education approaches that can maximize adoption of LED lights provided through the program and broader energy efficiency benefits to households through behaviour change

⁵⁸ Planning Commission, Government of India (2013). *Twelfth Five Year Plan: 2012 -2017*, Volume 3, paragraphs 23.38. New Delhi, India.

⁵⁹ India Gender Equality Diagnostic of Selected Sectors (2013) Asian Development Bank

communication. These will be designed in a gender-sensitive manner and incorporated into the implementation approaches for all LED home lighting projects.

A gender inclusive end-user awareness program on the efficient and safe use of energy will be prepared and implemented with active participation of women and girls. A gender inclusive and sensitive Stakeholder Communication Strategy (SCS) is prepared (refer to further details on gender considerations of the SCS in section “A.8 Knowledge Management”). It will enhance women’s participation through social mobilization to increase awareness, acceptance and use of energy efficient technologies. In all direct social mobilization and community engagement activities and research or consultation with end-users planned under the communication strategy, at least 40% of participants will be women. While it is not possible to predict the percentage of women who will attend public events such as mobile van outreach or who will visit kiosks distribution centers, EESL’s past experience indicates that between 20-30% of visitors were women. Therefore, overall, it is expected that the participants of the end-user awareness campaigns will be at least 30% women across all campaign activities – social mobilization, media and events -- combined.

In the context of the proposed GEF project, the marketing campaign will also customize actions that target women and men separately. Distributing and marketing agencies (Suppliers associated with the project) will be trained to differentiate their approach between men and women, recognizing the fact that women are the primary energy managers in households.

Gender equality principles will be applied during project implementation, particularly in procurement processes, training and capacity development. Policy dialogue will also foster equality in decision making at Central, State and ULB levels, in alignment with various relevant GOI policy commitments. Efforts would be made to ensure maximise participation of women wherever possible. Women from state and line departments, DISCOMs, ULBs and potential clients, women entrepreneurs would be encouraged to participate in the consultations, orientations and awareness programs that would be organized to disseminate benefits of EE new technologies including Tri-generation, smart grids, and details about these technologies, cost benefit, O&M, etc., to enhance their understanding about these new technologies.

To assess impact of SL program, social impact assessment/surveys will be undertaken to evaluate the result of the street lightening program with a focus on safety and security of women and their mobility in public places especially after dark.

The financing mechanism/structure (EERF) at the operational level will include provisions for participation of women in decision making. Job creation will be among the investment sub-project selection criteria. In assessing investments, due consideration would be given to encourage equal employment opportunities for women. This would apply across the energy value chain, and include utilities, distribution agencies/marketing teams, systems integrators etc. The GEF project aspiration will be to ensure that at least 25% women are engaged in project activities.

Moreover, in the longer term, a shortfall is expected in critical skills that will be required to architect and build the smart grids and tri generation and work on O & M of these new technologies. Hence, skills training would be imparted to eligible youths (with equal participation of women) to build their skills on design/architecture and O & M of the new technologies for future employment opportunities in the sector (based on a need assessment

other relevant areas can be identified by sector experts). Also, linkages will be developed with on-going skills program under NSDM⁶⁰ of the government to introduce a course in new EE technologies.

Further, suitable resources will be allocated to implement the gender activities included in the Gender action framework. A senior officer will be designated as gender focal point in EESL to oversee gender inclusion in project activities. Under the EERF operations, a dedicated Marketing Communications Specialist (GEF funds: 96,000 - refer to budget line 1205 in Annex F-1) and Gender Specialist (GEF funds: 48,000 - refer to budget lines 1204 in Annex F-1) will be hired. They will be responsible to support and guide the gender inclusion under the project.

TABLE 39 - PROVISIONAL GENDER ACTION FRAMEWORK

Objectives	Activities	Gender Output Indicators	Means of Verification	Project Output
Conduct social due diligence	<ul style="list-style-type: none"> Conduct social assessment, including gender analysis to assess the potential roles, benefits, impacts and risks for women and men in the existing/new EE technologies 	<ul style="list-style-type: none"> Social assessment, including gender analysis conducted 	EESL and project reports	Output 1
Assess the potential impact of Street lighting efficiency program	<ul style="list-style-type: none"> Conduct Social impact assessment/social audits to assess the impact of street lighting efficiency on safety & security and mobility of girls/women in public spaces (esp. at night) 	<ul style="list-style-type: none"> Social impact assessment/social audits conducted 	EESL and project reports	Output 3
Assess end user awareness on current behavior, driver and barriers to adopting energy efficiency products (Domestic lights /ceiling fans in households/other HH appliances / ACs)	<ul style="list-style-type: none"> Conduct formative research/an assessment (with equal women participation) to assess current awareness, behavior, drivers and barriers to adopting desired behavior of the target audience 	<ul style="list-style-type: none"> An assessment of current behavior, drivers and barriers of the target audience conducted 	EESL and project reports	Output 3

⁶⁰ National Skill Development Mission (NSDM) was launched by the Prime Minister of India on July 15th 2015. Its aim is to create convergence across sectors and States in terms of skill training activities.

Objectives	Activities	Gender Output Indicators	Means of Verification	Project Output
Enhance end user awareness on energy efficiency in households	<ul style="list-style-type: none"> Conduct training for sales staff of the kiosks and mobile vans on gender sensitive communication Prepare a gender sensitive training module/toolkit Conduct awareness /social mobilization campaigns targeting women consumer, women groups, or women's home energy efficiency clubs; youth especially those in school; women collectives, community groups, self- help groups, other existing institutional mechanism in the states e.g., India Posts, Esewa Kendras 	<p>Sales staff trained on gender sensitive communication and product information</p> <ul style="list-style-type: none"> A gender sensitive toolkit prepared <p>End user awareness /social mobilization campaigns conducted</p> <p>Women groups, collectives, youth clubs organized/mobilized</p>	<p>EESL and project reports</p> <p>Reports from Distribution Agency/Kiosks and Mobile Vans, other Points of Sale</p>	Output 3
Institutional Capacity Building				
Enhance/Build awareness among policy makers on gender-energy linkages	<ul style="list-style-type: none"> Enhance awareness of EESL staff, government officials (central and state) including DISCOMs and ULBs on gender and energy linkages 	<ul style="list-style-type: none"> EESL, DISCOMs and ULBs trained on gender and energy linkages 	EESL and project reports	Output 3
Enhance/Build awareness of government (central and state), participating DISCOMs and ULBs, clients and other stakeholders on energy efficient new technologies	<ul style="list-style-type: none"> Conduct orientation and awareness enhancement/capacity building programs targeted at both women and men staff in ULBs for SL/DL/CF programs, DISCOMs in case of smart grid and Ag-DSM programs; and potential clients such as hotel groups/ hospitals/malls, etc for tri generation. 	<ul style="list-style-type: none"> EESL, DISCOMs, ULBs and relevant stakeholders trained 	EESL and project reports	Output 2 Output 3

Objectives	Activities	Gender Output Indicators	Means of Verification	Project Output
Enhance skills and knowledge of youths/potential entrepreneurs on design and O & M of new technologies esp. smart grids and tri generation for employment in the sector	<ul style="list-style-type: none"> • Identify the relevant courses required • Develop linkages with the on-going skills program⁶¹ (under NSDM) of the government to introduce a course module in new EE technologies • Conduct skill training programs to build/enhance skills on design/architecture of smart grids and tri generation and work on O & M. 	Youths/potential entrepreneurs (equal participation of women) trained in designing and in O & M of new technologies	EESL and project reports	Output 8 Output 10
Develop structures/financing mechanism/ (EERF) with provisions for participation of women in decision making	<ul style="list-style-type: none"> • EERF/financing mechanism has provisions for participation of women such as- • Women representative in the advisory board • A full time Gender officer/focal point designated in PMU/EESL GFP is also member of the project selection committee Provisions of fund allocation for women entrepreneurs Provision for women's participation in O & M, distribution/marketing agencies for pilot projects 	A gender inclusive financing structure/mechanism developed and implemented	EESL and project reports	Output 6

⁶¹ National Skill Development Mission (NSDM) was launched by the Prime Minister of India on July 15th 2015. Its aim is to create convergence across sectors and States in terms of skill training activities.

Objectives	Activities	Gender Output Indicators	Means of Verification	Project Output
Strengthen gender inclusion in institution (EESL) and Program Management	<ul style="list-style-type: none"> • Provide equal employment opportunities for women in project activities across project utilities (PMU/ PMC/PIUs/distribution agencies/marketing teams. etc.) • [Target: at least 25% women are engaged in project activities] • Allocate resources to implement the gender activities/activities in the Gender mainstreaming framework Designate a gender focal point in EESL to oversee gender inclusion in project activities. Appoint a gender specialist to guide and support gender inclusion in project activities 	<p>At least 25% women participate/engaged in project activities Resources allocated to implement the gender activities A gender focal point appointed in EESL A gender specialist recruited</p>	EESL and project reports	Across the entire project
<p>Key Assumptions:</p> <ul style="list-style-type: none"> - EESL is committed to conducting the activities - Dedicated resources (human and financial) are allocated - The activities included in the budget allocated for awareness campaign in ADB loan (6.14 million USD) - Provision of gender specialist to guide the gender framework 				

A.5 RISKS

Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable).

Detail assessment of the risk related to the design, commissioning and operation of various technologies have been carried out in consultation with technology providers, facility owners and EESL.

For ensuring the successful project implementation, mitigation measures identified during the PPG phase will be monitored by Project Management Unit (PMU) during the project execution. Based on the monitoring, these mitigation measures will be reassessed and updated to counter the various risk associated with the project.

The table below shows the identified risks, rating and mitigation measures.

TABLE 40 - ASSOCIATED RISKS

Type of Risk	Risk Description	Technologies where the risk is applicable	Mitigation measure	Magnitude of Impact
Design and Technical	<ul style="list-style-type: none"> Improper design Improper selection of equipment Complexity of technical specifications Limited knowledge of integrating the different components of tri-generation 	Tri-generation and smart grids	<ul style="list-style-type: none"> Design guidelines and technical specifications prepared by highly experienced international and local experts (as planned in the project) Training of technology providers on integration of various components to be installed in a tri-generation system 	High
Market	Limited number of manufacturers and suppliers in India	Tri-generation and smart grids	<ul style="list-style-type: none"> EESL will leverage its existing international and national network in order to ensure sufficient number of suppliers for the project. The successful demonstration under the project would help in creating awareness about the technologies and would increase number of manufacturers in India. 	Medium
Performance	Performance risks related to performance of energy efficient equipment post implementation arises due to: <ul style="list-style-type: none"> Quality of equipment External conditions like weather Equipment breakdown 	Ceiling fans, Tri-generation and smart grids	<ul style="list-style-type: none"> Defining the performance of equipment over the life of equipment Defining the performance of equipment under various external conditions Integration of centralized control system to monitor the equipment performance Defining the warranty of equipment at the time of procurement. Defining the AMC cost and duration of AMC to be provided by the vendor at the time procurement 	Medium

Type of Risk	Risk Description	Technologies where the risk is applicable	Mitigation measure	Magnitude of Impact
Regulatory and commercial	Regulatory risks arise due to change in regulatory environment in the region or country. These risk affect the project financials. Some of the regulatory risk are: Interest rate fluctuation Energy price (gas, electricity) fluctuation Foreign exchange risk Regulatory changes in laws relating to tax concessions, etc.	Tri-generation and smart grids	EESL will sign an agreement with the client on the fluctuations in interest rate, energy price (electricity and gas), foreign exchange and changes in laws relating to tax concession. The agreement will define the present situation and forecasted scenario depending on the past trends. Under the commercial risk, EESL will use deemed savings approach for all technologies, except tri-generation and smart grids. This provides a regular income stream from their investment allowing them to avoid performance based risks. Regarding trigeneration, EESL will pass on the gas price risk to the consumer and with the smart grids will be paid a fixed price when an alert is triggered. All of these business model features allow EESL to reduce the commercial risk to themselves.	Low
Financial	The financial risk mainly deals with the cost escalations associated with the project due to delay in procurement, installation and commissioning of technologies	Tri-generation and smart grids	There exist a difference in the cost at the time of project designing and equipment procurement and installation due to the time lag. To mitigate this, following strategies are proposed <ul style="list-style-type: none"> • Estimation of cost escalation rate during the project design. • Defining schedule of construction, procurement, installation and commissioning of solutions • Linking the payment of vendor to the timely execution of project 	Low
Environmental	Disposal of replaced appliances and equipment containing hazardous waste	All technologies	The proposed GEF project and ADB loan and other investments will be guided by the ADB Safeguard Policy (2009), and EESL tendering / procurement policy and practice with appropriate measures built-in during project preparation. EESL will incorporate Central Pollution Control Board “Guidelines for Environmentally Sound Mercury Management in Fluorescent Lamp Sector” in the contracts to be signed with various contractors. EESL will distribute leaflets to consumers which provide guidance on the safe disposal of used equipment.	Low/Medium

Type of Risk	Risk Description	Technologies where the risk is applicable	Mitigation measure	Magnitude of Impact
Social	<ul style="list-style-type: none"> • Safety of Labour • Ensuring timely wages to labours 	Domestic lighting, street lighting, ceiling fans, tri-generation and smart grids	<p>EESL will incorporate all the important acts in contract to be signed with various contractors. The important acts are:</p> <ul style="list-style-type: none"> • Minimum Wages Act, 1948 and state specific notifications thereof • Payment of Wages Act, 1936 <p>In addition to above, following requirements shall be included in the contract signed between EESL and contractor</p> <ul style="list-style-type: none"> • Medical and accidental insurance for workers • Emergency preparedness, fire and electrical safety requirements at project warehouses and temporary storage locations • Grievance redressal mechanism for workers • Accident/incident reporting of near miss, lost time, first aid, reportable injury, major injury and fatality • Safety and appropriateness of tools and equipment used, example ladders, man basket cranes, etc. 	Low

A.6. INSTITUTIONAL ARRANGEMENTS AND COORDINATION

Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

Institutional Arrangements (refer to Annex H for more details)

This GEF/ADB/UNEP funded project will be implemented over a five-year period keeping in mind the lessons learned from ongoing projects on Domestic lighting, Street Lighting, Agricultural Pumps and pilots projects of BEE 5 Star Ceiling Fans, Super-Efficient Ceiling Fans, Tri-generation and Smart Grids. The lessons learned will be shared through meetings with various government departments involved in the project (Central Government (MoEF, MoUD, MoP), ULBs and DISCOMs).

The project will be jointly implemented by UNEP and ADB. ADB will lead on all investments in Components 1, 2 and 3. ADB will bring together the GEF grant and their own loan to EESL for investment and apply their due diligence process. They will also support EESL in component 3 in generating a new pipeline of investments under EESL's new business plan. UNEP will be the lead agency of the project, and will implement the technical assistance parts of Component 1, 2 and 3. UNEP will bring its regional and global experience and lessons in testing new business models and new technologies to the project. ADB and UNEP's collaboration will be guided by a separate letter of agreement under an existing, overarching Memorandum of Understanding between the two agencies. A detailed organigram of the Project's Management Structure is provided in Annex H.

The **Project Donor** is the GEF, and the **Project Co-finance partners** are ADB, UNEP and EESL. The **Project Implementing Agencies (IA)** are UNEP and ADB, who are responsible to the GEF for the project's oversight, the use of resources as written in the Project Document, or any amendments agreed to it by all donors. The main roles of the Implementing Agencies are described in Annex H. The **Project Executing Agency (EA)** is Energy Efficiency Services Limited (EESL), who is responsible for day to day management of the project, including financial management and project reporting. The main roles of the Executing Agency are provided in Annex H.

Project administration will follow the procedures of the Executing Agency, including for procurement, contracting, and recruitment. The **Project Management Unit (PMU)** will be located at EESL and the line of accountability will go up through the project team to the project manager and connect to the EESL management structure through the Project Director. EESL has appointed the Chief General Manager (Technical) as the National Project Director of this project.

A **Strategic Advisory Group (SAG)** is being proposed for the project which will provide advice/guidance on the overall project, make sure the broader level objectives are being met and also the alignment of the project with the national priorities. SAG will have representatives from relevant ministries (MoP, MoEF & CC), regulatory authorities (CEA, CERC) and others on invitation basis. PSC will update SAG on the project progress in the half-yearly meetings. PSC Chair and PD will be part of the SAG meetings along with the SAG secretariat, which will be part of the project team.

Overseeing the entire project will be the **Project Steering Committee (PSC)**. This will be chaired by the Managing Director EESL (currently Mr. Saurabh Kumar) and will include representatives from UNEP, ADB, BEE, EESL and ad hoc members on invitation basis. Project Director will be the Secretary/Conveyor for the PSC. This Committee will meet half-yearly, unless one of the committee members call for ad hoc interim meeting. The main functions of the PSC will be to review project progress, approve annual work plans and budget and provide strategic guidance to the project, and approve management decisions to ensure timely delivery of quality outputs.

Further details on the Strategic Advisory Group, the Project Steering Committee and the Project Management Unit are provided in Annex H, including a detailed organigram of these 3 project bodies.

Finally, the GEF project will establish an **Energy Efficiency Revolving Fund (EERF)** to support investments in proof of concept, replication and scaling up of new energy efficiency technologies. The provisional organizational structure for the EERF is detailed in Annex H.

Coordination with other projects/initiatives

Link with the ADB loan project

ADB and EESL are in the process of finalizing a USD 200 million loan on “Demand Side Energy Efficiency Investment”, which, inter alia, will support more efficient municipal lighting through use of light-emitting diode (LED) street lighting equipped with remote operating technology, (ii) more efficient domestic lighting through replacement of incandescent lights with LEDs (ADB, 2015), (iii) more efficient BEE 5 star ceiling fans through replacement of existing fans and (iv) implementation of energy efficient agricultural pumps. EESL is the intended borrower and will also serve as the executing agency and will implement all subprojects under the proposed ADB loan. The GEF investments under Component 1 will be directly linked to the ADB loan project, with investments under Component 2, indirectly linked. The ADB loan project will contribute to the overall business operations of EESL.

The impact of the ADB baseline loan project would be improved demand-side energy efficiency in India. At the outcome level, there would be increased end-use efficiency in the selected project areas. This would be achieved through the following outputs: (i) enhanced street lighting efficiency in select municipalities, (ii) enhanced domestic lighting efficiency in select utility service areas, (iii) improved agricultural demand-side management (DSM) in select utility service areas, and (iv) enhanced institutional capacity of EESL. While the local project provisionally intends to work in Rajasthan, Telangana, Maharashtra, Andhra Pradesh, Karnataka, Kerala and West Bengal, locations of additional projects will be identified during project processing. End-user awareness programs will be conducted to increase awareness and maximize gains. In addition, a proposed women-led ‘energy clinics’ program successfully implemented in Kerala will be adapted to the relevant project activities.

Link with the KfW loan project

KfW and EESL are in the process of finalizing a USD 31.2 million loan on “Demand Side Energy Efficiency Investment” on new Technologies, which, inter alia, will support super-efficient fans through use of DC motor equipped with remote operating technology, (ii) Tri-generation (Electricity, Cooling & Heating) and, (iii) Smart Grids through Smart meters. EESL is the borrower and will also serve as the executing agency and will implement all sub-projects under the proposed loan. The KfW loan project will contribute to the overall business operations of EESL.

The impact of the KfW loan on the project would be improved demand-side energy efficiency in India. At the outcome level, there would be increased end-use efficiency in the selected project areas. This would be achieved through the following outputs: (i) Usage of Super-Efficient fans in select DISCOMS in India, (ii) Tri-generation in select utility service areas of Commercial sector, (iii) Smart Grids through smart meters for Loss reduction, demand Response i.e. Demand-side management (DSM) in select DISCOMs in India and (iv) enhancing the institutional capacity of EESL. While the local project provisionally intends to work in Delhi, Andhra Pradesh, Karnataka, Kerala, West Bengal etc., locations of additional projects will be identified during project processing. End-user awareness programs will be conducted to increase awareness and maximize gains.

Link and coordination with the National Mission for Enhanced Energy Efficiency

This proposed project needs to link and coordinate its activities to with the National Mission for Enhanced Energy Efficiency (NMEEE): This Mission focuses on enhancing energy efficiency measures in the country through four initiatives. These initiatives are: a market-based mechanism to enhance cost-effectiveness of energy efficiency improvements in energy-intensive large industries through the certification of energy savings that could be traded (perform, achieve, and trade), accelerating the shift towards energy-efficient appliances in identified sectors (market transformation), creating a financing mechanism for facilitating demand side management (DSM) programmes (energy efficiency financing platform), and developing fiscal instruments that promote energy efficiency (framework for energy efficient economic development). The Mission seeks to enhance efforts to unlock the energy efficiency market on a purchasing power parity basis to result in a total avoided capacity addition of 19,598 MW by 2017.

There are three on-going GEF Climate Change projects, which this proposed project may have relevant links and should be explored. These are the following:

- “Facility for Low Carbon Technology Deployment”, (GEF IA - World Bank, GEF EA -Bureau of Energy Efficiency, GEF funding – USD 9,000,000). Project Objective: To develop a network of research and innovation institutions in India that can address technology gaps to mitigate climate change and improve the economy's energy efficiency.
- “Market Transformation and Removal of Barriers for Effective Implementation of the State Level Climate Change Action Plans” (GEF IA- UNDP, GEF EA- Ministry of Environment and Forests, GEF funding USD 3,894,438) Project Objective: To support the effective implementation of specific energy efficiency and renewable energy related climate change mitigation actions identified in the State Level Action Plans on Climate Change for selected states in India
- Promoting Market Transformation for Energy Efficiency in Micro, Small & Medium Enterprises. 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. EESL is the executing agent of this UNIDO project, as they are for this proposed GEF project. Therefore, coordination will be managed by EESL between these two projects to allow for synergy and complementarity.
- Partial Risk Sharing Facility for Energy Efficiency for USD 18 million implemented by the World Bank. The aim of the project is to remove the barrier for private sector ESCO’s to raise capital to make energy efficiency investments. This has been seen as major constraint for the growth of ESCO’s in India.
- Establishing the Foundations of a Partnership to Accelerate the Global Market Transformation for Efficient Appliances and Equipment implemented by UNEP. The aim of the project is to mitigate climate change by reducing the growth of global electricity consumption through the creation of a global partnership accelerating markets for highly efficient electrical appliances and equipment. This project just recently endorsed will produce best practice policy, awareness raising, and financial mechanism tool kits to facilitate the transition to efficient and advanced lighting (light emitting diodes) in the commercial, industrial and outdoor lighting applications. These guidance materials can be used to support this project.

A.7 BENEFITS

Describe the socioeconomic benefits to be delivered by the project at the national and local levels. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)

At the national level, the project will increase the technical and institutional capacity of government to address the negative effects of climate change by increasing the market share of LEDs under DL and SL segment and by demonstrating project on energy efficient technologies like super-efficient ceiling fans, tri-generation and smart grids. The direct consequence of this approach will be:

- i) Enhanced capacity to integrate energy efficient solutions like super-efficient ceiling fans, tri-generation and smart grids into policies, plans and legislation; and
- ii) Increased capacity to plan, finance and implement technological interventions as a means of adapting to climate change.

Major benefits associated with each of the components of this project is mentioned below:

Component 1:

The combined GEF grant and ADB loan supplemented by EESL's investment will assist in institutionalizing energy efficiency in India's public sector and will help to demonstrate that energy efficiency is the least cost means to close the gap between electricity demand and supply across the country. The investment program will benefit electricity consumers (principally domestic and agricultural consumers as well as ULBs) as a consequence of reduced electricity consumption. It will also allow electricity distribution companies to reduce purchases of expensive peak electricity and will reduce the electricity subsidy burden on state governments. EESL will benefit financially through sharing agreements with end-users that will allow it to recover its costs and earn a sustainable return on its investments.

From a socio-economic perspective, benefits accrue by way of incremental consumption of electricity during peak periods enabled by the reduction in electricity used for lighting and domestic fans, and resource cost savings arising from a reduction in electricity used for water pumping, street lighting, and household LED bulbs and electric fans outside of peak demand periods.

Women in particular, will benefit from increased participation in project implementation, enhanced understanding of the savings potential from conversion to new approaches to energy consumption and management, and increased opportunities to engage in the productive sector.

Component 2:

The combined GEF grant, EESL investment as equity supplemented by loan will assist in establishing business models for three new technologies, namely super-efficient ceiling fans, tri-generation and smart grid. Under each of the technologies, respective projects will have multi-area benefits ranging from energy savings, cost savings, reduction in GHG emissions, development of standards and specifications, standardization of methodology for the entire project management cycle.

Component 3:

The combined GEF grant and EESL investment will assist in putting across a growth strategy and overall project framework for all the technologies. This framework will combine all the stages of project management ranging

from identification, implementation and monitoring. The activities planned under this component will benefit EESL in streamlining and optimizing the existing structures and resource, which will further benefit projects across technologies, in terms of cost savings as well as energy savings. Further, the same benefits and learning will be replicated to all the new as well as existing projects, leading to direct benefit of effort reduction and improvement in the quality of offerings.

Cross-cutting benefits:

Additionally, the GEF project will provide further benefits from a public health perspective through the environmentally sound disposal of used technologies when being replaced with energy efficient appliances and equipment - and particularly domestic and street CFL lamps, which contain mercury. This will be guided by ADB's Safeguard Policy (2009) and EESL's tendering/procurement policy and practice with appropriate measures built-in during project implementation. EESL will incorporate the Central Pollution Control Board's "Guidelines for Environmentally Sound Mercury Management in Fluorescent Lamp Sector" in the contracts to be signed with various contractors that will be in charge of the replacement programmes.

A.8 KNOWLEDGE MANAGEMENT

Elaborate on the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives (e.g. participate in trainings, conferences, stakeholder exchanges, virtual networks, project twinning) and plans for the project to assess and document in a user-friendly form (e.g. lessons learned briefs, engaging websites, guidebooks based on experience) and share these experiences and expertise (e.g. participate in community of practices, organize seminars, trainings and conferences) with relevant stakeholders.

Within all three components and implementation structure, the project will promote effective management of knowledge. The table below details how knowledge will be managed effectively.

TABLE 41 - KNOWLEDGE MANAGEMENT

Project Component	Contribution to effective knowledge management
Component 1 - Expanding and sustaining investments in existing market sectors	<p><i>Generating and recording information/knowledge: Policy briefs and technical guidelines will be developed to support integration of climate change and applicable technologies (lighting, pumping, and BEE 5-star ceiling fan) into relevant policies and plans, and their related budget.</i></p> <p><i>Improving knowledge: MRV systems developed for technologies under this component will facilitate the updating of data on operating performance of technology products and energy savings achieved. This will further help in estimating the energy savings more accurately for upcoming projects on similar technologies.</i></p> <p><i>Maintaining/sustaining knowledge: Proper training and capacity building will enhance the knowledge of various stakeholders involved in the planning and implementation of projects related to technologies under this component.</i></p>
Component 2 - Building market diversifications	<p><i>Generating and recording information/knowledge:</i></p> <ul style="list-style-type: none"> ○ A set of detailed assessments (technical, financial, environmental and social) will be carried out for super-efficient ceiling fans, tri-generation and smart grid for the identified stakeholders (ULBs, DISCOMs, Buildings, Municipalities, etc.); ○ Detail technological and procurement specifications will be developed for super-efficient ceiling fans, tri-generation and smart grid technologies; ○ Set of business models will be developed to assess the financial feasibility of super-efficient ceiling fans, tri-generation and smart grid technologies. <p><i>Improving knowledge: MRV systems developed for ceiling fans, tri-generation and smart grids will facilitate the updating of data on operating performance and energy savings achieved. This will further help in estimating the energy savings more accurately for upcoming projects in these technologies.</i></p> <p><i>Maintaining/sustaining knowledge: Proper training and capacity building will enhance the knowledge of various stakeholders involved in the planning and implementation of ceiling fans, tri-generation and smart grid projects.</i></p>
Component 3 - Replication and scaling up	<ul style="list-style-type: none"> ● Generating and recording information/ knowledge: Detailed strategy for attracting Public Private Partnership (PPP) investment in identified technologies will be developed. ● Improving knowledge: Assessment of various processes will be done for identifying automation requirements to further enhance the operational efficiency. ● Maintaining/ sustaining knowledge: Conducting training and capacity building programs for identified DISCOMs and ULBs on energy efficiency.

Stakeholder Communication Strategy (SCS)

In order to ensure proper knowledge management with the relevant stakeholders, a Stakeholder Communication Strategy (SCS) is proposed. The SCS will promote awareness, end user uptake and behaviour change to support demand side energy efficiency. Awareness programs and engagement will contribute to maximizing energy-efficiency gains under the project and help to ensure that end-users adopt – and sustain the use of – the improved technologies. The SCS will lay out the framework to achieve this, including the communication objectives of the end-user awareness campaigns for each of the energy-efficient products promoted under the Project; key message development; activities; implementation arrangements; and monitoring and evaluation mechanism. The SCS will guide Energy Efficiency Services Limited (EESL) in developing specific communication activities and Information-Education-Communication (IEC) messages.

The SCS will provide the general road map for implementation of end-user awareness programs (with active participation of women) for the domestic programs (LED bulbs, ceiling fans) and the agricultural pumps program. It will also provide guidelines to enhance communication for the street lighting program and smart grid program. Overall it will strengthen EESL's public engagement activities. The SCS will detail Communication Plans for each program (i.e., LED bulbs, street lighting, agricultural pumps, 5-star ceiling fans, tri-generation systems, smart grids and super-efficient ceiling fans).

The planning and implementation of communication activities will use a Behaviour Change Communication (BCC) approach targeted to end-users and beneficiaries and aims not only to raise awareness, but also to change attitudes and practices. The BCC approach starts with a *behaviour analysis* to gain an understanding of the key target audiences in order to determine appropriate messages, activities and channels to effect the desired change in practices (i.e., uptake of energy efficient products and services). The BCC approach which will be laid out in the SCS would identify *current and desired behaviours; behavioural barriers and drivers; key messages and activities*.

Current Behaviours are current practices of end-users vis-à-vis the program. *Desired Behaviours* are practices that the program is targeting. *Barriers* are what hinders a person's acceptance of the Desired Behaviour. *Drivers* are factors that facilitate a person's acceptance of the Desired Behaviour, e.g., cost or time savings, convenience, improved credibility of the products, etc. *Key Messages* are information provided to the target audience to motivate them to accept the Desired Behaviour. The Messages provide the audience with a "Reason Why" the Desired Behaviour is beneficial, and a "Call to Action" identifying what action is to be taken and when. These will be communicated to end-users through various relevant, appealing, and creative materials and channels. *Activities* are actions that will be implemented to achieve the communication objectives.

Outputs, Outcomes (Indicators) and Means of Verification will also be identified and contribute to the monitoring and evaluation activities described in the SCS. This is elaborated subsequently.

Gender Inclusiveness in SCS

Many user education programs on energy efficiency at the household level do not adequately reach women end-users. However, while men continue to hold more decision making power, women are often strong influencers in decision making about household purchases. Hence, there is need for focused efforts to maximize the reach of the end-user awareness programs to women, to not only recognizes their role in household decision making, but also to potentially enhance it.

In all direct social mobilization and community engagement activities and research or consultation with end-users planned under this proposed SCS, at least 40% of participants will be women. While it is not possible to

predict the percentage of women who will attend public events such as mobile van outreach or who will visit kiosks distribution centres, EESL's past experience indicates that between 20-30% of visitors are women. Therefore, overall, it is expected that the participants of the end-user awareness campaigns will be at least 30% women across all campaign activities – social mobilization, media and events – combined.

To achieve this target, the following principles for *integrating and strengthening gender-inclusiveness and enhancing women's role in energy efficiency related decision-making* will be followed for the implementation of end-user awareness for each program at both the national and state levels:

- Formative research and pretesting of materials will be conducted through focus group discussions (FGDs), individual interviews or other qualitative methodologies. Respondents will be at least 40% women to ensure that their opinions, beliefs and practices are heard and taken into account in message and materials development;
- Campaign materials should not propagate gender stereotypes and should portray women in empowering roles wherever possible;
- Gender will be considered when selecting dissemination channels and mobile van routes to ensure that women audiences are reached;
- Social mobilization activities will be conducted through existing village and state level community mechanisms such as self-help groups, water user groups, etc., and will ensure that women-led groups are engaged. Women “energy champions” will also be identified and trained to conduct awareness-raising in their communities;
- Monitoring and evaluation activities will include the collection of sex- disaggregated data and will highlight women's contributions to energy efficiency awareness raising. Project impacts on women (both positive and negative) will also be captured in monitoring and evaluation.

EESL will also ensure that the guidelines prepared for the state level activities encompass these principles and that all media agencies or firms engaged as part of awareness activities abide by these principles.

General Knowledge Management Objectives

The SCS will aim to achieve the following communication objectives:

- Increase in the number of LED bulbs and energy efficient ceiling fans sold in cities/districts of Rajasthan, Maharashtra, Andhra Pradesh, and Uttar Pradesh, against baseline;
- Increase in the number of agricultural pumps sold in Rajasthan, Andhra Pradesh, and Karnataka, against baseline;
- Enhanced awareness and appreciation of the benefits of LED street lighting by the public (including women and disadvantaged groups) in Rajasthan, Maharashtra, Goa, and Telangana;
- Increase in awareness and understanding of the benefits of smart grids, super-efficient ceiling fans and tri-generation systems based on project demonstrations.

The SCS will be designed and implemented in a customized manner, by product, by project geographic area and by target audience.

Implementation Responsibility (of SCS)

The EESL Public Relations and Marketing unit at the national level will provide overall management for communication planning, implementation and monitoring and evaluation activities conducted both nationally and at the state level. They will be responsible for the following:

EESL State-level Implementation of Communication

The state EESL offices will conduct the following activities:

- Develop the state level localized communication plan for each program in the state with assistance from the EESL national office;
- Adapt, pre-test (with at least 40% women respondents) and produce collaterals and materials;
- Supervise and monitor mobile vans;
- Supervise and monitor distribution points and points of sale;
- Oversee and monitor communication activities by marketing agencies;
- Provide technical support to communication training for sales forces and overseeing their work;
- Provide technical support to and monitor gender-inclusive social mobilization activities;
- Provide timely information to the national EESL office to inform them of potentially negative media or public attention;
- Document state level end-user awareness activities;
- Implement communication impact evaluation activities through a third party research agency.

Indicators cited in the communication plans for LED bulbs, ceiling fans, agricultural pumps and street lighting will be tracked and measured regularly. Monitoring and evaluation will be done during key activity milestones. Sex-disaggregated data will be collected, monitored and reported for all programs across states and at all levels.

Monitoring

Monitoring activities will be instituted to ensure that:

- Activities are implemented as planned according to quality, time and other resource specifications;
- Outputs of activities in progress are being delivered as expected and will be fully delivered upon completion;
- Issues, problems as well as strong areas of implementation are identified;
- The SCS is being followed and gender inclusion is being achieved.

The following monitoring activities will be conducted:

- Review of progress reports by distribution, marketing and other agencies as cited in the matrices
- Validation of progress reports by direction observation and interviews with staff implementing distributing and awareness raising campaigns
- Interviews of end-users/beneficiaries at distribution points and during marketing agency awareness raising activities and events using an established random sampling frame.
- All assessments done under the monitoring activities will ensure an equal number of male and female respondents and data and results will be gender disaggregated.
- The states will provide Monitoring Reports to the EESL national office for each program on a regular basis.

Evaluation

Evaluation activities will be instituted to ensure that:

- Activities and outputs are producing the desired changes in knowledge, attitudes and behaviours in the end-users;
- Behaviours are being sustained by end-users;
- Unexpected benefits or adverse results as a result of communication activities are identified.

The EESL national office will be responsible for conducting the following evaluation activities, building on state-level evaluation activities as needed:

- Pre-post surveys to assess end-user changes in knowledge, attitudes and sustained use of LED bulbs, ceiling fans, and agricultural pumps. The surveys will also identify factors correlated to such changes;
- Reach and recall study of localized ad campaigns;
- Public satisfaction survey for street lighting.

All assessments done under the monitoring activities will ensure an equal number of male and female respondents and data and results will be sex disaggregated.

Media Monitoring and Crisis Communication Protocol

EESL will institute a mechanism to track media and public opinion to identify adverse news and reports emanating from the states and respond to these reports in a timely manner according to an established “crisis communication” protocol.

B. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH NATIONAL PRIORITIES

Is the project consistent with the National strategies and plans or reports and assessments under relevant conventions? (yes /no). If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.

This proposed GEF project is consistent with the following national strategies and plans:

National Action Plan (NAP) on Climate Change

On June 30, 2008, India's first National Action Plan on Climate Change (NAPCC) outlining existing and future policies and programs addressing climate mitigation and adaptation was released. The plan identifies eight core "national missions" running through 2017 and directs ministries to submit detailed implementation plans to the Prime Minister's Council on Climate Change by December 2008. Emphasizing the overriding priority of maintaining high economic growth rates to raise living standards, the plan "identifies measures that promote our development objectives while also yielding co-benefits for addressing climate change effectively." It says these national measures would be more successful with assistance from developed countries, and pledges that India's per capita greenhouse gas emissions "will at no point exceed that of developed countries even as we pursue our development objectives."

Out of the eight national missions, the National Mission on Enhanced Energy Efficiency focuses on improving energy efficiency levels in different sectors including buildings and industries in India

National Mission on Enhanced Energy Efficiency (NMEEE)

The National Mission on Enhanced Energy Efficiency (NMEEE) is the mission with an objective of promoting innovative policy and regulatory regimes, financing mechanisms, and business models which not only create, but also sustain, markets for energy efficiency in a transparent manner with clear deliverables to be achieved in a time bound manner.

The Ministry of Power (MOP) and Bureau of Energy Efficiency (BEE) were tasked to prepare the implementation plan for the NMEEE. NMEEE spelt out the following four new initiatives to enhance energy efficiency, in addition to the programs on energy efficiency being pursued. They are:

- Performance Achieve and Trade;
- Market transformation for energy efficiency;
- Energy efficiency financing platform;
- Framework for Energy Efficient Economic Development.

The Mission will unlock the market for energy efficiency and help achieve total avoided capacity addition of 19,598 MW and fuel savings of around 23 million tonnes per year at its full implementation stage. The programmes under this mission have resulted in an avoided generation capacity addition of about 10,000 MW between 2005 and 2012 with government targeting to save 10% of current energy consumption by 2018-2019.⁶²

⁶² India's INDC

Demand Side Management (DSM) Programmes

Accelerating adoption of energy efficiency through Demand Side Management in buildings is a major thrust area of the Government of India. The policy on smart city launched by the Government earmarks energy efficiency as one of the feature of the smart cities.

The above programs implemented by EESL complements the market related actions of the National Mission for Enhanced Energy Efficiency (NMEEE). The demand side management programmes launched by BEE for improving energy efficiency are as mentioned below:

Energy efficient lighting

India has launched an ambitious plan to replace all incandescent lamps with Light-emitting diode (LED) bulbs in the next few years leading to an energy savings of up to 100 billion kilowatt hours (kWh) annually. LED based Domestic Efficient Lighting Program (DELP) and National street lighting program are currently implemented by EESL in India. To date EESL has installed 100 million LED lamps and their overall plan is to install 770 million Domestic LED lamps in India.

Similar program for implementation of energy efficient 5 star rated ceiling fans has been launched in India. Currently the program is being implemented on pilot basis for 100,000 ceiling fans.

Standards and Labelling Programme

As on today 21 equipment and appliances have been labelled. The programme has contributed to an increase of 25% to 30% in the energy efficiency of an average refrigerator or air-conditioner in 2014 compared to those sold in 2007.

The Energy Conservation Building Code (ECBC) launched by the Government of India under the Energy Conservation Act 2001, for voluntary adoption in the country, sets minimum energy performance standards for commercial buildings. During the 12th Five-year plan, it is anticipated that by mandating ECBC for new commercial buildings, 75% of the upcoming new buildings would become ECBC compliant. It is also anticipated that by conducting energy audits in 20% existing buildings, energy saving of around 20% would be possible to achieve. The implementation of ECBC in new commercial buildings and energy audits in existing buildings would result in a saving around 5.07 billion kWh of electricity consumption.

Eight states have already adopted and notified the ECBC, twelve states have amended ECBC and over 300 new commercial buildings have become compliant.

BEE has also developed a Star Rating Program for existing commercial buildings, which is based on actual energy performance of the building, expressed as an Energy Performance Index (measured in terms of annual electricity consumption per unit of built up area).

India's Twelfth Five-year Plan (2012–17)

The most significant and monitorable target of India's 12th five-year plan is an Average GDP growth of 8%. This requires a growth of about 6% in energy supply from all sources, as India's import dependence is already high. Hence there is an urgent need to push Energy Efficiency in all sectors.

Power for All

A joint initiative of GOI and Government of Andhra Pradesh: The Power for All Programme, covers the entire gamut of Power Sector, including Generation, Transmission, Distribution, Renewables, Energy Conservation and Customer Initiatives. The State Government is promoting Energy Conservation and Efficiency Measures in a big way. It is proposed to implement Demand Side Management (DSM) initiatives in domestic household lighting, municipal street lights and agriculture pump-sets in collaboration with EESL, a public sector body with no upfront investment from the Government / Municipalities / Discoms / Consumers / Farmers.

Tri-generation

Tri-generation technology results in the reduction of electrical demand, energy consumption and GHG emissions and it complements the smart city program and Renewable energy program launched by Government of India. Government of India under Indo-German Energy Programme has implemented tri-generation project at one of the government hospital Jai Prakash Narayan Apex Trauma Center (All India Institute of Medical Sciences) in New Delhi, India.

Smart Grid

Currently AT&C losses in India is around 25% against the world average of 8%. Utilities with AT&C losses around 30% need to reduce their losses by 3% annually. Smart Grids will facilitate the reduction of AT&C losses, shifting of peak power consumption, avoid theft and prioritizing the available source of power (solar, biogas, grid and diesel) in facility. In view of this EESL along with BEE has planned for implementing smart grid projects in 30 distribution companies across India

To develop a road map for Smart Grids in India, the Ministry of Power, Government of India has set up India's Smart Grid Task Force (ISGTF) as an Inter-Ministerial group to serve as Government's focal point for activities related to Smart Grid and to evolve a road map for Smart Grids in India. The ISGTF has taken up measures to ensure that open source technologies and protocols related to smart meters and communication are standardized.

India's Intended Nationally Determined Contribution (INDC)

India is committed to engaging actively in multilateral negotiations under the UNFCCC in a positive, creative and forward-looking manner. In recognition of the growing problem of Climate Change, India declared a voluntary goal of reducing the emissions intensity of its GDP by 33 to 35%, over 2005 levels, by 2030, despite having no binding mitigation obligations as per the Convention. The work towards implementation of energy efficient lighting, pumps, ceiling fans, tri-generation and smart grids will facilitate India in meeting INDC targets.

India's United Nations Development Action Framework (UNDAF)

The project's objective is aligned with Outcome 6 of India's United Nations Development Action Framework (UNDAF) for the period 2013-2017, which states the following:

“Outcome 6: Sustainable Development.

India aims to sustain high rates of economic growth as well as accelerate poverty reduction. These are being threatened by environmental factors and energy insecurity. [...]. Climate change is expected to intensify natural

disasters and pose more challenges to livelihoods and habitats. UNDAF will support the Indian government to sustain its growth and development objectives in the face of these environmental challenges.”⁶³

Alignment to Sustainable Development Goals (SDGs)⁶⁴

At the Sustainable Development Summit on 25 September 2015, UN Member States adopted the 2030 Agenda for Sustainable Development, which includes a set of 17 Sustainable Development Goals (SDGs) to end poverty, fight inequality and injustice, and tackle climate change by 2030.

This project is very much aligned to move towards the achievement of SDGs as the outputs link directly to some of the goals such as, Gender Equality (SDG 5) in the context of Energy Efficiency Projects, Affordable and Clean Energy (SDG 7) and Climate Action (SDG 13).

⁶³ India UNDAF 2013-2017, page 47.

⁶⁴ <http://niti.gov.in/content/overview-sustainable-development-goals>

C. DESCRIBE THE BUDGETED M&E PLAN

M&E activities and related costs are presented in the costed M&E Plan (Annex G) and are fully integrated in the overall project budget.

The project will comply with ADB and UN Environment standard monitoring, reporting and evaluation procedures. Reporting requirements and templates are an integral part of the legal instrument to be signed by the Executing Agency and the Implementing Agencies.

The project M&E plan is consistent with the GEF Monitoring and Evaluation policy. The Project Results Framework presented in Annex A includes SMART indicators for each expected outcome as well as end-of-project targets. These indicators along with the key deliverables and benchmarks included in Annex I will be the main tools for assessing project implementation progress and whether project results are being achieved. The means of verification to track the indicators are summarized in Annex A.

The M&E plan will be reviewed and revised as necessary during the project inception workshop to ensure project stakeholders understand their roles and responsibilities vis-à-vis project monitoring and evaluation. Indicators and their means of verification may also be fine-tuned at the inception workshop. General project monitoring is the responsibility of the Project Management Unit but other project partners will have responsibilities to collect specific information to track the indicators. It is the responsibility of the Project Manager to inform ADB and UN Environment of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely fashion.

The project Steering Committee will receive periodic reports on progress and will make recommendations to ADB/UN Environment concerning the need to revise any aspects of the Results Framework or the M&E Plan. Project oversight to ensure that the project meets ADB, UN Environment and GEF policies and procedures is the responsibility of the ADB/UN Environment Task Managers. The ADB/UN Environment Task Managers will also review the quality of draft project outputs, provide feedback to the project partners, and establish peer review procedures to ensure adequate quality of scientific and technical outputs and publications.

Project supervision will take an adaptive management approach. The ADB/UN Environment Task Managers will develop a project supervision plan at the inception of the project, which will be communicated to the project partners during the inception workshop. The emphasis of the Task Managers' supervision will be on outcome monitoring but without neglecting project financial management and implementation monitoring. Progress vis-à-vis delivering the agreed project global environmental benefits will be assessed with the Steering Committee at agreed intervals. Project risks and assumptions will be regularly monitored both by project partners and ADB/UN Environment. Risk assessment and rating is an integral part of the PIR. The PIR will be completed by the Project Manager and ratings will be provided by UN Environment's Task Manager, with the support of ADB's Task Manager. The quality of project monitoring and evaluation will also be reviewed and rated as part of the PIR. UN Environment's Task Manager will have the responsibility of verifying the PIR and submitting it to the GEF. Key financial parameters will be monitored quarterly to ensure cost-effective use of financial resources.

A Mid-Term Evaluation (MTE) will take place by the middle of the 3rd implementation year, once the project is approximately halfway through the workplan. The GEF budget allocated for the MTE is US\$ 60,000 (refer to annex F-1 and annex G). UN Environment will be responsible for managing the Mid-Term Evaluation, although the terms of reference and selection of consultants will be done in direct collaboration with ADB. The Project Manager and partners will actively participate in the process. The review will include all parameters

recommended by the GEF for Terminal Evaluations and will verify information gathered through the GEF tracking tools, as relevant. The review will be carried out using a participatory approach whereby parties that may benefit or be affected by the project will be consulted. Such parties were identified during the stakeholder analysis (see above section A.3). The project Steering Committee will participate in the MTE and develop a management response to the evaluation recommendations along with an implementation plan. It is the responsibility of the ADB/UN Environment Task Managers to monitor whether the agreed recommendations are being implemented.

An independent Terminal Evaluation (TE) will take place at the end of project implementation. The GEF budget allocated for the TE is US\$ 80,000 (refer to Annex F-1 and Annex G). UN Environment will lead the TE process, however the terms of reference and selection of consultants shall be done in direct collaboration with ADB. . The Project Manager and partners will actively participate in the process. The TE will provide an independent assessment of project performance (in terms of relevance, effectiveness and efficiency), and determine the likelihood of impact and sustainability. It will have two primary purposes:

- (i) to provide evidence of results to meet accountability requirements, and
- (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among ADB, UN Environment and executing partners.

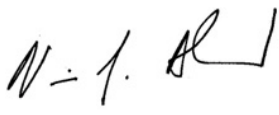
The TE report will be sent to project stakeholders for comments. Formal comments on the report will be shared in an open and transparent manner. The project performance will be assessed against standard evaluation criteria. The final determination of project ratings will be made by the independent evaluator(s) when the report is finalized.

A review of the quality of the evaluation report will be done by UN Environment and submitted along with the report to the GEF Evaluation Office not later than six months after the completion of the evaluation. The evaluation report will be publically disclosed and will be followed by a recommendation compliance process.

PART III: CERTIFICATION BY GEF PARTNER AGENCY(IES)

GEF Agency(ies) certification

This request has been prepared in accordance with GEF policies⁶⁵ and procedures and meets the GEF criteria for CEO endorsement under GEF-6.

Agency Coordinator, Agency Name	Signature	Date	Project Contact Person	Telephone	Email Address
Brennan Van Dyke, UNEP-GEF Coordinator		19/04/2017	Geordie Colville Programme Officer, UNEP	+254207623257	geordie.colville@unep.org
Nessim Ahmad, Deputy Director General, concurrently Chief Compliance Officer and GEF Executive Coordinator, AsDB		19/04/2017	Jiwan Acharya, Senior Energy Specialist, South Asia Regional Department, AsDB	+911124107200	jacharya@adb.org

⁶⁵ GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, SCCF and CBIT

ANNEX A: PROJECT RESULTS FRAMEWORK

Project Objective	Objective level Indicators	Baseline	Targets and Monitoring Milestones	Means of Verification	Assumptions & Risks	UNEP MTS reference*
To reduce greenhouse gas (GHG) emissions through energy efficiency through scaling up and new technology applications	Cumulative amount of Direct GHG emissions reductions (in tCO _{2eq})	0 tCO _{2eq}	10,556,082 tCO _{2eq} (by 2022) 37,904,820 tCO _{2eq} (by 2032)	M&E of the projects	Risks: EESL officials are not convinced by project results Not enough budget or other competing priorities for budget allocation	MTS 2014-2017: CC EA2 ⁶⁶ MTS 2018-2021: CC EA2 ⁶⁷

⁶⁶ MTS 2014-2017, Climate Change (CC):

- CC EA2 - Low emission growth: Energy efficiency is improved and the use of renewable energy is increased in partner countries to help reduce greenhouse gas emissions and other pollutants as part of their low emission development pathways

⁶⁷ MTS 2018-2021, Climate Change (CC):

- CC EA2: Countries increasingly adopt and/or implement low greenhouse gas emission development strategies and invest in clean technologies

Project Outcome	Outcome Indicators	Baseline	Targets and Monitoring Milestones	Means of Verification	Assumptions & Risks	MTS Expected Accomplishment
1. Energy efficiency improved through the installation of street lighting (SL), domestic lighting (DL), 5 star ceiling fans and agricultural pumps (AgDSM)	Number of additional Domestic Lighting units replaced by LED lamps	208,296,978 units replaced (as at February 2017)	39,776,293 additional Domestic Lights replaced by LED lamps (by 2022)	<ul style="list-style-type: none"> - Due diligence reports - Review reports - Feasibility reports - EESL and Municipality MoUs/Contracts - Energy Saving Performance Contracts (ESPC) - Documentation for marketing campaigns - EESL and Supplier Contracts - Energy Saving Performance Contracts (ESPC) - Documentation on finalized MRV framework for each of the technologies - Bid documents - Commissioning Reports - Documentation of the revolving fund - Other project reports 	<p>Assumptions:</p> <ul style="list-style-type: none"> - Respective DISCOMs / ULBs need to give confirmation to provide support for the project initiation and during the implementation - Adequate availability of equipment/services as per the requirement - Revolving fund gets designed and operationalized in a timely manner. <p>Risks:</p> <ul style="list-style-type: none"> - The project is not able to generate interest among vendors/suppliers of these technologies - The project is not able to generate further interest among DISCOMs / ULBs - Revolving fund structure formation getting delayed 	<p>MTS 2014-2017: CC EA2</p> <p>MTS 2018-2021: CC EA2</p>
	Number of additional LED Street Lighting units replaced by LED lamps	1,653,204 units replaced (as at February 2017)	1,505,942 additional Street Lights replaced by LED lamps (by 2022)			
	Number of additional pumps replaced by efficient agricultural pumps	2,527 units replaced (as at February 2017)	229,532 additional pumps replaced by efficient agricultural pumps (by 2022)			
	Number of additional fans replaced by BEE 5 Star Ceiling Fans	287,929 units replaced (as at February 2017)	2,128,298 additional fans replaced by BEE 5 Star Ceiling Fans (by 2022)			
	Number of gender sensitive end-user awareness programs conducted	0 (none)	End-user awareness programs implemented with 30% women's participation			

Project Outcome	Outcome Indicators	Baseline	Targets and Monitoring Milestones	Means of Verification	Assumptions & Risks	MTS Expected Accomplishment
2. Energy efficiency improved through the installation of super-efficient ceiling fans, tri-generation technologies and smart-grid application	Number of Super-Efficient Ceiling Fans units installed / distributed	0 units	783,937 super-efficient ceiling fans units to be installed / distributed (by 2022)	<ul style="list-style-type: none"> - EESL and Supplier Contracts - Energy Saving Performance Contracts (ESPC) - Documentation on finalized MRV framework - Commissioning Reports - Bid documents - EESL and Municipality MoUs/Contracts - Energy Saving Performance Contracts (ESPC) - Documentation for marketing - Monitoring, Reporting and Verification Reports for each of the projects (technologies) - Documentation for marketing campaigns - Letter of interest from the facility owner - Letter of interest from the utility board/director - EESL Board decisions 	<p>Assumptions:</p> <ul style="list-style-type: none"> - Respective DISCOMs / ULBs / Facility owners to give confirmation to provide support for the project initiation and during the implementation - Adequate availability of equipment/services as per the requirement <p>Risks:</p> <ul style="list-style-type: none"> - The project is not able to generate interest among vendors/suppliers of these technologies - The project is not able to generate further interest among DISCOMs / ULBs / Facility owners - The respective pilots are not able to establish a business case. - Pilots in the area of SE CF, TG, SG are not successful 	<p>MTS 2014-2017: CC EA2</p> <p>MTS 2018-2021: CC EA2</p>
	Price reduction of commercially available Super-Efficient Ceiling Fans	US\$ 47	US\$ 26.5 (by 2022)			
	Installed Tri-generation capacity in MW	0 MW	Tri-generation pilot project to be implemented targeting 12.5 MW of installed capacity (by 2022)			
	Number of expressions of interest from facility owners in fully commercial Tri-generations contracts with EESL	0	At least 5 (by 2022)			
	Annual energy savings from Smart Grid in MWh	0 MWh	Smart Grid pilot project to be implemented targeting 42,454 MWh of annual energy savings (by 2022)			
	Number of expressions of interest from other utilities in fully commercial Smart Grid contracts with EESL	0	At least 5 (by 2022)			
	Based on project pilot experiences, EESL's board endorses further investments in Tri-generation and Smart-Grid technologies	No decision	Positive decision (by 2022) with necessary programmatic framework			

Project Outcome	Outcome Indicators	Baseline	Targets and Monitoring Milestones	Means of Verification	Assumptions & Risks	MTS Expected Accomplishment
3. Enabling conditions created to support EESL growth strategy targeting US\$ 300 million in investments across all 7 technologies (SL, DL, BEE 5 Star CF, Agricultural Pumps, Super-efficient CF, TG, SG)	<p>Number of new technologies piloted by the project that meet EESL's investment criteria</p> <p>Revolving Fund - investment pipeline amounts in US\$ at the end of the project</p>	<p>Number of current technologies ventured (5 technologies)</p> <p>Baseline is - zero for the investment EERF pipeline</p>	<p>At least 2 new technologies meet EESL's investment criteria (by 2022)</p> <p>Investment Pipeline (as per EERF mandate) of US\$ 300,000,000 established (by 2022)</p>	<p>- Consolidated strategy module covering all 7 technologies approved by the Project Steering Committee</p> <p>- Approved documentation on new technologies for EESL to venture</p> <p>- Approved documentation on Investment Pipeline</p>	<p>Assumptions:</p> <ul style="list-style-type: none"> - Growth strategy to be in place for all the 7 technologies for the next 5 years, post completion of this project - Automation of the required tasks completed by end of project life cycle <p>Risks:</p> <ul style="list-style-type: none"> - The project is not able to identify new technologies - The project is not able to fully automate the requirements - Revolving fund is not able to attract investment 	<p>MTS 2014-2017: CC EA2, RE EA2⁶⁸</p> <p>MTS 2018-2021: CC EA2, RE EA2⁶⁹</p>

⁶⁸ MTS 2014-2017, Resource Efficiency (RE):

- RE EA2 – Sectors and supply: Uptake of sustainable consumption and production and green economy instruments and management practices in sectoral policies and in business and financial operations across global supply chains is increased, in the context of sustainable development and poverty eradication

⁶⁹ MTS 2018-2021, Resource Efficiency (RE):

- RE EA2: Public, private and finance sectors increasingly adopt and implement sustainable management frameworks and practices

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).



PIF Review

Review Criteria	Questions	Secretariat Comment	Agency Response
	drivers ² of global environmental degradation, issues of sustainability, market transformation, scaling, and innovation?		
	4. Is the project designed with sound incremental reasoning?	DER, August 6, 2015. Yes.	
	5. Are the components in Table B sound and sufficiently clear and appropriate to achieve project objectives and the GEBs?	<p>DER, August 6, 2015.</p> <p>The project consists of three components:</p> <ol style="list-style-type: none"> 1) Expanding and sustaining investments in existing market sectors 2) Building market diversification 3) Replication and scaling-up <p>Please address the following comments:</p> <ol style="list-style-type: none"> 1) The project components are well explained and justified. Thank you for the clear linkage between TA and INV activities within the components. We note that MRV will be critical to all components, but we do not see sufficient references to MRV in the project activities. Please add additional activities that will help monitor the results both from a financial perspective and an energy savings perspective. These could be added to each component, or perhaps the agencies can consider adding a strong MRV activity in component 3. 	<ol style="list-style-type: none"> 1) Yes, MRV will be critical to all components and we have, as suggested, reinforced activities in this regard. We have included this in both components 1 and 2. Both components include ESCO contracts which will measure energy savings. We have listed a number of methodologies in these components to calculate energy savings. Together with financial data coming from the revolving fund, this will be fed into component 3 for analysis on the financial and energy savings performance of these contracts. This will help EESL to calibrate its business model going forward. 2) We have expanded the scope in component 3 to include a review of other technologies that could be included in EESL business models in the medium term. 3) UNEP, ADB and EESL remain of the view of that UNEP takes the lead in this project. Components will be implemented based on each agencies' comparative advantage and in full coordination

PIF Review

Review Criteria	Questions	Secretariat Comment	Agency Response
		<p>2) Component 3 could also consider some analysis of potential additional energy saving technologies that can fit the innovative business model.</p> <p>3) The document implies that UNEP is the lead agency. Please adjust the language in the PIF document to indicate more clearly that for GEF purposes, ADB is the lead agency. How the agencies wish to structure the shared project implementation is up to the agencies, but for GEF purposes, the ADB will be responsible for submitting PIRs and fulfilling other responsibilities as the lead agency.</p> <p>4) Please justify the project management costs. The amount requested is within the allowed limit of 5%, however most of the GEF funding will be allocated for investment. Please consider if project management costs can be reduced and resources allocated to project activities.</p> <p>DER, August 11, 2015.</p> <p>1) Additional MRV activities have been included. Comment cleared.</p> <p>2) Comment cleared.</p> <p>3) The agencies have identified UNEP as the lead agency. UNEP will be responsible for submitting PIRs and fulfilling other responsibilities as</p>	<p>between both agencies. In component 1, the ADB loan targets business as usual for EESL. The aim is to help EESL stabilise its financial position and bring quick impacts to the project. As such, this is not expected to be complex. The other main area of the project, covered in components 2 and 3 will be to help EESL to improve its business models and expand into new technologies. This is far more complex, but has large potential for energy savings, if the project does manage to help EESL reduce the risks associated with including new technologies and clients in its portfolio. Much of this work will be implemented by UNEP and as such, ADB EESL and UNEP agree it makes most sense for UNEP to continue leading on this project. UNEP still aims to have an office in India and this will allow UNEP to provide closer support to this project.</p> <p>4) The project costs have been reduced by USD 300,000 to USD 597,903. The approximate annual costs of the PMC are detailed below:</p> <p>(Pictograph that shows \$120,000 annual</p>

PIF Review			
Review Criteria	Questions	Secretariat Comment	Agency Response
		the lead agency. Comment cleared. 4) Project management costs have been reduced. Comment cleared.	costs for the PMC, including \$36,000 for project manager and \$42,000 for finance manager.)
	6. Are socio-economic aspects, including relevant gender elements, indigenous people, and CSOs considered?	DER, August 6, 2015. Please expand the stakeholder section to reference CSO that can be essential for promoting energy efficiency campaigns. DER, August 11, 2015. Comment cleared.	Yes, this has been addressed and the stakeholder section includes now reference to CSO regarding energy efficiency campaigns.
Availability of Resources	7. Is the proposed Grant (including the Agency fee) within the resources available from (mark all that apply):		
	<ul style="list-style-type: none"> The STAR allocation? 	DER, August 6, 2015. Yes. A letter of endorsement, signed by the OFP, Sri. Susheel Kumar on July 30, 2015, was submitted in the amount of \$20,880,000, inclusive of project grant, PPG, and agency fee.	
	<ul style="list-style-type: none"> The focal area allocation? 	DER, August 6, 2015. Yes.	
	<ul style="list-style-type: none"> The LDCF under the principle of equitable access 	NA	
	<ul style="list-style-type: none"> The SCCF (Adaptation or Technology Transfer)? 	NA	
Recommendations	8. Is the PIF being recommended for clearance and PPG (if additional amount beyond the norm) justified?	DER, August 6, 2015. Not at this time. Please address the comments in box 5 and 6.	
		DER, August 11, 2015. Yes. All comments cleared. The program manager recommends CEO PIF	

PIF Review			
Review Criteria	Questions	Secretariat Comment	Agency Response
		clearance.	
Review Date	Review	August 06, 2015	
	Additional Review (as necessary)	August 11, 2015	
	Additional Review (as necessary)		

CEO endorsement Review			
Review Criteria	Questions	Secretariat Comment at CEO Endorsement	Response to Secretariat comments
Project Design and Financing	1. If there are any changes from that presented in the PIF, have justifications been provided?	DER, May 4, 2017. Yes. Several changes were made, but justifications have been provided. In particular, energy efficient 5 star ceiling fans and agricultural pumps were added to the project plans.	
	2. Is the project structure/ design appropriate to achieve the expected outcomes and outputs?	DER, May 4, 2017. Yes.	
	3. Is the financing adequate and does the project demonstrate a cost-effective approach to meet the project objective?	DER, May 4, 2017. Yes. The project extends proven business models to new types of energy efficiency equipment, enabling GEF technical assistance to unlock ADB and kFw	

CEO endorsement Review

Review Criteria	Questions	Secretariat Comment at CEO Endorsement	Response to Secretariat comments
		loans.	
	4. Does the project take into account potential major risks, including the consequences of climate change, and describes sufficient risk response measures? (e.g., measures to enhance climate resilience)	DER, May 4, 2017. Yes.	
	5. Is co-financing confirmed and evidence provided?	DER, May 4, 2017. Yes.	
	6. Are relevant tracking tools completed?	DER, May 4, 2017. Yes.	
	7. <i>Only for Non-Grant Instrument:</i> Has a reflow calendar been presented?	DER, May 4, 2017. NA	
	8. Is the project coordinated with other related initiatives and national/regional plans in the country or in the region?	DER, May 4, 2017. Yes. The project is strongly coordinated with the Government of India energy efficiency initiatives and other global efforts.	
	9. Does the project include a budgeted M&E Plan that monitors and measures results with indicators and targets?	DER, May 4, 2017. Yes.	
	10. Does the project have descriptions of a knowledge management plan?	DER, May 4, 2017. Yes.	

CEO endorsement Review

Review Criteria	Questions	Secretariat Comment at CEO Endorsement	Response to Secretariat comments
Agency Responses	11. Has the Agency adequately responded to comments at the PIF ³ stage from:		
	<ul style="list-style-type: none"> • GEFSEC 	DER, May 4, 2017. Yes.	
	<ul style="list-style-type: none"> • STAP 	DER, May 4, 2017. Yes. Response to STAP comments is provided in Annex B, page 130-131.	
	<ul style="list-style-type: none"> • GEF Council 	<p>DER, May 4, 2017. Not at this time. Please respond to the German council member comment:</p> <p>"Germany welcomes the PIF "Creating and sustaining markets for energy efficiency" in India. The project builds on many results already obtained by the Indo-German Energy Programme (IGEN) which has been financed by BMZ and implemented by GIZ and KfW together with the Indian Bureau of Energy Efficiency (BEE) and Energy Efficiency Services Ltd. (EESL) since 2003 and 2009 respectively. We especially appreciate the focus on energy efficient street and domestic lighting, tri-generation technologies and ESCO concepts which have as well been supported in India under the Indo-German cooperation by IGEN.</p> <p>Concerning the proposal, we nevertheless suggest to update the</p>	<i>UNEP/ADB Response:</i>

CEO endorsement Review

Review Criteria	Questions	Secretariat Comment at CEO Endorsement	Response to Secretariat comments
		mentioned baselines with regard to the project outcomes (not only due to the results of IGEN). These baselines should particularly be improved with a view to the already achieved energy efficiency improvements through the installation of street lighting and domestic LEDs as well as for tri-generation technologies."	<ul style="list-style-type: none"> - <i>UNEP and ADB acknowledge the contribution of the Indo-German cooperation programme on energy efficiency in India and reiterate that KfW is a co-financier of this project for the innovative technologies on super-efficient ceiling fans, smart grids and trigeneration. The activities related to trigeneration have been designed based on the lessons learned from the Indo-German programme mentioned in this comment.</i> - <i>The data in the CEO endorsement document related to lighting, trigeneration and smart grids is updated vis-à-vis the PIF, however for the lighting, fans and agricultural pumps, the baseline changes every day given the fast moving market environment in India. EESL tracks these movements on a daily basis through a dashboard available on line and presented on page 24, Figure 4.</i> - <i>Updated baseline information in the CEO endorsement document can be found on page 12 Table 1 (February 2017) for lighting, fans and agricultural pumps and on pages 31-36 for trigeneration.</i>
	<ul style="list-style-type: none"> • Convention Secretariat 	DER, May 4, 2017. NA	
Recommendation	12. Is CEO endorsement recommended?	DER, May 4, 2017. Not at this time. Please respond to the comment in Box 11.	<i>Comment has been addressed</i>
Review Date	Review	May 04, 2017	
	Additional Review (as necessary)		
	Additional Review (as necessary)		

Scientific and Technical Advisory Panel

The Scientific and Technical Advisory Panel, administered by UNEP, advises the Global Environment Facility (Version 5)

STAP Scientific and Technical screening of the Project Identification Form (PIF)

Date of screening: September 26, 2015 Screener: Lev Neretin

Panel member validation by: Ralph E. Sims

Consultant(s):

I. PIF Information *(Copied from the PIF)*

Full Size Project GEF Trust Fund

GEF Project ID: 9258

Project Duration : 5

Countries : India

Project Title: Creating and Sustaining Markets for Energy Efficiency

GEF Agencies: ADB and UNEP

Other Executing Partners: Energy Efficiency Services Limited (EESL)

GEF Focal Area: Climate Change

II. STAP Advisory Response *(see table below for explanation)*

Based on this PIF screening, STAP's advisory response to the GEF Secretariat and GEF Agency(ies): **Concur**

III. Further guidance from STAP

1. The aim is to stimulate investment in EE through scaling up of LEDs in street and domestic lighting, ceiling fans, tri-generation, and smart grids. This includes social marketing, finance mechanisms, supply contracts. STAP commends project proponents for well-structured proposal with a strong national ownership and several innovative elements. Reducing electricity demand from India's grid, which is 70% coal-fired, by improved appliance efficiency would have multi-benefits including reducing CO2 emissions. EE has received considerable support by the Government over the past decade including establishment of Energy Efficiency Services Limited (EESL) in 2009. Also the ESCO business model has been introduced but has faced various barriers including mistrust by clients. This project aims to reduce these barriers.

2. Baseline technologies are well outlined. These include smart grids that have potential to help reduce the very high power system losses of 25%. Government loans are available for line companies to invest in smart-metering which, combined with EE (through EESL) can help reduce peak loads. This is an innovative approach but EESL and other project partners are advised to carefully review the numerous smart-grid initiatives being undertaken worldwide. Examples include
<http://ogjresearch.stores.yahoo.net/smart-grid-review-january.html> ; <http://www.smartgridtechnology.net/> ;
http://www.irena.org/DocumentDownloads/Publications/smart_grids.pdf and IEA's co-operative programme:
<http://www.iea-isgan.org/?c=1>

3. However, it appears the smart-grid potential is already evolving rapidly in India with considerable input from the private sector including ABB, GE, L&T, Schneider Electric and Wipro (<http://www.sbwire.com/press-releases/smart-grid-market-2015-in-india-review-research-size-share-industry-analysis-trends-and-forecast-2019-622047.htm>). So the project proponents should consider including more actively the private sector, in addition to the power distribution companies, among the project partners which is not currently the case.

4. Tri-generation suits the Indian climate so should be encouraged, but it is not clear from where the technologies are to be sourced. Are they locally made or imported? Are the systems economically viable? Will demonstrations be established and if so where? As for LEDs and efficient ceiling fans, no evidence is provided on the projected return on investment as a result of energy savings. The smart-grid example shows gains but mainly from reduced losses and theft of power.

UNEP & ADB response:

Tri-generation: The required technology is available in India. However, through this project, we plan to consult with international companies/service providers as well, if they are interested to transfer the knowledge and further set-up the infrastructure, here in India. Tri-generation is feasible for facilities which needs cooling, heating and hot water. Further, it is economically viable where minimum 80% of electricity is provided by grid and rest (20%) through diesel gensets. In India, at most of the facilities, electricity generated through diesel gensets contribute as high as 50%. Demonstrations will be established during the project, however the locations will only be decided during implementation.

LEDs and Super-efficient ceiling fans: The respective calculations and numbers are provided in the baseline scenario, under Component 1 and 2. Please note that there is a minimum rate of return i.e. 21% (pre-tax) to be maintained. The same has been kept in mind, while preparing the respective calculations.

Smart Grid: To capture energy savings, project will be targeting technical losses. Baseline scenario (component 2 – smart grid) shows a table with technical/commercial losses with the respective potential (investment/savings). As the mechanism is trigger based and further measurement and verification of individual loss category is difficult, we have taken a consolidated reduction of 5% in the aggregate technical and commercial losses (AT&C).

5. The alternative scenario involves financial mechanisms to stimulate greater investment. GEF funding will help reduce GHG emissions through energy efficiency, scaling up and applications of the new technologies.

6. A total potential GHG saving of 8.53 Mt CO₂-eq is claimed, but insufficient details were provided in Section 5 for the calculations and assumptions used.

UNEP & ADB response:

GHG savings have been updated. The assumptions and calculations are provided in section A.1.5 and Annex J-2 of the CEO Endorsement document.

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS⁷⁰

Provide detailed funding amount of the PPG activities financing status in the table below:

UN Environment Project Preparation Grant:

UN Environment PPG Grant Approved at PIF: US\$ 150,000			
<i>Project Preparation Activities Implemented</i>	<i>GEF/LDCF/SCCF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date⁷¹</i>	<i>Amount Committed</i>
Consultants	46,400	43,250	46,400
Travel on official business	7,900	6,852	7,900
Consulting firm	68,400	68,400	68,400
Meetings	17,000	14,233	17,000
Contingency	10,300	10,300	10,300
Total	150,000	143,035	150,000

ADB Project Preparation Grant:

ADB PPG Grant Approved at PIF: US\$ 150,000			
<i>Project Preparation Activities Implemented</i>	<i>GEF/LDCF/SCCF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date⁷²</i>	<i>Amount Committed</i>
Consultants	100,000	14,853	100,000
International Travel	12,000	0	12,000
Local Travel	18,000	0	18,000
Workshops, Seminars	13,000	0	13,000
Contingencies	7,000	0	7,000
Total	150,000	14,853	150,000

⁷⁰ If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue to 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. Agencies should also report closing of PPG to Trustee in its Quarterly Report.

⁷¹ As at 31/03/2017.

⁷² US\$ 14,853 has been disbursed for consulting outputs of gender equality specialist and energy efficiency specialist and related communications. The remaining funds will be used on on-going work in relation to pre-design of social marketing campaigns, refinement of gender action framework, review of feasibility of various EE technology markets by EE specialist, follow up with EESL from financial management assessment, continued pre-feasibility and preparatory work in relation to the EE Revolving Fund architecture - as well as associated workshops, meetings and travel.

ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used)

Provide a calendar of expected reflows to the GEF/LDCF/SCCF Trust Funds or to your Agency (and/or revolving fund that will be set up)

Not applicable.

ANNEX E: CONSULTANTS TO BE HIRED FOR THE PROJECT USING GEF RESOURCES

<i>Position Titles</i>	<i>\$/ Person Week</i>	<i>Estimated Person Weeks</i>	<i>Tasks To Be Performed</i>
For Technical Assistance			
Local			
<i>Investment Fund Manager</i>	\$ 1,250/person/week	192 weeks	Investment Fund Manager shall be responsible for oversight and technical direction, managing day to day operations, developing a viable project pipeline and achieving technical, economic and social performance milestones defined in the EERF business plan.
<i>Legal Specialist</i>	\$ 1,000/person/week	20 weeks	The role of the legal expert shall include analyzing the rules and working mechanism created for EERF, and providing legal support for functioning of EERF. The legal expert shall also support during procurement of technologies and project execution. The legal expert will report to the project director and the Project Management Unit.
<i>Gender Specialist</i>	\$ 1,000/person/week	32 weeks	The consultant will be responsible for developing subproject design elements that will maximize gender benefits in the identified subproject areas and will design and implement women-targeted interventions for the finalized subprojects.
<i>Marketing Communication Specialist</i>	\$ 625/person/week	160 weeks	A dedicated marketing communications specialist will be needed to help support the overall EESL Communications Plan, as well as provide guidance and leadership for the design and implementation of gender sensitive social marketing campaigns.
<i>Business Development Officer</i>	\$ 500/person/week	144 weeks	The position focuses on implementation of business development strategies and plans to meet the fund's revenue targets.
<i>Financial Management Specialist</i>	\$ 500/person/week	192 weeks	The EERF will require a dedicated Financial Management Specialist to set up and implement the financial architecture for the fund. Among others, the specialist will be responsible for conducting fiduciary risk analysis, including (i) review and finalization of cost estimates, (ii) financial analysis; and (ii) financial management assessments as needed throughout the operation of the EERF.
<i>Other Technical Specialists (Technical Working Group)</i>	\$ 1250/person/week	144 weeks	Technical Working Group will comprise of specialists in the area of tri-generation/co-gen/district cooling, smart grids (meters), ceiling fans, smart appliances, buildings. They will be providing inputs for training programs, engineering designs, sub-project implementation apart from domain support to the overall project.
International			
<i>Energy Efficiency Specialist</i>	\$ 3,333/person/week	15 weeks	The consultant will be responsible for assessing the performance of EESL's existing portfolio, the potential to achieve the desired results through the planned projects under the mentioned investment, and to assess the scope for refining the project process.

ANNEX F-1: RECONCILIATION BETWEEN GEF ACTIVITY BASED BUDGET AND UNEP BUDGET LINE

ANNEX F-1 - RECONCILIATION BETWEEN GEF ACTIVITY BASED BUDGET AND UNEP BUDGET LINE (GEF FUNDS ONLY US\$)												
Project title: Creating and Sustaining Markets for Energy Efficiency												
Project number: 9258												
Project executing partner: Energy Efficiency Services Limited (EESL)												
Project implementation period:												
From: July 2017												
To: June 2022												
UNEP Budget Line	Expenditure by project component					Expenditure by calendar year						
	Component 1	Component 2	Component 3	PMC	Total	2017 (H2)	2018	2019	2020	2021	2022 (H1)	Total
10 PERSONNEL COMPONENT												
1100 Project Personnel												
1101 National Project Director	-	-	-	130 000	130 000	13 000	26 000	26 000	26 000	26 000	13 000	130 000
1102 Project Manager	-	-	-	248 000	248 000	24 800	49 600	49 600	49 600	49 600	24 800	248 000
1103 Quality Assurance Expert 1	-	57 500	30 000	-	87 500	8 750	17 500	17 500	17 500	17 500	8 750	87 500
1104 Quality Assurance Expert 2	-	57 500	30 000	-	87 500	8 750	17 500	17 500	17 500	17 500	8 750	87 500
1105 Growth Strategy Expert 1	-	-	87 500	-	87 500	8 750	17 500	17 500	17 500	17 500	8 750	87 500
1106 Growth Strategy Expert 2	-	-	87 500	-	87 500	8 750	17 500	17 500	17 500	17 500	8 750	87 500
1107 Project Team Member 1 (Junior level)	20 000	60 000	10 000	-	90 000	9 000	18 000	18 000	18 000	18 000	9 000	90 000
1108 Project Team Member 2 (Junior level)	20 000	60 000	10 000	-	90 000	9 000	18 000	18 000	18 000	18 000	9 000	90 000
1109 Project Team Member 3 (Mid level)	25 000	80 000	15 000	-	120 000	12 000	24 000	24 000	24 000	24 000	12 000	120 000
1110 Project Team Member 4 (Mid level)	25 000	80 000	15 000	-	120 000	12 000	24 000	24 000	24 000	24 000	12 000	120 000
1199 Sub-total	90 000	395 000	285 000	378 000	1 148 000	114 800	229 600	229 600	229 600	229 600	114 800	1 148 000
1200 Consultants												
1201 Energy Efficiency Specialist (International)	50 000	-	-	-	50 000	10 000	20 000	20 000				50 000
1202 Investment Fund Manager (National)	240 000	-	-	-	240 000	24 000	48 000	48 000	48 000	48 000	24 000	240 000
1203 Legal Specialist (National)	20 000	-	-	-	20 000	2 000	4 000	4 000	4 000	4 000	2 000	20 000
1204 Gender Specialist (National)	32 000	-	-	-	32 000	3 200	6 400	6 400	6 400	6 400	3 200	32 000
1205 Marketing Communications Specialist (National)	100 000	-	-	-	100 000	10 000	20 000	20 000	20 000	20 000	10 000	100 000
1206 Business Development Officer (National)	72 000	-	-	-	72 000	7 200	14 400	14 400	14 400	14 400	7 200	72 000
1207 Financial Management Specialist (National)	96 000	-	-	-	96 000	9 600	19 200	19 200	19 200	19 200	9 600	96 000
1208 Other Technical Specialists	180 000	-	-	-	180 000	18 000	36 000	36 000	36 000	36 000	18 000	180 000
1299 Sub-total	790 000	-	-	-	790 000	84 000	168 000	168 000	148 000	148 000	74 000	790 000
1300 Administrative Support												
1301 Technical Working Coordinator 1	-	-	-	45 000	45 000	4 500	9 000	9 000	9 000	9 000	4 500	45 000
1302 Technical Working Coordinator 2	-	-	-	45 000	45 000	4 500	9 000	9 000	9 000	9 000	4 500	45 000
1303 Support/Contract Staff	110 000	150 000	35 000	-	295 000	29 500	59 000	59 000	59 000	59 000	29 500	295 000
1399 Sub-total	110 000	150 000	35 000	90 000	385 000	38 500	77 000	77 000	77 000	77 000	38 500	385 000
1600 Travel on official business												
1601 Travel	266 920	135 000	153 155	60 000	615 075	61 508	123 015	123 015	123 015	123 015	61 508	615 075
1699 Sub-total	266 920	135 000	153 155	60 000	615 075	61 508	123 015	123 015	123 015	123 015	61 508	615 075
1999 Component total	1 256 920	680 000	473 155	528 000	2 938 075	298 808	597 615	597 615	577 615	577 615	288 808	2 938 075
20 SUB-CONTRACT COMPONENT												
2100 Sub-contracts (MOUs/LOAs for cooperating agencies)												
2101	-	-	-	-	-	-	-	-	-	-	-	-
2199 Sub-total	-	-	-	-	-	-	-	-	-	-	-	-
2200 Sub-contracts (MOUs/LOAs for supporting organizations)												
2201	-	-	-	-	-	-	-	-	-	-	-	-
2299 Sub-total	-	-	-	-	-	-	-	-	-	-	-	-
2300 Sub-contracts (for commercial purposes)												
2301 Agency for Measurement, Reporting and Verification	-	480 000	-	-	480 000	-	96 000	96 000	96 000	96 000	96 000	480 000
2302 Agency for Bid Advisory	-	-	-	-	-	-	-	-	-	-	-	-
2303 Agency for training and capacity building	-	-	300 000	-	300 000	12 000	48 000	60 000	60 000	60 000	60 000	300 000
2304 Agency for IT software/services	-	-	130 000	-	130 000	-	-	-	65 000	65 000	-	130 000
2305 Agency for developing the growth strategy	-	-	100 000	-	100 000	-	20 000	20 000	20 000	20 000	20 000	100 000
2306 Agency for design, manufacture, supply, testing, installation and commissioning of LED Streetlights	-	-	-	-	-	-	-	-	-	-	-	-
2307 Agency for design, manufacture and supply of LED Bulbs (Under Domestic Lighting Project)	-	-	-	-	-	-	-	-	-	-	-	-
2308 Agency for supply and installation of energy efficiency pump sets for projects related to agricultural functions	-	-	-	-	-	-	-	-	-	-	-	-

ANNEX F-1 - RECONCILIATION BETWEEN GEF ACTIVITY BASED BUDGET AND UNEP BUDGET LINE (GEF FUNDS ONLY US\$)

Project title: Creating and Sustaining Markets for Energy Efficiency												
Project number: 9258												
Project executing partner: Energy Efficiency Services Limited (EESL)												
Project implementation period:												
From:	July 2017											
To:	June 2022											
	Expenditure by project component					Expenditure by calendar year						
UNEP Budget Line	Component 1	Component 2	Component 3	PMC	Total	2017 (H2)	2018	2019	2020	2021	2022 (H1)	Total
2309 Agency for supply and distribution of 5 star ceiling fans	-	-	-	-	-							-
2310 Agency for supply and distribution of super-efficient ceiling fans	-	6 000 000	-	-	6 000 000			1 500 000	1 500 000	1 500 000	1 500 000	6 000 000
2311 Agency for supply, installation, testing and commissioning of Trigereneration	-	3 000 000	-	-	3 000 000				1 500 000	1 500 000		3 000 000
2312 Agency for Implementation of Smart Grid Project	-	4 000 000	-	-	4 000 000				1 200 000	2 800 000		4 000 000
2313 Agency for pre-feasibility study for Trigereneration	-	72 000	-	-	72 000				72 000			72 000
2314 Agency for feasibility study for Trigereneration	-	160 000	-	-	160 000				160 000			160 000
2315 Agency for pre-feasibility study for Smart Grid	-	80 000	-	-	80 000				80 000			80 000
2316 Agency for feasibility study for Smart Grid	-	120 000	-	-	120 000				120 000			120 000
2399 Sub-total	-	13 912 000	530 000	-	14 442 000	12 000	164 000	1 676 000	4 873 000	6 041 000	1 676 000	14 442 000
2999 Component total	-	13 912 000	530 000	-	14 442 000	12 000	164 000	1 676 000	4 873 000	6 041 000	1 676 000	14 442 000
30 TRAINING COMPONENT												
3200 Group training	-	-	-	-	-							-
3201 Training on Quality Assurance	-	-	120 000	-	120 000		120 000					120 000
3202 Training on Growth Strategy	-	-	120 000	-	120 000		36 000	36 000			48 000	120 000
3203 Training for ULBs	-	-	200 000	-	200 000		40 000	40 000	40 000	40 000	40 000	200 000
3204 Training EERF	89 886	-	-	-	89 886	9 886	20 000	20 000	20 000	20 000		89 886
3299 Sub-total	89 886	-	440 000	-	529 886	9 886	216 000	96 000	60 000	60 000	88 000	529 886
3300 Meetings/Conferences	-	-	-	-	-							-
3301 Stakeholder Meetings & Conferences	40 000	50 000	100 000	-	190 000	9 500	47 500	57 000	38 000	19 000	19 000	190 000
3399 Sub-total	40 000	50 000	100 000	-	190 000	9 500	47 500	57 000	38 000	19 000	19 000	190 000
3999 Component total	129 886	50 000	540 000	-	719 886	19 386	263 500	153 000	98 000	79 000	107 000	719 886
40 EQUIPMENT AND PREMISES COMPONENT												
4100 Expendable equipment	-	-	-	-	-							-
4101	-	-	-	-	-							-
4199 Sub-total	-	-	-	-	-	-	-	-	-	-	-	-
4200 Non-expendable equipment	-	-	-	-	-							-
4201	-	-	-	-	-							-
4299 Sub-total	-	-	-	-	-	-	-	-	-	-	-	-
4999 Component total	-	-	-	-	-	-	-	-	-	-	-	-
50 MISCELLANEOUS COMPONENT												
5100 Operation and maintenance of equipment	-	-	-	-	-							-
5101	-	-	-	-	-							-
5199 Sub-total	-	-	-	-	-	-	-	-	-	-	-	-
5200 Reporting costs	-	-	-	-	-							-
5201 Reports & publications	245 000	59 099	150 000	39 903	494 002	49 400	98 800	98 800	98 800	98 800	49 400	494 002
5299 Sub-total	245 000	59 099	150 000	39 903	494 002	49 400	98 800	98 800	98 800	98 800	49 400	494 002
5300 Sundry	-	-	-	-	-							-
5301 Financial Audit	4 000	4 000	4 000	-	12 000		2 400	2 400	2 400	2 400	2 400	12 000
5302 Office Supplies	-	-	-	30 000	30 000	3 000	6 000	6 000	6 000	6 000	3 000	30 000
5303 EERF - Administrative Expenses	80 000	-	-	-	80 000	16 000	40 000	8 000	8 000	8 000		80 000
5399 Sub-total	84 000	4 000	4 000	30 000	122 000	19 000	48 400	16 400	16 400	16 400	5 400	122 000
5400 Hospitality and entertainment	-	-	-	-	-							-
5401	-	-	-	-	-							-
5499 Sub-total	-	-	-	-	-	-	-	-	-	-	-	-
5500 Evaluation	-	-	-	-	-							-
5501 Midterm Evaluation	20 000	20 000	20 000	-	60 000			60 000				60 000
5502 Terminal Evaluation	30 000	25 000	25 000	-	80 000					80 000		80 000
5599 Sub-total	50 000	45 000	45 000	-	140 000	-	-	60 000	-	80 000	-	140 000
5999 Component total	379 000	108 099	199 000	69 903	756 002	68 400	147 200	175 200	115 200	195 200	54 800	756 002
99 GRAND TOTAL	1 765 806	14 750 099	1 742 155	597 903	18 855 963	398 594	1 172 315	2 601 815	5 663 815	6 892 815	2 126 608	18 855 963

ANNEX F-2 - RECONCILIATION BETWEEN GEF BUDGET AND CO-FINANCE BUDGET

ANNEX F-2 - RECONCILIATION BETWEEN GEF BUDGET AND CO-FINANCE BUDGET (TOTAL GEF & CO-FINANCE US\$)													
Project title: Creating and Sustaining Markets for Energy Efficiency													
Project number: 9258													
Project executing partner: Energy Efficiency Services Limited (EESL)													
Project implementation period:													
From: July 2017													
To: June 2022													
UNEP Budget Line	GEF Cash	Co-finance contribution per institution and per type								Total co-financing		Total project funding	
		ADB		UNEP		KfW		EESL		Cash	In-kind	Cash	In-kind
	A	B	C	D	E	F	G	F	G	B+D+F	C+E+G	A+B+D+F	C+E+G
10 PERSONNEL COMPONENT													
1100 Project Personnel													
1101 National Project Director	130 000				20 000				280 000	-	300 000	130 000	300 000
1102 Project Manager	248 000				20 000				180 000	-	200 000	248 000	200 000
1103 Quality Assurance Expert 1	87 500								40 000	-	40 000	87 500	40 000
1104 Quality Assurance Expert 2	87 500								40 000	-	40 000	87 500	40 000
1105 Growth Strategy Expert 1	87 500								40 000	-	40 000	87 500	40 000
1106 Growth Strategy Expert 2	87 500								40 000	-	40 000	87 500	40 000
1107 Project Team Member 1 (Junior level)	90 000								40 000	-	40 000	90 000	40 000
1108 Project Team Member 2 (Junior level)	90 000								40 000	-	40 000	90 000	40 000
1109 Project Team Member 3 (Mid level)	120 000								35 000	-	35 000	120 000	35 000
1110 Project Team Member 4 (Mid level)	120 000								35 000	-	35 000	120 000	35 000
1199 Sub-total	1 148 000	-	-	-	40 000	-	-	-	770 000	-	810 000	1 148 000	810 000
1200 Consultants													
1201 Energy Efficiency Specialist (International)	50 000	350 000								350 000	-	400 000	-
1202 Investment Fund Manager (National)	240 000									-	-	240 000	-
1203 Legal Specialist (National)	20 000									-	-	20 000	-
1204 Gender Specialist (National)	32 000									-	-	32 000	-
1205 Marketing Communications Specialist (National)	100 000	72 000							144 000	72 000	144 000	172 000	144 000
1206 Business Development Officer (National)	72 000									-	-	72 000	-
1207 Financial Management Specialist (National)	96 000	96 000								96 000	-	192 000	-
1208 Other Technical Specialists	180 000									-	-	180 000	-
1299 Sub-total	790 000	518 000	-	-	-	-	-	-	144 000	518 000	144 000	1 308 000	144 000
1300 Administrative Support													
1301 Technical Working Coordinator 1	45 000								25 000	-	25 000	45 000	25 000
1302 Technical Working Coordinator 2	45 000								25 000	-	25 000	45 000	25 000
1303 Support/Contract Staff	295 000								190 000	-	190 000	295 000	190 000
1399 Sub-total	385 000	-	-	-	-	-	-	-	240 000	-	240 000	385 000	240 000
1600 Travel on official business													
1601 Travel	615 075	193 000							400 000	193 000	400 000	808 075	400 000
1699 Sub-total	615 075	193 000	-	-	-	-	-	-	400 000	193 000	400 000	808 075	400 000
1999 Component total	2 938 075	711 000	-	-	40 000	-	-	-	1 554 000	711 000	1 594 000	3 649 075	1 594 000
20 SUB-CONTRACT COMPONENT													
2100 Sub-contracts (MOUs/LOAs for cooperating agencies)													
2101										-	-	-	-
2199 Sub-total										-	-	-	-
2200 Sub-contracts (MOUs/LOAs for supporting organizations)													
2201										-	-	-	-
2299 Sub-total										-	-	-	-
2300 Sub-contracts (for commercial purposes)													
2301 Agency for Measurement, Reporting and Verification	480 000									-	-	480 000	-
2302 Agency for Bid Advisory	-								200 000	-	200 000	-	200 000
2303 Agency for training and capacity building	300 000								200 000	-	200 000	300 000	200 000
2304 Agency for IT software/services	130 000								400 000	-	400 000	130 000	400 000
2305 Agency for developing the growth strategy	100 000								100 000	-	100 000	100 000	100 000
2306 Agency for design, manufacture, supply, testing, installation and commissioning of LED Streetlights	-	80 120 000							59 650 000	139 770 000	-	139 770 000	-
2307 Agency for design, manufacture and supply of LED Bulbs (Under Domestic Lighting Project)	-	40 049 000							15 860 000	55 909 000	-	55 909 000	-
2308 Agency for supply and installation of energy efficiency pump sets for projects related to agricultural functions	-	80 120 000							91 570 000	171 690 000	-	171 690 000	-

ANNEX F-2 - RECONCILIATION BETWEEN GEF BUDGET AND CO-FINANCE BUDGET (TOTAL GEF & CO-FINANCE US\$)

Project title: Creating and Sustaining Markets for Energy Efficiency															
Project number: 9258															
Project executing partner: Energy Efficiency Services Limited (EESL)															
Project implementation period:															
From: July 2017															
To: June 2022															
UNEP Budget Line	GEF	Co-finance contribution per institution and per type								Total co-financing		Total project funding			
	Cash A	ADB		UNEP		KfW		EESL		Cash	In-kind	Cash	In-kind		
		Cash B	In-kind C	Cash D	In-kind E	Cash F	In-kind G	Cash F	In-kind G	B+D+F	C+E+G	A+B+D+F	C+E+G		
2309	Agency for supply and distribution of 5 star ceiling fans	-								31 920 000		31 920 000		31 920 000	
2310	Agency for supply and distribution of super-efficient ceiling fans	6 000 000				15 000 000				15 000 000		15 000 000		21 000 000	
2311	Agency for supply, installation, testing and commissioning of Trigeneration	3 000 000				6 200 000				6 200 000		6 200 000		9 200 000	
2312	Agency for Implementation of Smart Grid Project	4 000 000				10 000 000				10 000 000		10 000 000		14 000 000	
2313	Agency for pre-feasibility study for Trigeneration	72 000												72 000	
2314	Agency for feasibility study for Trigeneration	160 000												160 000	
2315	Agency for pre-feasibility study for Smart Grid	80 000												80 000	
2316	Agency for feasibility study for Smart Grid	120 000												120 000	
2399	Sub-total	14 442 000	200 289 000	-	-	31 200 000	-	199 000 000	900 000	430 489 000	900 000	444 931 000	900 000	444 931 000	900 000
2999	Component total	14 442 000	200 289 000	-	-	31 200 000	-	199 000 000	900 000	430 489 000	900 000	444 931 000	900 000	444 931 000	900 000
30	TRAINING COMPONENT														
3200	Group training														
3201	Training on Quality Assurance	120 000												120 000	
3202	Training on Growth Strategy	120 000							50 000		50 000		50 000		50 000
3203	Training for ULBs	200 000							178 240		178 240		178 240		178 240
3204	Training EERF	89 886												89 886	
3299	Sub-total	529 886	-	-	-	-	-	-	228 240	-	228 240	-	228 240	529 886	228 240
3300	Meetings/Conferences														
3301	Stakeholder Meetings & Conferences	190 000							50 000		50 000		50 000		50 000
3399	Sub-total	190 000	-	-	-	-	-	-	50 000	-	50 000	-	50 000	190 000	50 000
3999	Component total	719 886	-	-	-	-	-	-	278 240	-	278 240	-	278 240	719 886	278 240
40	EQUIPMENT AND PREMISES COMPONENT														
4100	Expendable equipment														
4101															
4199	Sub-total	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4200	Non-expendable equipment														
4201															
4299	Sub-total	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4999	Component total	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	MISCELLANEOUS COMPONENT														
5100	Operation and maintenance of equipment														
5101															
5199	Sub-total	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5200	Reporting costs														
5201	Reports & publications	494 002							147 760		147 760		147 760		147 760
5299	Sub-total	494 002	-	-	-	-	-	-	147 760	-	147 760	-	147 760	494 002	147 760
5300	Sundry														
5301	Financial Audit	12 000												12 000	
5301	Office Supplies	30 000							80 000		80 000		80 000		80 000
5303	EERF - Administrative Expenses	80 000												80 000	
5399	Sub-total	122 000	-	-	-	-	-	-	80 000	-	80 000	-	80 000	122 000	80 000
5400	Hospitality and entertainment														
5401															
5499	Sub-total	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5500	Evaluation														
5501	Midterm Evaluation	60 000												60 000	
5502	Terminal Evaluation	80 000												80 000	
5599	Sub-total	140 000	-	-	-	-	-	-	-	-	-	-	-	140 000	-
5999	Component total	756 002	-	-	-	-	-	-	227 760	-	227 760	-	227 760	756 002	227 760
99	GRAND TOTAL	18 855 963	201 000 000	-	-	40 000	31 200 000	-	199 000 000	2 960 000	431 200 000	3 000 000	450 055 963	3 000 000	

ANNEX G: M&E BUDGET AND WORK PLAN

M&E Activity	Description	Responsible Parties	Timeframe	Indicative budget (USD)
Inception Workshop (IW) and Report	Report prepared immediately following the IW; it includes: <ul style="list-style-type: none"> - Detailed Work Plan for the 1st year, and overview of Annual Work Plan for subsequent years. - Detailed budget for the 1st year, and overview of the overall budget for subsequent years, divided per component and budget lines. - Detailed narrative of roles of ADB, UN Environment, the PMU and the PSC: institutional responsibilities, coordinating actions and feedback mechanisms - Detailed Procurement and M&E Plans 	<u>Execution:</u> Project Manager <u>Support:</u> ADB TM UN Environment TM	Immediately following, within 2 months of project start-up	GEF: Part of PM tasks Co-fin: US\$ 5,000
Half-yearly progress report	Part of UN Environment procedures for project monitoring. <ul style="list-style-type: none"> - Analyzes project performance over the reporting period UN Environment; - Describes constraints experienced in the progress towards results and the reasons. - Describes Work Plan for the next period in an Annex and the detailed budget divided per component and budget lines 	<u>Execution:</u> Project Manager <u>Support:</u>	Two (2) half-yearly progress reports for any given year <ul style="list-style-type: none"> - As at June 30 and Dec. 31 - Submit by July 31 and Jan. 31 latest 	GEF: Part of PM tasks Co-fin: US\$ 10,000
Quarterly expenditure reports	Detailed expenditure reports (in Excel), with explanations and justification of any change for each budget line	<u>Execution:</u> Project Manager Financial officer <u>Support:</u> FMO	Four (4) quarterly expenditure reports for any given year <ul style="list-style-type: none"> - As at Dec. 31, March 31, June 30 and Sept. 30 - Submit by Jan. 31, April 30, July 31 and Oct. 31 latest Final expenditure Report 60 days after project completion	GEF: Part of PM tasks Co-fin: US\$ 10,000
Technical and thematic Reports; Communication of lessons learnt	Technical and thematic periodic reports could also be prepared to focus on specific issues or areas of activity covered by the project,	<u>Execution:</u> Project Manager <u>Support:</u> Project consultants	As necessary for the thematic reports	GEF: Part of PM tasks Co-fin: US\$ 50,000
Project Implementation Review (PIR)	Analyzes project performance over the reporting period UNEP. Describes constraints experienced in the progress towards results and the reasons. Draws lessons and makes clear recommendations for future orientation in addressing the key problems in the lack of progress. The PIR is discussed at PSC meetings.	<u>Execution:</u> Project Manager UN Environment TM ADB TM <u>Support:</u> Financial officer FMO	Yearly <ul style="list-style-type: none"> - As at June 30 - Submit by 31 July latest 	GEF: Part of PM tasks Co-fin: US\$ 10,000

M&E Activity	Description	Responsible Parties	Timeframe	Indicative budget (USD)
Co-financing Report	Report on co-financing (cash and/or in-kind) fulfilled contributions from all project partners that provided co-finance letters.	<u>Execution:</u> Project Manager Financial Officer <u>Support:</u> Co-financing partners FMO	Yearly - As at June 30 - Submit by 31 July latest	GEF: Part of PM tasks Co-fin: US\$ 10,000
Medium-Term Evaluation / Medium-Term Review (MTE/MTR)	The purpose of the Mid-Term Evaluation (MTE) or Mid-Term Review (MTR) is to provide an independent assessment of project performance at mid-term, to analyze whether the project is on track, what problems and challenges the project is encountering, and which corrective actions are required so that the project can achieve its intended outcomes by project completion in the most efficient and sustainable way. In addition, it will verify information gathered through the GEF tracking tools. Since for short duration projects, PIR can serve as the project MTR, the need of a MTE or MTR for this project will be assessed by the Task Manager according to the progress of the project.	<u>Execution:</u> Independant evaluator(s) (if MTE) <i>or</i> Project Manager UN Environment TM (if MTR) <u>Support:</u> UN Environment EO ADB TM Project Manager FMO Project partners	At mid-point of project implementation upon Task Manager's request	GEF: US\$ 60,000 Co-fin: US\$ 0
Final Report	The project team will draft and submit a Project Final Report, with other docs (such as last PIR), at least two weeks before the PSC meeting for their review and comments; this meeting decides whether any action is needed to achieve the sustainability of project results; and draws lessons to be captured into other projects; Comprehensive report summarizing all activities, achievements, lessons learned, objectives met or not achieved structures and systems implemented, etc. Lays out recommendations for any further steps that may need to be taken to ensure the sustainability and replication of project activities.	<u>Execution:</u> Project Manager <u>Support:</u>	Final report no later than three (3) months after the technical completion date	GEF: Part of PM tasks Co-fin: US\$ 5,000
Terminal Evaluation	Further review the topics covered in the mid-term evaluation. Looks at the impacts and sustainability of the results, including the contribution to capacity development and the achievement of global environmental goals.	<u>Execution:</u> Independant evaluator(s) <u>Support:</u> UN Environment EO Project Manager UN Environment TM ADB TM	Can be initiated within six (6) months prior to the project's technical completion date	GEF: US\$ 80,000 Co-fin: US\$ 0

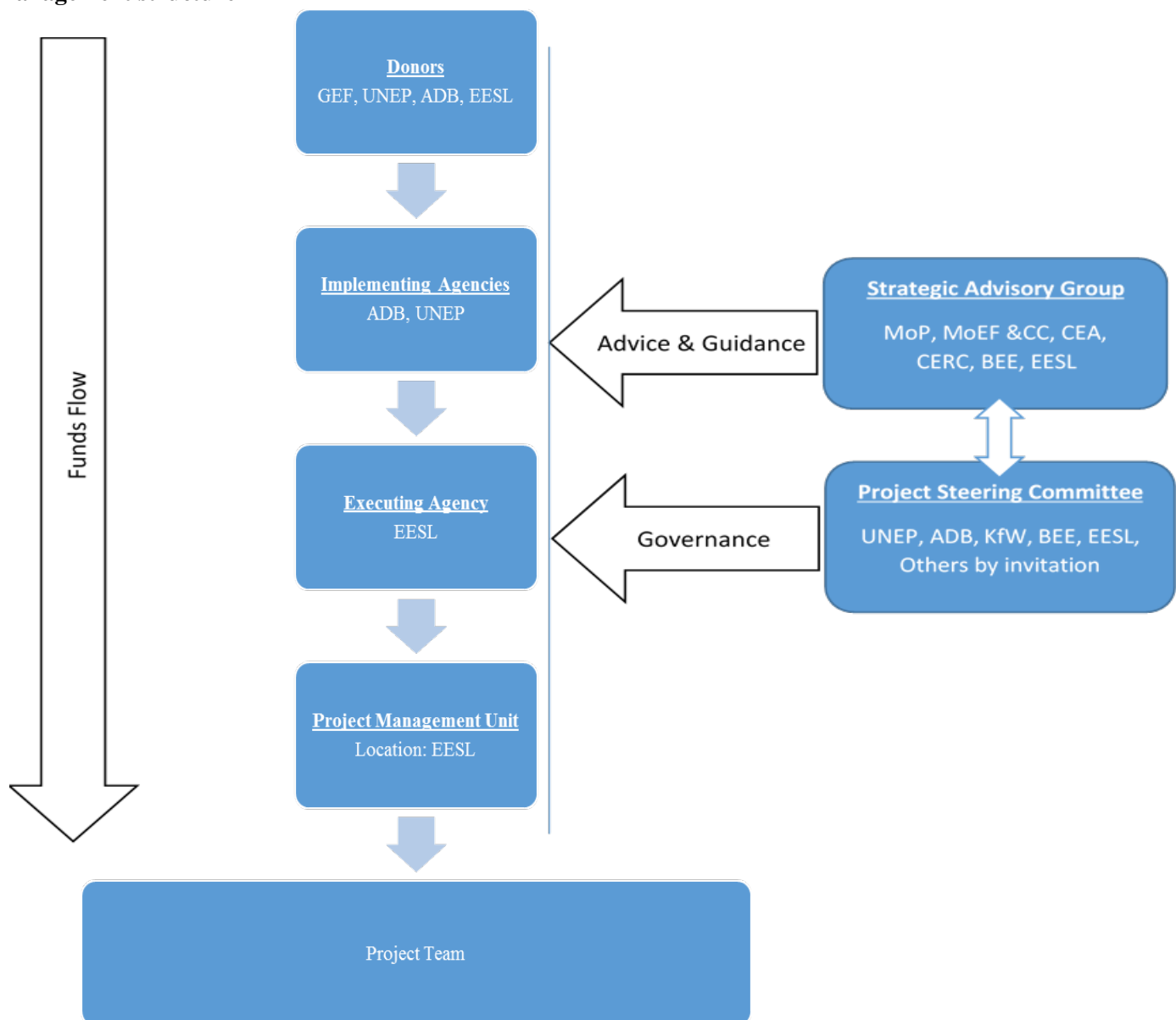
M&E Activity	Description	Responsible Parties	Timeframe	Indicative budget (USD)
Audits	Financial audits	<u>Execution:</u> Independant audit firm <u>Support:</u> Project Manager Financial officer	Annually - As at 31 Dec. - Submit by June 30 latest	GEF: US\$ 12,000 Co-fin: US\$ 0
Publication of Lessons Learnt and other project publications	Lessons learned and other project documents are published for the benefit of on-going and future projects	<u>Execution:</u> Project Manager <u>Support:</u> Project consultants	Annually, part of half-yearly progress reports and Final Report	GEF: Part of PM tasks Co-fin: US\$ 27,760
TOTAL M&E COST			GEF: US\$ 152,000	Co-fin: US\$ 127,760

ANNEX H: PROJECT IMPLEMENTATION ARRANGEMENTS

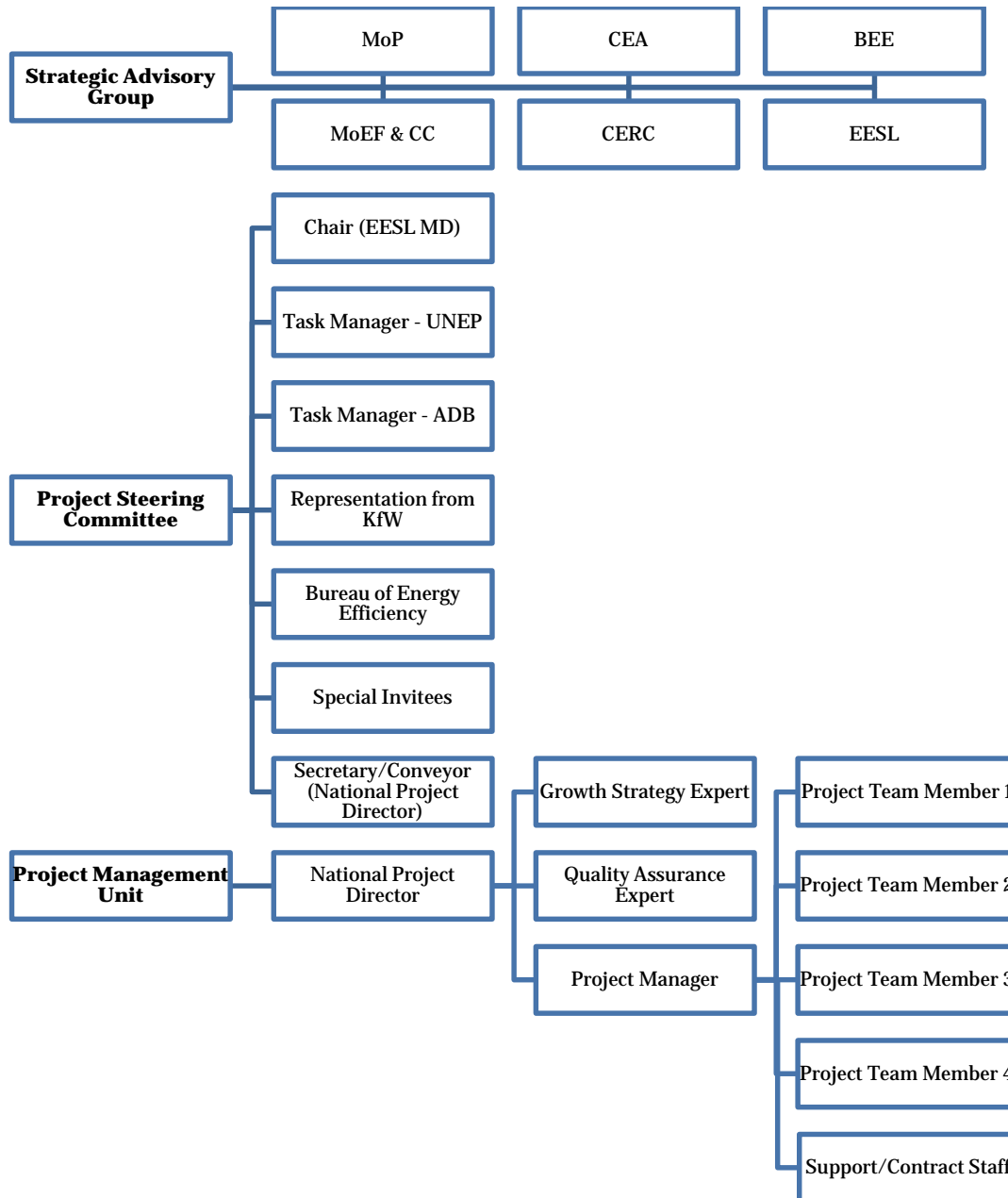
This GEF/ADB/UNEP funded project will be implemented over a five-year period keeping in mind the lessons learned from ongoing projects on Domestic lighting, Street Lighting, Agricultural Pumps, BEE 5 Star Ceiling Fans, Super-Efficient Ceiling Fans, Tri-generation and Smart Grids. The lessons learned will be shared through meetings with various government departments involved in the project (Central Government (MoEF, MoUD, MoP), ULBs and DISCOMs).

The project will be jointly implemented by UNEP and ADB. ADB will lead on all investments in Components 1, 2 and 3. ADB will bring together the GEF grant and their own loan to EESL for investment and apply their due diligence process. They will also support EESL in component 3 in generating a new pipeline of investments under EESL's new business plan. UNEP will be the lead agency of the project, and will implement the technical assistance parts of Component 1, 2 and 3. UNEP will bring its regional and global experience and lessons in testing new business models and new technologies to the project. ADB and UNEP's collaboration will be guided by a separate letter of agreement under an existing, overarching Memorandum of Understanding between the two agencies.

Management structure



Combined Hierarchy for Strategic Advisory Group, Project Steering Committee and Project Management Unit



The **Project Donor** is the GEF, and the **Project Co-finance partners** are ADB, UNEP, KfW and EESL.

The GEF **Agencies** are UNEP and ADB, who are responsible to the GEF for the project's oversight, the use of resources as written in the Project Document, or any amendments agreed to it by all donors. The main roles of the Implementing Agencies are described below:

Daily project execution and implementation oversight, and operational completion:

- Ensure timely disbursement/sub-allotment to executing agency, based on agreed legal document and in accordance with UNEP/ADB and GEF fiduciary standards;
- Follow-up with Executing Agency (EA) for progress, equipment, financial and audit reports;

- Provide consistent and regular oversight on project execution and conduct project supervisory missions as per Supervision Plans and in doing so ensures that all UNEP/ADB and GEF criteria, rules and regulations are adhered to by project partners;
- Technically assess and oversee quality of project outputs, products and deliverables – including formal publications;
- Provide no-objection to main TORs and subcontracts issued by the project, including selection of project manager or equivalent;
- Attend and facilitate inception workshops, field visits where relevant, and selected steering committee meetings;
- Assess project risks, and monitor and enforce a risk management plan;
- Regularly monitors project progress and performance and rates progress towards meeting project objectives, project execution progress, quality of project monitoring and evaluation, and risk;
- Monitor reporting by project executing partners and provides prompt feedback on the contents of the report;
- Promptly informs management of any significant risks or project problems and takes action and follows up on decisions made;
- Apply adaptive management principles to the supervision of the project;
- Review of reporting, checking for consistency between execution activities and expenditures, ensuring that it respects GEF rules;
- Clearance of cash requests, and authorization of disbursements once reporting found to be complete;
- Approve budget revision, certify fund availability and transfer funds;
- Ensure that GEF and UNEP/ADB quality standards are applied consistently to all projects, including branding and safeguards;
- Certify project operational completion;
- Link the project partners to any events organised by GEF and UNEP/ADB to disseminate information on project results and lessons;
- Manage relations with GEF.

During project monitoring and evaluation (PIR, MTE, TE):

- Review and finalize PIR;
- Develop portfolio level consolidated report and submit to GEF (and contribute to all GEF-level report);
- The UNEP Evaluation Office in collaboration with the ADB Independent Evaluation Department ensures that independent evaluations are carried out according to GEF, UNEP and ADB requirements (dedicated budget, TOR, mission planning), and review evaluation reports;
- Work with EA to develop management response to evaluation reports and Steering Committee recommendations;
- Manage relations with the GEF Evaluation Office and GEF Secretariat on all M&E products;
- Ensure OFPs obtain all M&E products and respond to information requests.

UNEP as the lead agency will manage the PIR process and submit consolidated PIR to the GEF. UNEP will also manage the mid-term (MTE) and terminal evaluations (TE) in direct collaboration with ADB.

During project financial closure:

- Lead project closure process using information provided by EA;
- Inform Trustee and GEF Sec of closure;
- Return any unspent GEF funds to Trustee;
- Conduct post-facto evaluations or lessons learnt exercises.

The **Project Executing Agency (EA)** is Energy Efficiency Services Limited (EESL), who is responsible for day to day management of the project, including financial management and project reporting. The main roles of the Executing Agency are described below:

- Ensure technical execution according to the execution plan laid out in the project document;

- Ensure technical quality of products, outputs and deliverables;
- Ensure compilation and submission of progress, financial and audit reporting to IA;
- Submission of budget revisions to IA for approval;
- Addressing and rectifying any issues or inconsistencies raised by the IA;
- Bringing issues raised by or associated with clients to the IA for resolution;
- Facilitating Steering Committees and other oversight bodies of the project;
- Day to day oversight of project execution;
- Submit all technical reports and completion reports to IA (realized outputs, inventories, verification of co-finance, terminal reporting, etc.)

Project administration will follow the procedures of the Executing Agency, including for procurement, contracting, and recruitment. The **Project Management Unit (PMU)** will be located at EESL and the line of accountability will go up through the project team to the project manager and connect to the EESL management structure through the Project Director. EESL has appointed the Chief General Manager (Technical) as the National Project Director of this project.

A **Strategic Advisory Group (SAG)** is being proposed for the project which will provide advice/guidance on the overall project, make sure the broader level objectives are being met and also the alignment of the project with the national priorities. SAG will have representatives from relevant ministries (MoP, MoEF & CC), regulatory authorities (CEA, CERC) and others on invitation basis. PSC will update SAG on the project progress in the half-yearly meetings. PSC Chair and PD will be part of the SAG meetings along with the SAG secretariat, which will be part of the project team.

Overseeing the entire project will be the **Project Steering Committee (PSC)**. This will be chaired by the Managing Director EESL (currently Mr. Saurabh Kumar) and will include representatives from UNEP, ADB, KfW, BEE, EESL and ad hoc members on invitation basis. Project Director will be the Secretary/Conveyor for the PSC. This Committee will meet half-yearly, unless one of the committee members call for ad hoc interim meeting. The main functions of the PSC will be to review project progress, approve annual work plans and budget and provide strategic guidance to the project, and approve management decisions to ensure timely delivery of quality outputs.

The Project Steering Committee will consist of the following members, unless otherwise agreed:

- EESL Managing Director (PSC Chair)
- National Project Director (PSC Secretary)
- UNEP Task Manager
- ADB Task Manager
- Bureau of Energy Efficiency (BEE), Ministry of Power, Government of India
- Invited participants by committee members.

The **Project Management Unit (PMU)** will be led by the Project Director (also part of the steering committee). Day-to-day progress will be tracked by a Project Manager who will be hired by EESL in accordance with its hiring policy for the duration of the project. The Project Manager will be responsible to assemble a Core Project Team, as ad-hoc employees, consultants and/or service providers of EESL or as subcontractors. The Core Project Team will be supported by subcontracted consultants to complete specified tasks as identified. The PMU will comprise of Project Director, Project Manager and other project team members. The Project Director will be responsible for organizing the steering committees, reporting to both Implementing Agencies (financially, progress and PIRs), will take the lead in the mid-term/terminal evaluation.

Terms of Reference for Project Management Unit (PMU)

Background

The PMU will be responsible for undertaking operational management-related and technical decisions for the project in accordance with this terms of reference (ToR). This PMU will present annual work plans to the Steering Committee for approval, as well as oversee the M&E plan for the project. The PMU will also ensure that required resources are

identified, address first-line conflicts within the project, and negotiate solutions to problems between the project and external bodies. The PMU will also approve the responsibilities of the Core Project Team and Consultants.

Representatives from organizations may be invited to join the PMU to contribute guidance at its discretion.

Scope of Work

Specific responsibilities of the PMU are as follows:

- Ensure that project teams are mobilized, specifically that MOUs, partnership agreements and contractual arrangements are in place in accordance with the project objectives and tenets of good governance.
- Ensure that objectives are fulfilled in an effective and efficient manner.
- Submit annual work plans and budgets, and other reports that may be required.
- Ensure effective quality assurance and financial reporting requirements.
- Ensure institutional coordination and facilitate an effective communication and decision-making process between government, implementation partners, civil society and other actors.
- Monitor and evaluate project implementation to ensure consistency with the approved work plans and results framework of the project.
- Review, revise and approve ToR's for staff, experts and contractors required to assist in project implementation, as directed by the PD.
- Propose policy revisions that would facilitate the mainstreaming of the project activities.
- Identify and engage with relevant implementing partners and stakeholders.
- Facilitate interactions between the PD/project team and the relevant government departments, in order to optimize project interactions.
- Refer unresolved first-line conflicts within the project, and matters arising between the project and external bodies to the Oversight Committee.
- Report to the Project Steering Committee on progress.

Provisional Organizational Structure for Energy Efficiency Revolving Fund (EERF)

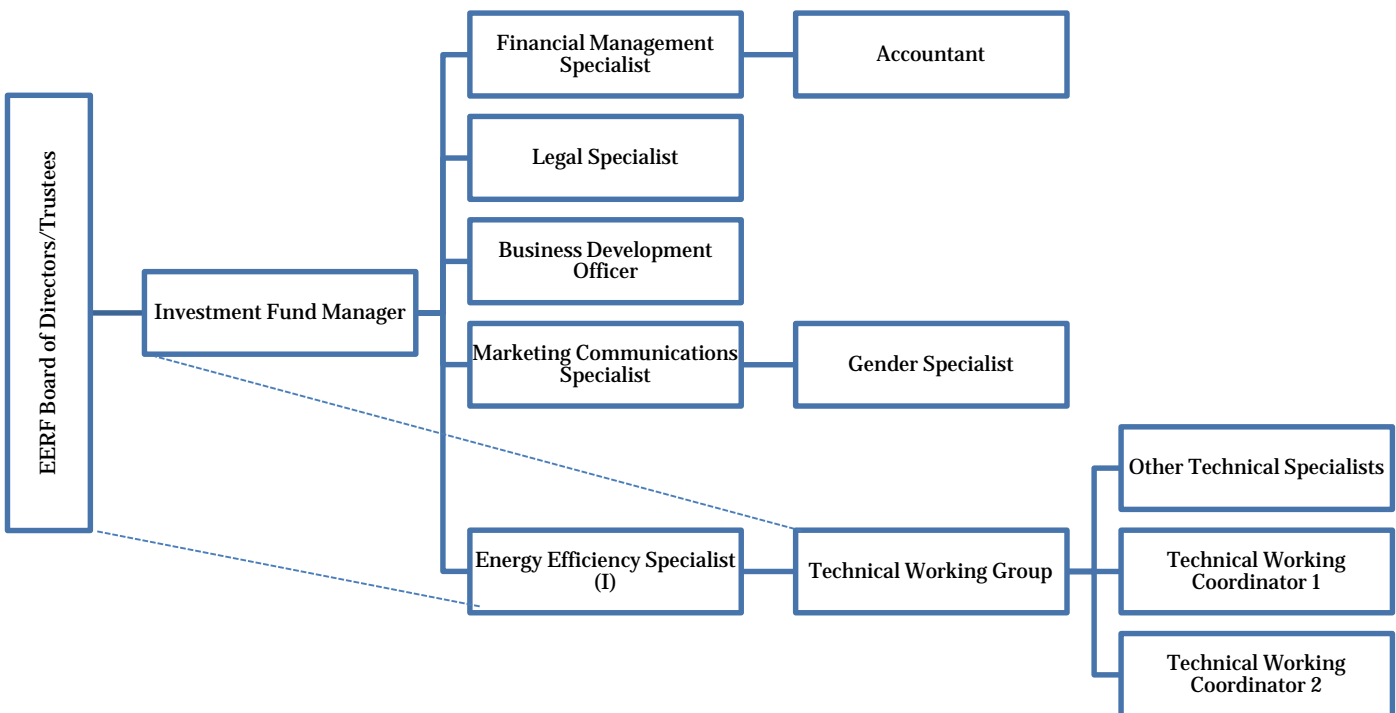
The GEF project will establish an energy efficiency revolving fund (EERF) to support investments in proof of concept, replication and scaling up of new energy efficiency technologies. Super-efficient ceiling fans, tri-generation systems and smart grids have been identified as priority investment areas; although other technologies may be assessed and advanced during project implementation. The detailed design, structuring and operationalization of the fund would be undertaken during the early stages of project implementation, as described in activities under Component 1 of the GEF project.

A Board of Directors/Trustees (mix of public and private sector representatives) will be at the helm of the revolving fund, whose functions would include, but not be limited to:

- (i) Determining the investment strategy and policy of the fund
- (ii) Engaging a dedicated fund management team
- (iii) Establishing criteria for project selection
- (iv) Approving the annual business plans and budgets
- (v) Preparing annual financial reports to the government, and
- (vi) Ensuring fund operations are aligned with national EE policies and priorities.

The Investment Fund Manager shall be responsible for oversight and technical direction, managing day to day operations, developing a viable project pipeline and achieving technical, economic and social performance milestones defined in the EERF business plan.

Other technical and functional specialists will be reporting to the Investment Fund Manager as part of the EERF Project Team. There will be parallel (dotted) reporting structure for few of the positions i.e. Technical Working Group reporting to the Investment Fund Manager and Energy Efficiency Specialist (I) reporting to the EERF Board.



ANNEX J-1: TRACKING TOOL FOR GEF-6 CCM PROJECTS

The GEF tracking tool is provided in a separate excel file:

<Annex J-1 - Tracking Tool for GEF-6 CCM Projects.xlsx>

ANNEX J-2: ESTIMATES OF DIRECT GREENHOUSE GAS EMISSION REDUCTION

Step 1: Enter Basic Project Information

Project Information

Project Information

Project Title	Creating and sustaining markets for energy efficiency
GEF ID Number	9258
Country	India
Region	SAR
GEF Agency	UN Environment & ADB
Date of Submission of GHG Accounting	
Contact Name	Geordie Colville & Ruth Coutto
First Year of Project	2017
Year of Project Close	2022
GEF Grant Amount (\$)	\$18 855 963
Co-financing Amount (\$)	\$434 200 000

Note:
From July 2017
To June 2022

General Parameters

	Default	User-Specified
Length of Analysis Period (Years After Project Close)	20	10
First Post-project Year		2023
Last Post-project Year		2032
Maximum Technology / Measure Lifetime (Years)	20	20

Notes

Minimum life span among technologies is 10 years
Tri-generation technology lifetime

Fuels and Emission Factors

	Default	User-Specified
Grid Electricity T&D Loss Rate (%)	10%	21%
Grid Electricity Emissions (tCO2/MWh)	0.8780	0.8200
Fuel: Click here to select from list	0.0000	0.0000
Fuel: Click here to select from list	0.0000	0.0000
Fuel: Click here to select from list	0.0000	0.0000

Notes

CEA Report, 2015
CO2 Baseline Database, CEA

Step 2: List Activity Components and Select Quantification Module

Activity Component	Sector/Subsector	Logframe Output	Module/Intervention Type
Replacement of existing domestic lamps with LED lamps	Domestic appliances	Output 5	Demonstration & Diffusion
Replacement of existing street lights with LED lights	Street lighting	Output 5	Demonstration & Diffusion
Replacement of existing fans with BEE 5-star ceiling fans	Domestic appliances	Output 5	Demonstration & Diffusion
Replacement of existing fans with super efficient ceiling fans	Domestic appliances	Output 11	Demonstration & Diffusion
Implementation of Smart Grid pilot project	Smart Grid	Output 11	Demonstration & Diffusion
Implementation of Tri-generation pilot project	Tri-generation	Output 11	Demonstration & Diffusion

Step 3: Model Activity Components

Demonstration/Diffusion Module

Project Information

Project Title	Creating and sustaining markets for energy efficiency
Country	India
Contact Name	Geordie Colville & Ruth Coutto
First Year of Project	2017
Last Year of Project	2022

Results: Demonstration/Diffusion Activity Components

	Cumulative			Annual			
	Total	2017-2022	2023-2032	2017	2022	2025	2035
Direct Electricity Savings (MWh)	38 202 801	10 639 067	27 563 735	0	3 583 542	3 583 542	363 993
N/A	0	0	0	0	0	0	0
N/A	0	0	0	0	0	0	0
N/A	0	0	0	0	0	0	0
Direct Total Energy Savings (GJ)	137 530 085	38 300 640	99 229 445	0	12 900 753	12 900 753	1 310 374
Direct GHG Emission Savings (tCO2)	37 904 820	10 556 082	27 348 738	0	3 555 591	3 555 591	361 154
Direct Post-project GHG Emission Savings (tCO2)							
Indirect Bottom-up Emission Savings (tCO2)	0		0				

Component 1: Replacement of existing domestic lamps with LED lamps -- General Inputs

Component Specifications

	Default	User-Specified	Per Unit	Notes
Annual Electricity Savings (MWh)		0.054		- 60 W existing domestic lamps replaced by 9 W LED domestic lamps - Domestic lamps operate 3.5 hours per day and 300 days per year - Refer to CEO Endorsement Document section A.1.5 for detailed assumptions

Useful Lifetime of Investment	15	10		Lifetime of a domestic LED

Baseline Assumptions

	Default	User-Specified	Notes
Percent of Activities Implemented in the Baseline	10%	0%	Replacement program - no activities implemented in the baseline

Indirect Bottom-up Estimate

	Default	User-Specified	Notes
Number of s Implemented During Project Period		39 776 293	Gradual replacement over the 5 years of project implementation
Number of Replications Post-project as Spillover		0	
Total		0	

Component 2: Replacement of existing street lights with LED lights -- General Inputs

Component Specifications	Default	User-Specified	Per Unit	Notes
Annual Electricity Savings (MWh)		0.277		- 112 W existing street lights replaced by 43 W LED lights
---				- Street lights operate 11 hours per day and 365 days per year
---				- Refer to CEO Endorsement Document section A.1.5 for detailed assumptions

Useful Lifetime of Investment	15	10		Lifetime of a LED street light

Baseline Assumptions	Default	User-Specified	Notes
Percent of Activities Implemented in the Baseline	10%	0%	Replacement program - no activities implemented in the baseline

Indirect Bottom-up Estimate	Default	User-Specified	Notes
Number of s Implemented During Project Period		1 505 942	Gradual replacement over the 5 years of project implementation
Number of Replications Post project as Spillover		0	
Total		0	

Component 3: Replacement of existing fans with BEE 5-star ceiling fans -- General Inputs

Component Specifications	Default	User-Specified	Per Unit	Notes
Annual Electricity Savings (MWh)		0.060		- 70 W existing fans replaced by 50 W BEE 5-star fans
---				- Domestic fans operate 10 hours per day and 300 days per year
---				- Refer to CEO Endorsement Document section A.1.5 for detailed assumptions

Useful Lifetime of Investment	15	10		Lifetime of a BEE 5-star ceiling fan

Baseline Assumptions	Default	User-Specified	Notes
Percent of Activities Implemented in the Baseline	10%	0%	Replacement program - no activities implemented in the baseline

Indirect Bottom-up Estimate	Default	User-Specified	Notes
Number of s Implemented During Project Period		2 128 298	Gradual replacement over the 5 years of project implementation
Number of Replications Post project as Spillover		0	
Total		0	

Component 4: Replacement of conventional agricultural pumps with energy efficient pumps -- General Inputs

Component Specifications	Default	User-Specified	Per Unit	Notes
Annual Electricity Savings (MWh)		3.357		- 5595 W conventional agricultural pumps replaced by 3730 W efficient pumps
---				- Agricultural pumps fans operate 6 hours per day and 300 days per year
---				- Refer to CEO Endorsement Document section A.1.5 for detailed assumptions

Useful Lifetime of Investment	15	15		Lifetime of an energy efficient agricultural pump

Baseline Assumptions	Default	User-Specified	Notes
Percent of Activities Implemented in the Baseline	10%	0%	Replacement program - no activities implemented in the baseline

Indirect Bottom-up Estimate	Default	User-Specified	Notes
Number of s Implemented During Project Period		229 532	Gradual replacement over the 5 years of project implementation
Number of Replications Post project as Spillover		0	
Total		0	

Component 5: Replacement of existing fans with super efficient ceiling fans -- General Inputs

Component Specifications	Default	User-Specified	Per Unit	Notes
Annual Electricity Savings (MWh)		0.105		- 70 W existing fans replaced by 35 W super efficient fans
---				- Domestic fans operate 10 hours per day and 300 days per year
---				- Refer to CEO Endorsement Document section A.1.5 for detailed assumptions

Useful Lifetime of Investment	15	10		Lifetime of a super efficient ceiling fan

Baseline Assumptions	Default	User-Specified	Notes
Percent of Activities Implemented in the Baseline	10%	0%	Replacement program - no activities implemented in the baseline

Indirect Bottom-up Estimate	Default	User-Specified	Notes
Number of s Implemented During Project Period		783 937	Gradual replacement over the 5 years of project implementation
Number of Replications Post project as Spillover		0	
Total		0	

Component 6: Implementatation of Smart Grid pilot project -- General Inputs

Component Specifications	<i>Default</i>	<i>User-Specified</i>	<i>Per Unit</i>	<i>Notes</i>
Annual Electricity Savings (MWh)		42 454		- Refer to CEO Endorsement Document section A.1.5 for detailed assumptions

Useful Lifetime of Investment	15	15		Life of smart grid technology (conservative assumption)

Baseline Assumptions	<i>Default</i>	<i>User-Specified</i>	<i>Notes</i>
Percent of Activities Implemented in the Baseline	10%	0%	Greenfield pilot project - no baseline existing activities

Indirect Bottom-up Estimate	<i>Default</i>	<i>User-Specified</i>	<i>Notes</i>
Number of s Implemented During Project Period		1	Smart Grid pilot project operational by the end of Year 4
Number of Replications Post project as Spillover		0	
Total		0	

Component 7: Implementation of Tri-generation pilot project -- General Inputs

Component Specifications	<i>Default</i>	<i>User-Specified</i>	<i>Per Unit</i>	<i>Notes</i>
Annual Electricity Savings (MWh)		13 319		- Refer to CEO Endorsement Document section A.1.5 for detailed assumptions

Useful Lifetime of Investment	15	20		Life of tri-generation technology (conservative assumption)

Baseline Assumptions	<i>Default</i>	<i>User-Specified</i>	<i>Notes</i>
Percent of Activities Implemented in the Baseline	10%	0%	Greenfield pilot project - no baseline existing activities

Indirect Bottom-up Estimate	<i>Default</i>	<i>User-Specified</i>	<i>Notes</i>
Number of s Implemented During Project Period		1	Tri-generation pilot project operational by the end of Year 4
Number of Replications Post project as Spillover		0	
Total		0	

ANNEX K: OFP ENDORSEMENT LETTER

सुशील कुमार
अपर सचिव
SUSHEEL KUMAR, IAS
Additional Secretary



भारत सरकार
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
नई दिल्ली - 110003
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FORESTS &
CLIMATE CHANGE
NEW DELHI-110003

D. O. No. 4 (2)/1/2015 – IC (GEF)
Dated: 30th July 2015

To: **Ms Brennan Van Dyke**
GEF Executive Coordinator
UNEP, Nairobi

Mr Nessim Ahmad
Director and GEF Official Focal Point
ADB, Manila

Subject: Endorsement of UNEP & ADB PIF on "Creating and Sustaining Markets for Energy Efficiency".

In my capacity as India's GEF Operational Focal Point, I confirm that the above project concept is (a) in accordance with my government's national priorities and our commitment to UNFCCC; and, (b) has been discussed with relevant stakeholders, including the global environmental convention focal points.

I am pleased to endorse the preparation of the above project concept by the Ministry of Power, Government of India, Energy Efficiency Services Limited with the assistance of UNEP and ADB along with other stakeholders. I request UNEP and ADB to ensure that the FSP is submitted to GEF OFP India office for review and approval with co-funding commitments before submitting it for GEF CEO endorsement.

The total financing being requested for this project us USD 20.88 million from India's STAR allocation, inclusive of project preparation grant (PPG) and agency fee for project cycle management services. The details of the grant requested from the GEF Trust Fund (GTF) as mentioned above is detailed in the table below:

Source of Funds	GEF Agency	Focal Area	Amount (in USD)			
			PPG (inclusive of agency fee)	FSP	Fee (for FSP only)	Total
GTF	UNEP & ADB	Climate Change	327,000	18,855,963	1,697,037	20,880,000
		Total	327,000	18,855,963	1,697,037	20,880,000

I consent to the utilization of India's GEF-6 STAR allocation under climate change focal area as mentioned in the table above.

Yours sincerely,

(Susheel Kumar)

Copy to:

- Shri Ravi Shankar Prasad, Joint Secretary, MoEFCC and National Focal Point for UNFCCC
- Shri Raj Kumar, Joint Secretary, DEA and India's GEF Political Focal Point
- Shri Satish Kumar, Joint Secretary, Ministry of Power
- Shri Saurabh Kumar, Managing Director, EESL



इंदिरा पर्यावरण भवन, जोर बाग रोड, नई दिल्ली-110 003 फोन : 011-24695242, फैक्स : 011-24695260
INDIRA PARYAVARAN BHAWAN, JOR BAGH ROAD, NEW DELHI-110 003 Ph : 011-24695242, Fax : 011-24695260
E-mail : asmef.susheel@gov.in




Asian Development Bank

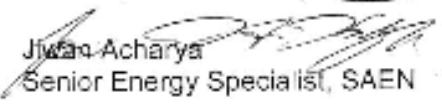
Memorandum

South Asia Department
Energy Division

7 March 2017

To: Nessim Ahmad
Deputy Director General, SDCC concurrently Chief Compliance Officer
GEF Executive Coordinator

Through: Priyantha Wijayatunga
Director, SAEN 

From: Jyoti Acharya
Senior Energy Specialist, SAEN 

Subject: **Co-Financing Commitment to the Project "GEF ID 9258: Creating and Sustaining Markets for Energy Efficiency" (India)**

1. I am pleased to confirm that the ADB-administered *Loan 3436-IND: Demand Side Energy Efficiency Investment Project* will provide co-finance of USD200 million towards the above-captioned GEF-supported project. This is in addition to USD1 million provided by ADB through the Project Preparatory Technical Assistance (PPTA) for the loan.

2. The ADB funds are intended to be channeled in parallel with the proposed GEF grant co-finance of USD14.35 million through Energy Efficiency Services Ltd (EESL), a public sector undertaking, which will be the Executing Agency.

3. The objective of the combined loan, technical assistance and grant is to increase end use efficiency and reduce greenhouse gas (GHG) emissions by scaling up existing technologies, and establishing pilot demonstrations of new technology applications.

4. By advancing an energy service company (ESCO) delivery mechanism, the ADB investment project and technical assistance intend to: (i) enhance street lighting efficiency in one or more municipalities in Rajasthan, Maharashtra, Goa, and Telangana; (ii) enhance electric bulb and fan efficiency in households in utility service areas in Rajasthan, Maharashtra, Andhra Pradesh, and Uttar Pradesh; and (iii) improve efficiency of agricultural water pumps in utility service areas of Rajasthan, Andhra Pradesh, and Karnataka. The activities will be implemented in additional states if sub-project readiness is assured. Gender sensitive social marketing programs and relevant knowledge management activities will be supported to maximize gains.

5. This overall support is consistent with India's obligations under the United Nations Framework Convention on Climate Change (UNFCCC), in particular the recent Intended Nationally Determined Contributions (INDCs); as well as the National Mission for Enhanced Energy Efficiency (NMEEE). It is also aligned with the priorities identified under the GEF Climate Change Mitigation Focal Area.

cc: B. Dunn, A. Abraham, SDES; eStar; Project file



एनर्जी एफिशिएंसी सर्विसेज लिमिटेड

(भारत सरकार, विद्युत मंत्रालय के सार्वजनिक क्षेत्र के उपक्रमों का संयुक्त उद्यम)

ENERGY EFFICIENCY SERVICES LIMITED

(A Joint Venture of PSUs of Ministry of Power, Govt. of India)

CIN : U40200DL2009PLC196789



Dr. Naoko Ishii
CEO & Chairperson
Global Environment Facility
1818 H Street, NW ,MS P4-400
Washington,DC-20433,USA

Date:21/03/2017

Subject: Co-Financing Confirmation for GEF-6 Cycle "Creating and Sustaining Markets for Energy Efficiency".

Dear Ma'am

This has reference to the above subject. Energy Efficiency Services Limited(EESL) has the pleasure of confirming its Co-Financing support towards the GEF-6 project spread over a duration of 5 years starting from 2017.The Co- financing is as follows-

SNo	Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (USD)
1.	National Government	Energy Efficiency Services Limited(EESL)	Equity & Loans	199,000,000
2.	National Government	Energy Efficiency Services Limited(EESL)	In-Kind	2,960,000
	Total Co-financing			201,960,000

Regards

(Saurabh Kumar)
Managing Director



कॉर्पोरेट ऑफिस : चौथा एवं पांचवा तल, आई डब्ल्यू एआई भवन, ए-13, सेक्टर - 1, नोएडा - 201301, (उत्तर प्रदेश)

Corporate Office : 4th & 5th Floor, IWAI Building, A-13, Sector - 1, Noida - 201301, (UP)

दूरभाष / Phone: 91-120-4908000 फैक्स / Fax: 91-120-4908099 वेबसाइट / Website : www.eeslindia.org

रजिस्टर्ड ऑफिस : चौथा तल, सेवा भवन, आर० के० पुरम, नई दिल्ली-110066

Registered Office : 4th Floor, Sewa Bhawan, R. K. Puram, New Delhi - 110066

Mr. S P Garnaik
CGM (Tech)
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Date: 16/03/2017

re) Energy Efficiency in Energy Intensive Sectors (EESL II)
BMZ ID: 2015 67 981
Here: Co-financing GEF-6 project

Dear Sir,

This is with reference to the co-financing request by EESL for the GEF-6 project. We are glad to support EESL's activities in smart-grid technology, super-efficient fans, tri-generation, LED lighting and other areas mentioned in the Project Identification Form (PIF).

We hereby provide our consent in principle to use up to 30 million EUR (currently 31.9 million USD) out of the 200 million EUR loan "Energy Efficiency in Energy Intensive Sectors (EESL II)" as co-financing for the GEF-6 project.

Kindly note that any activities financed through KfW funds would have to be in line with the Loan Agreement and Separate Agreement signed between EESL and KfW on 10th March 2017. This includes, among others, procurement procedures, environmental and social safeguards, eligibility criteria, appraisal procedure of investments, monitoring and reporting etc..

Further, we would request some clarifications on the PIF and implementation details of the project. Therefore we suggest follow-up discussions with your team in the next weeks.

Sincerely,



Dr. Jürgen Welsch
Head of Division



Corinna Peters
Project Manager



Chetna Gogna <cgogna@eesl.co.in>

FW: GEF-6 document

Corinna.Peters@kfw.de <Corinna.Peters@kfw.de>

Mon, Mar 20, 2017 at 4:40 PM

To: spgarnaik@eesl.co.in

Cc: sgopal@eesl.co.in, mkhatri@eesl.co.in, usha.rao@kfw.de, knhemanth@eesl.co.in, cgogna@eesl.co.in, pkyadav@eesl.co.in

Dear Garnaik,

With reference to our co-financing letter dated 16th March 2017, I would like to emphasise that we are providing our in principle consent for co-financing of UP TO 30 million EUR (currently 31.9 million USD). Any amount smaller than 30 million EUR (or its equivalent in USD) being used for co-financing this project is also ok with us. Hence, the requested 31.2 million USD can be covered from the KfW loan.

Best regards,

Corinna

Corinna Peters

KfW Development Bank

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UNITED NATIONS ENVIRONMENT PROGRAMME

Programme des Nations Unies pour l'environnement Programa de las Naciones Unidas para el Medio Ambiente
Программа Организации Объединенных Наций по окружающей среде برنامج الأمم المتحدة للبيئة
联合国环境规划署



Paris, 10 March, 2017

Subject: UN Environment co-finance for the project “Creating and Sustaining Markets for Energy Efficiency” in India

Dear Brennan,

I have the pleasure to confirm the support of UN Environment to the project “Creating and Sustaining Markets for Energy Efficiency” in India (GEF ID 9258).

The UN Environment affirms its desire to support the implementation of this project through an in-kind contribution with an estimated value of US\$ 40,000 over the 60 months of the project (starting July 2017).

UN Environment’s contribution will comprise staff time and travel during the 5 years of the project from UN Environment’s Economy Division, including the Chief of the Energy, Climate and Technology Branch (D-1), the United for Efficiency Programme Officer (P-4), Administrative staff and staff from the Regional Office for Asia-Pacific.

The UN Environment welcomes this important initiative and is pleased to be part of it.

Yours sincerely,

Mark Radka
Chief, Energy, Climate, and Technology Branch

Mrs Brennan Van Dyke
GEF Executive Coordinator
Deputy Director, Office for Operations
UN Environment
Nairobi, Kenya

ECONOMY DIVISION

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ANNEX M: ENVIRONMENTAL AND SOCIAL SAFEGUARDS CHECKLIST

Project Title:	Creating and sustaining markets for energy efficiency		
GEF project ID and UNEP ID/IMIS Number	9258	Version of checklist	2
Project status (preparation, implementation, MTE/MTR, TE)	Preparation	Date of this version:	21/03/2017
Checklist prepared by (Name, Title, and Institution)	Geordie Colville, UN Environment		

In completing the checklist both short- and long-term impact shall be considered.

Section A: Project location:

If negative impact is identified or anticipated the Comment/Explanation field needs to include: Project stage for addressing the issue; Responsibility for addressing the issue; Budget implications, and other comments.

	Yes/No/N.A.	Comment/explanation
- Is the project area in or close to -		
- densely populated area	Yes	The project will operate in urban areas, however no negative impact to populated areas is foreseen.
- cultural heritage site	No	
- protected area	No	
- wetland	No	
- mangrove	No	
- estuarine	No	
- buffer zone of protected area	No	
- special area for protection of biodiversity	No	
- Will project require temporary or permanent support facilities?	Yes	EESL already has its own offices. However, the construction of the Tri-generation pilot project could require temporary support offices on the construction site.
<i>If the project is anticipated to impact any of the above areas an Environmental Survey will be needed to determine if the project is in conflict with the protection of the area or if it will cause significant disturbance to the area.</i>		

Section B: Environmental impacts, i.e.

If negative impact is identified or anticipated the Comment/Explanation field needs to include: Project stage for addressing the issue; Responsibility for addressing the issue; Budget implications, and other comments.

	Yes/No/N.A.	Comment/explanation
- Are ecosystems related to project fragile or degraded?	No	Although the project will be working in farmland and agricultural areas to reduce the costs and GHG emissions related to water pumping, no negative impact on the ecosystem is foreseen.
- Will project cause any loss of precious ecology, ecological, and economic functions due to construction of infrastructure?	No	
- Will project cause impairment of ecological opportunities?	No	The cost of electricity is subsidised in India for farmers, so an increase in efficiency will not be an incentive to pump more water, but only to reduce peak power demand.
- Will project cause increase in peak and flood flows? (including from temporary or permanent waste waters)	No	

	<i>Yes/No/N.A.</i>	<i>Comment/explanation</i>
- Will project cause air, soil or water pollution?	No	The project aims to reduce fossil fuel use through the dissemination of energy efficient technologies, and therefore reduce air pollution.
- Will project cause soil erosion and siltation?	No	
- Will project cause increased waste production?	Yes	Many of the energy efficiency investments by EESL and project partners will involve replacing old and/or inefficient equipment. However, in the case of replacement and with the availed option of buy-back by the respective implementation partner (i.e. utility/DISCOM, etc.), the contract is designed in such a way that the responsibility lies with the respective partner to dispose the product as per the applicable guidelines/standards. The same will be overseen by EESL as well.
- Will project cause Hazardous Waste production?	Yes	The proposed GEF project and ADB loan and other investments will be guided by the ADB Safeguard Policy (2009), and EESL tendering / procurement policy and practice with appropriate measures built-in during project preparation. EESL will incorporate Central Pollution Control Board “Guidelines for Environmentally Sound Mercury Management in Fluorescent Lamp Sector” in the contracts to be signed with various contractors. EESL will distribute leaflets to consumers which provide guidance on the safe disposal of used equipment.
- Will project cause threat to local ecosystems due to invasive species?	No	
- Will project cause Greenhouse Gas Emissions?	No	The project aims to reduce GHG emissions through the dissemination of energy efficient technologies.
- Other environmental issues, e.g. noise and traffic	Yes	Replacing equipment will involve construction and retrofit over a temporary period.
<i>Only if it can be carefully justified that any negative impact from the project can be avoided or mitigated satisfactorily both in the short and long-term, can the project go ahead.</i>		

Section C: Social impacts

If negative impact is identified or anticipated the Comment/Explanation field needs to include: Project stage for addressing the issue; Responsibility for addressing the issue; Budget implications, and other comments.

	<i>Yes/No/N.A.</i>	<i>Comment/explanation</i>
- Does the project respect internationally proclaimed human rights including dignity, cultural property and uniqueness and rights of indigenous people?	Yes	ESSL recognizes human rights.
- Are property rights on resources such as land tenure recognized by the existing laws in affected countries?	Yes	Property rights are recognized in India law.
- Will the project cause social problems and conflicts related to land tenure and access to resources?	No	

	<i>Yes/No/N.A.</i>	<i>Comment/explanation</i>
- Does the project incorporate measures to allow affected stakeholders' information and consultation?	Yes	The project involves stakeholder consultation at various stages of the project, including with the potential clients - before contracts are signed and investments are made. The project also includes communication campaigns to raise population and consumer's awareness.
- Will the project affect the state of the targeted country's (-ies') institutional context?	No	
- Will the project cause change to beneficial uses of land or resources? (incl. loss of downstream beneficial uses (water supply or fisheries)?	No	
- Will the project cause technology or land use modification that may change present social and economic activities?	Yes	The project involves investments in new technologies such as efficient lighting, efficient pumps, super-efficient ceiling fans, tri-generation and smart grid. These technologies reduce the energy consumption in facilities and households and improve the operating costs of facilities. The investments will provide utility savings for both consumers and EESL alike.
- Will the project cause dislocation or involuntary resettlement of people?	No	
- Will the project cause uncontrolled in-migration (short- and long-term) with opening of roads to areas and possible overloading of social infrastructure?	No	
- Will the project cause increased local or regional unemployment?	No	
- Does the project include measures to avoid forced or child labour?	Yes	This is part of EESL's procurement guidelines, which are aligned with Procurement norms of the Government of India. As per the Indian Law, child labor is prohibited. The same laws and guidelines are applicable to the vendors as well through the contract documentation.

	<i>Yes/No/N.A.</i>	<i>Comment/explanation</i>
- Does the project include measures to ensure a safe and healthy working environment for workers employed as part of the project?	Yes	<p>Adherence to Environment, Health & Safety and Social (EHSS) issues - EESL has prepared EHSS guidelines/manual, which lays down EESL's commitment and procedure to address important EHSS issues. Through EESL's EHSS manual, EESL clearly defines its policy mandate to adhere to local guidelines. EESL is also ensuring that its vendors/contractors adhere to EESL's commitment in these areas.</p> <p>EESL will incorporate the following acts in contract to be signed with various contractors:</p> <ul style="list-style-type: none"> • Minimum Wages Act, 1948 and state specific notifications thereof • Payment of Wages Act, 1936 <p>In addition to the above, the following requirements shall be included in the contracts signed between EESL and contractors:</p> <ul style="list-style-type: none"> • Medical and accidental insurance for workers • Emergency preparedness, fire and electrical safety requirements at project warehouses and temporary storage locations • Grievance redressal mechanism for workers • Accident/incident reporting of near miss, lost time, first aid, reportable injury, major injury and fatality • Safety and appropriateness of tools and equipment used, example ladders, man basket cranes, etc.
- Will the project cause impairment of recreational opportunities?	No	
- Will the project cause impairment of indigenous people's livelihoods or belief systems?	No	
- Will the project cause disproportionate impact to women or other disadvantaged or vulnerable groups?	No	<p>The project includes gender sensitive social marketing campaigns. This marketing campaign will customize actions that target women and men separately. Suppliers will be trained to differentiate their approach between men and women, recognizing the fact that women are the primary energy managers in households.</p> <p>Gender equality principles will be applied during project implementation, particularly in procurement processes, training and capacity development.</p>
- Will the project involve and or be complicit in the alteration, damage or removal of any critical cultural heritage?	No	

	Yes/No/N.A.	Comment/explanation
- Does the project include measures to avoid corruption?	Yes	<p>EESL, a public sector entity under the administration of Ministry of Power, Government of India has strict guidelines and measures to avoid corruption, which is in alignment with Central Government guidelines and norms.</p> <p>On the procurement front, the same is done through e-tendering and the RfP is not only announced in leading national newspapers but is also uploaded on EESL website as per the norms prescribed. The procurement policy is approved by the Board and is consistent with the procurement norms of the government, Central Public Sector Units and follows all the guidance of Central Vigilance Commission (CVC) and Comptroller and Auditor General (CAG) of India.</p> <p>Further, project related procurement will also be aligned with the ADB Procurement Guidelines⁷³, Guidelines on the Use of Consultants by Asian Development Bank and Its Borrowers⁷⁴, ADB's anticorruption policy⁷⁵ and ADB's Integrity Principles and Guidelines⁷⁶.</p>
<i>Only if it can be carefully justified that any negative impact from the project can be avoided or mitigated satisfactorily both in the short and long-term, can the project go ahead.</i>		

Section D: Other considerations

If negative impact is identified or anticipated the Comment/Explanation field needs to include: Project stage for addressing the issue; Responsibility for addressing the issue; Budget implications, and other comments.

	Yes/No/N.A.	Comment/explanation
- Does national regulation in affected country (-ies) require EIA and/or ESIA for this type of activity?	No	
- Is there national capacity to ensure a sound implementation of EIA and/or SIA requirements present in affected country (-ies)?	N.A	
- Is the project addressing issues, which are already addressed by other alternative approaches and projects?	N.A.	
- Will the project components generate or contribute to cumulative or long-term environmental or social impacts?	Yes	The project implementation will help in reducing the GHG emissions further enabling social upliftment of the society. The project will reduce air pollution, electricity consumption and potentially generate employment.
- Is it possible to isolate the impact from this project to monitor E&S impact?	Yes	An MRV system will be set up for this project.

⁷³ <https://www.adb.org/documents/procurement-guidelines>

⁷⁴ <https://www.adb.org/documents/guidelines-use-consultants-asian-development-bank-and-its-borrowers>

⁷⁵ <https://www.adb.org/documents/anticorruption-policy>

⁷⁶ <https://www.adb.org/documents/integrity-principles-and-guidelines>

ANNEX N: ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
AgDSM	Agricultural Demand Side Management Programme
AT&C	Aggregate Technical and Commercial
BEE	Bureau of Energy Efficiency
CCMS	Centralized Control Monitoring System
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CEA	Central Electricity Authority
CERC	Central Electricity Authority Commission
CF	Ceiling Fan
CHP	Combined Heat and Power
CPCB	Central Pollution Control Board
CSR	Corporate Social Responsibility
DELP	Domestic Efficient Lighting Program
DISCOM	Distribution Company
DL	Domestic Lighting
DPR	Detailed Project Report
DSM	Demand Side Management
EA	Executing Agency
EC Act	Energy Conservation Act
ECBC	Energy Conservation Building Code
EE	Energy Efficiency
EEPS	Energy Efficient Pump Sets
EERF	Energy Efficiency Revolving Fund
EESL	Energy Efficiency Services Limited
EHS	Environment, Health and Safety
ELCOMA	Electric Lamp & Component Manufacturers in India
ERP	Enterprise Resource Planning
ESA	Energy Services Agreement
ESCO	Energy Saving Company
ESP	Energy Service Provider
FA	Financing Agreement
FGD	Focus Group Discussion
FMA	Financial Management Assessment
GEF	Global Environment Facility
GHG	Greenhouse Gas
IA	Implementing Agency
ICL	Incandescent Light Bulb
IITM	Indian Institute of Technology Madras
INDC	Intended Nationally Determined Contribution
IPO	Initial Public Offering
IPP	Independent Power Producer
IREDA	Indian Renewable Energy Development Agency
IRR	Internal Rate of Return
LED	Light Emitting Diode
LNG	Liquefied Natural Gas
M&V	Monitoring & Verification

MOEF	Ministry of Environment and Forests
MOP	Ministry of Power
MoU	Memorandum of Understanding
MRV	Measurement, Reporting and Verification
MSME	Micro, Small and Medium Enterprises
MTE	Mid-Term Evaluation
NAPCC	National Action Plan on Climate Change
NDA	Non-Disclosure Agreement
NITI	National Institution for Transforming India
NMEEE	National Mission on Enhanced Energy Efficiency
PMU	Project Management Unit
PPG	Project Preparation Grant
PPP	Public Private Partnership
PSC	Project Steering Committee
R-APDRP	Restructured Accelerated Power Development and Reforms Programme
S&L	Standards & Labelling
SAG	Strategic Advisory Group
SE CF	Super-efficient Ceiling Fan
SEEP	Super-efficient Equipment Programme
SIDBI	Small Industries Development Bank of India
SITC	Supply, Installation, Testing, Commissioning
SL	Street Lighting
SLNP	Street Lighting National Program
SOP	Standard Operating Procedures
SPV	Special Purpose Vehicle
tCO _{2eq}	Tonnes of CO ₂ equivalent
TE	Terminal Evaluation
UJALA	Unnat Jyoti by Affordable LEDs for All
ULB	Urban Local Body
UNDAF	United Nations Development Action Framework
UNEP	United Nations Environment Programme
VAM	Vapour Absorption Machine
WRI	World Resources Institute

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