



UNDP Project Document

Government of China

and

United Nations Development Programme

**PHASING-OUT OF INCANDESCENT LAMPS & ENERGY SAVING LAMPS
PROMOTION (PILESLAMP) PROJECT
(PIMS# 4166)**

Brief Description:

The objective of the PILESLAMP project is the enhanced promotion and resulting higher utilization of energy saving lamps (ESLs) in China through the transformation of the local lighting products market and the phasing-out of incandescent lamp production and sale. It is expected to contribute to the reduction of GHG emissions through the transformation of the Chinese lighting market towards more energy-efficient lighting products, technologies, and practices. The project is comprised of activities aimed at promoting the widespread adoption of energy efficient lighting products (ESLs), improving the Chinese ESL market, and working towards the phasing-out of ILs. Moreover, the project is also in line with the GEF's global lighting program that aims to transform the global market toward efficient lighting technologies and through accelerated phase-out of inefficient lighting, thereby reducing global GHG emissions.

SIGNATURE PAGE

Country: China

UNDAF Outcome(s)/Indicator(s):

By the end of 2010, more efficient management of natural resources and development of environmentally friendly behavior to ensure environmental sustainability (with special focus on energy, biodiversity and water resources)

Expected Outcome(s)/Indicator (s):

End-use energy efficiency and application of new and renewable energy technologies improved

Expected Output(s)/Indicator(s):

Energy Consumption per unit GDP decreased

Implementing partner: National Development and Reform Commission (NDRC), China

Programme Period: <u>2008-2012</u>
Programme Component: <u>Energy and Environment</u>
Project Title: <u>Phasing-out Incandescent Lamps & Energy Saving Lamps Promotion (PIESLAMP)</u>
Project ID: <u>00062179 (PIMS 4166)</u>
Project Duration: <u>4 years</u>
Management Arrangement: <u>NEX</u>

Total budget: <u>\$84,000,000</u>
Allocated resources:
• GEF <u>\$14,000,000</u>
Paraller finance:
• Government <u>\$18,900,000</u>
• Private Sector <u>\$32,000,000</u>
• Other: <u>\$600,000</u>
• In-kind contribution <u>\$18,500,000</u>

Agreed By:

Government of People's Republic of China

Li Zhen July 24, 2009 DDG of Ministry of Finance
 Signature Date Title

National Development and Reform Commission, China (NDRC)

Li Zhen 2009. 7. 24
 Signature Date Title

UNDP China

Napoleon Navam UNDP Country Director
 Signature Date Title

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List of Acronyms

Acronym	Meaning
BRESL	Barrier Removal to Cost Effective Energy Efficiency Standards and Labeling
C&R	Commercial and Residential
CALI	China Association of the Lighting Industry
CDM	Clean Development Mechanism
CFL	Compact Fluorescent Lamp
CFLi	integrated Compact Fluorescent Lamp (i.e. including electronic ballast)
CHUEE	China Utility-Based Energy Efficiency
CICETE	China International Center for Economic and Technical Exchange
CIP	Cleaner Industrial Process
CNIS	China National Institute of Standards
CO ₂	Carbon Dioxide
CSC	China Standards Certification Center
CTA	Chief Technical Advisor
DSM	Demand Side Management
EE	Energy Efficiency
ELI	Efficient Lighting Initiative
EMCA	Energy Management Company Association
EOI	Expression of Interest
ERI	Energy Research Institute
ESL	Energy Saving Lamps
EUEEP	End-Use Energy Efficiency Project
FL	Linear Fluorescent Lamp
FSP	Full-Size Project Document
GHG	Greenhouse Gas
GLIC	Green Lights Information Center
GLS	General Lighting Service
GOC	Government of China
GWh	Giga Watt Hours = 10 ⁹ Wh
Hg	Mercury (chemical)
IFC	International Finance Corporation
IL	Incandescent Lamp
kW	Kilowatt = 1000W
LFA	Logical Framework Analysis
M&E	Monitoring and Evaluation
Mtons	Million Tons
MOF	Ministry of Finance
MT	Metric Tons
MWh	Mega Watt Hours = 10 ⁶ Wh
NDRC	National Development and Reform Commission
NECC	National Energy Conservation Center
NLTC	National Lighting Test Center
NPD	National Project Director
PAC	Project Assurance Committee
Pb	Lead (chemical)
PIF	GEF Project Identification Form
PIESLAMP	Phasing-out of Incandescent Lamps and Energy Saving Lamps Promotion
PMO	Project Management Office

Acronym	Meaning
PSC	Project Steering Committee
T5, T8	Efficient linear fluorescent lamp types
TA	Technical Assistance
tce	tons carbon equivalent
toe	tons oil equivalent
TWh	Tera Watt Hours = 10 ¹² Wh
UAC	Unit Abatement Cost (US\$/ton CO2)
UNFCCC	UN Framework Convention on Climate Change

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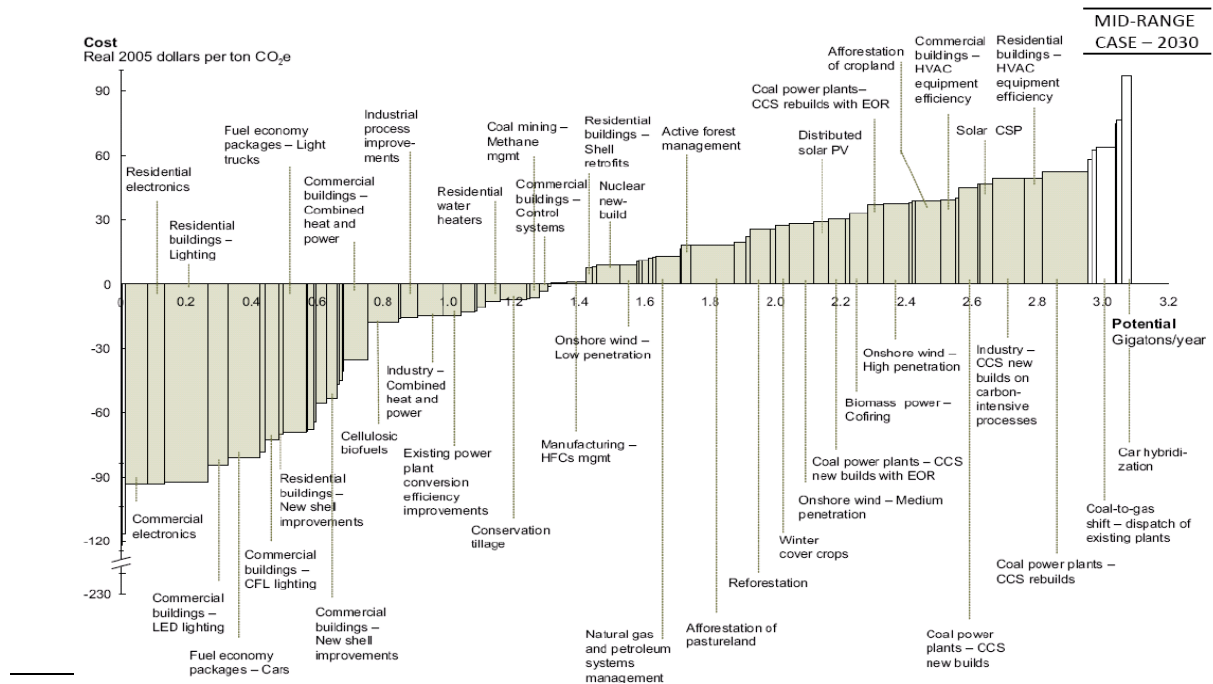
SECTION I: Elaboration of the Narrative

PART I: Situation Analysis

Context and Global Significance

1. The energy demand in China is continues to rise in line with economic development. With the influx of foreign manufacturing capital and investments, the country’s energy demand has commensurately increased. At present, China became the global manufacturing base for many consumer goods including lighting products. The current economic downturn following the financial crisis will not change this overall growth trajectory (see Figure 5 below).
2. Worldwide, grid-based lighting consumes 19% of total global electricity production, and is associated with 1.9 billion tons of CO₂ emissions a year, around 7% of global emissions. Most of the global lighting services are still provided by inefficient incandescent lamps. Globally more than 70% of the lamp sales are incandescent, while compact fluorescent lamps (CFLs) account for around 6%¹. In China, lighting accounts for about 12% of the country’s electricity consumption. It is somewhat less compared to the global figures since the country’s economy is largely production based.
3. Incandescent lamps typically consume four times more energy to provide the same lighting services as efficient alternatives, such as CFLs, while the latter last up to 10 times longer. Although switching from incandescent to energy efficient lighting alternatives represents one of the most cost-effective ways to save electricity and reduce global greenhouse gas emissions (Fig. 1), the progress of phasing out incandescent lighting has been relatively slow, and concerted efforts are required at a global level to accelerate the pace of market transformation for high-performance, energy efficient lighting.

Figure 1: Cost effectiveness of various CO₂ saving technologies²



¹ International Energy Agency, 2006

² McKinsey/IEA

4. If all incandescent lamps worldwide were to be replaced by energy-saving CFL, more than 700 TWh of electricity would be saved per year, representing an associated reduction of 400 Mtons CO₂. At a minimum, the respective figures for developing countries are in the order of 300 TWh and 170 Mtons CO₂ per year. Without palpable change in lighting quality, a market shift from inefficient incandescent lamps to energy-efficient alternatives such as CFLs would cut world lighting electricity demand by 18%³.
5. Over the past year, several OECD and developing countries have announced their intention to phase out incandescent lighting and have engaged preliminary legal and technical work toward this objective (see Fig. 2). Representatives of the leading lighting manufacturers in the world already announced their support for such an ambitious market transformation, some of them calling for a coordinated effort among countries. In addition, many developing countries undertake efforts promoting the adoption of CFLs and consider formulating strategies promoting ESL and eventually phasing out incandescent lamps.

Lighting Industry in China (Market and Lighting Product Energy Performance)

6. In this overall and world-wide context China's role became very important: Not only is China already the third largest economy of the world, her power consumption for lighting appears to be decisive for the success of any global phase out regimen. Moreover, China is today the leading manufacturing country of lighting products in the world. For example, the production of CFLs, both for the domestic and export market increased considerably in recent years. The annual production of CFLs in China rose from around 100 Million in 1996 to around 3 billion in 2007, a 30-fold increase. The production today accounts for more than 80% of the total world production. About 70% or more than 2 billion pieces of these CFLs are exported. On the other side, China is still the leading manufacturing country of incandescent lamps (ILs). In 2006, the IL production in the country was about 4.3 billion pieces, representing about one third of the world's production (compare Tab. 1 and Fig. 3).
7. The export quota of incandescent general lighting service Lamps (GLS) is about 50%, which indicates annual national sales of about 2 billion GLS and an overall stock of approximately more than 3 billion incandescent lamps used in China, as otherwise there would be a 100% stock turnover based on the estimate of installed incandescent GLS as reported during the previous UNDP-GEF China Green Lights' program (see Fig. 4 below).

Table 1: China Lighting Industry Output⁴

Year	Gross Lamp-Industry Output	% Change	Export value CFLs	% Change
2005	25 / 3.1 (RMB Billion/ Billion US\$)		0.9 (Bill. US\$)	
2006	33 / 4.2	32	1.36	62
2007	48 / 6.3	45	1.76	40

8. China will further invest in the lighting industry and particularly in new technologies like ESL and LED lighting. In its quest to build a high technology and value adding production the Government of China (GOC) supports R&D efforts to develop a competitive LED

³ International Energy Agency, 2006

⁴ Data from: http://www.researchandmarkets.com/reportinfo.asp?report_id=613719 and

<http://www.chinasourcingreports.com/csr/Hardware-&-DIY/Compact-Fluorescent-Lamps/p/CSRCFL/Main.htm>

manufacturing base with about 44 Million US\$ under the current 5-year plan. It is predicted that by 2010, the production and sales of electric light source products will be around 13 billion, with the average annual growth maintaining at slightly below 5%. Meanwhile, under a business as usual scenario, of this 13 billion electric light source products, one in three would still be incandescent GLS, while the remaining two thirds will be fluorescent and other efficient lighting products.

Figure 2: Incandescent Lights Phase-Out, ESL Market Transformation and Demand Side Management Programs Around the World⁵

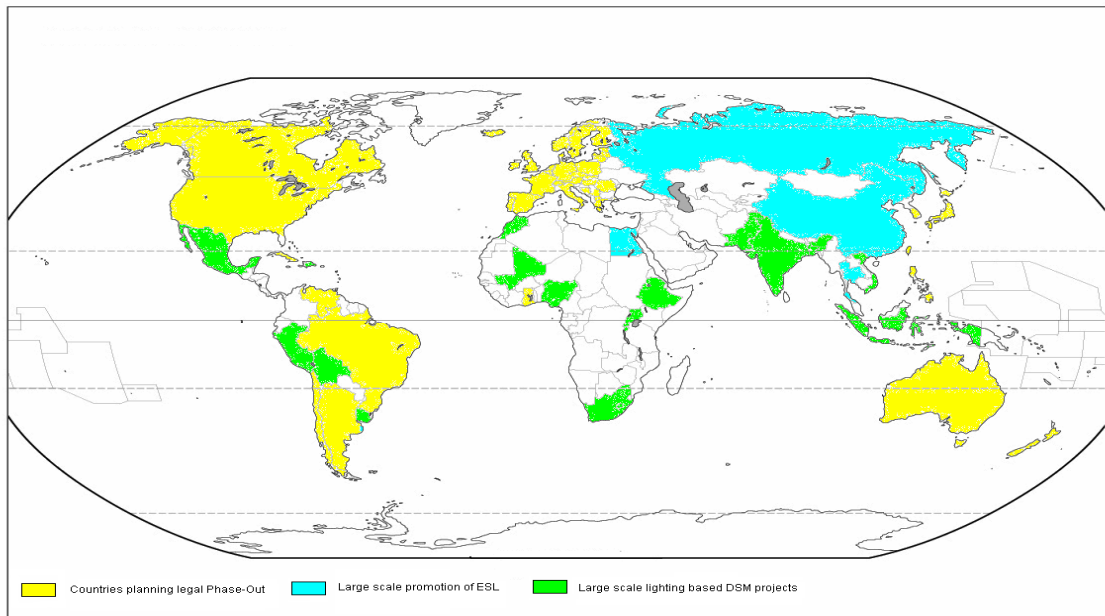
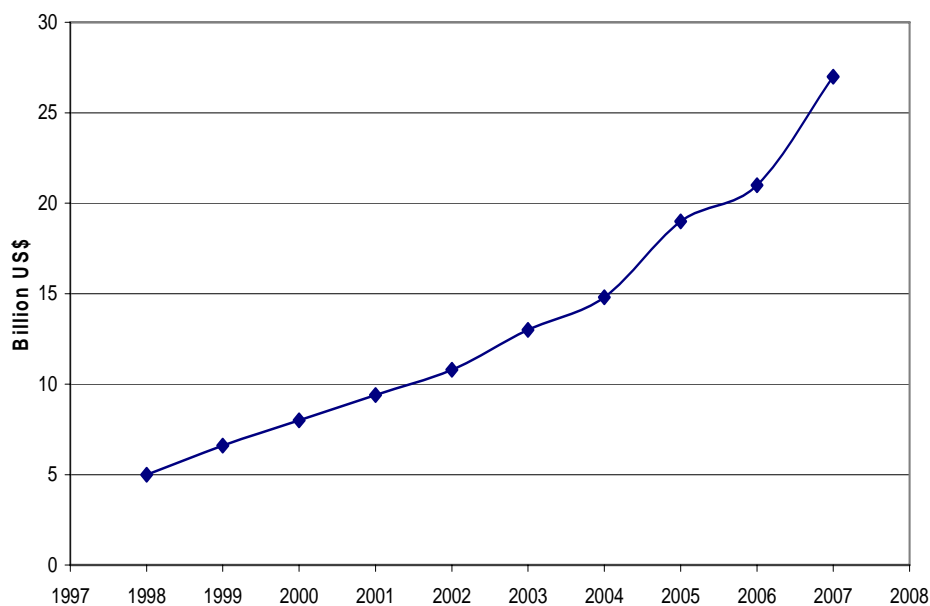
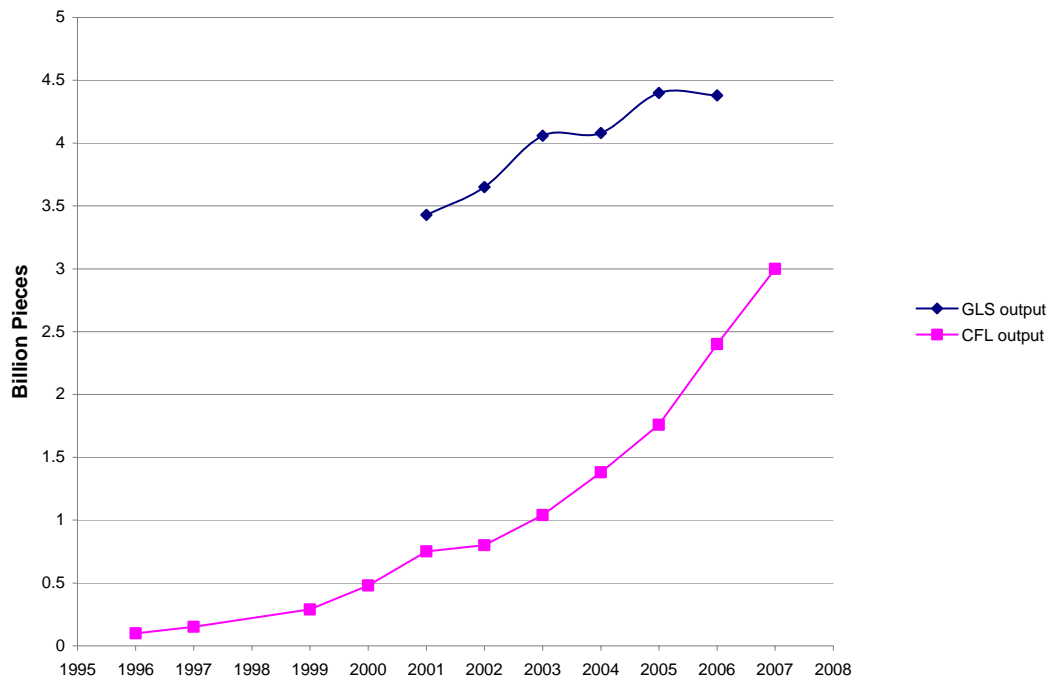


Figure 3: Sales of China's Lighting Industry - Total



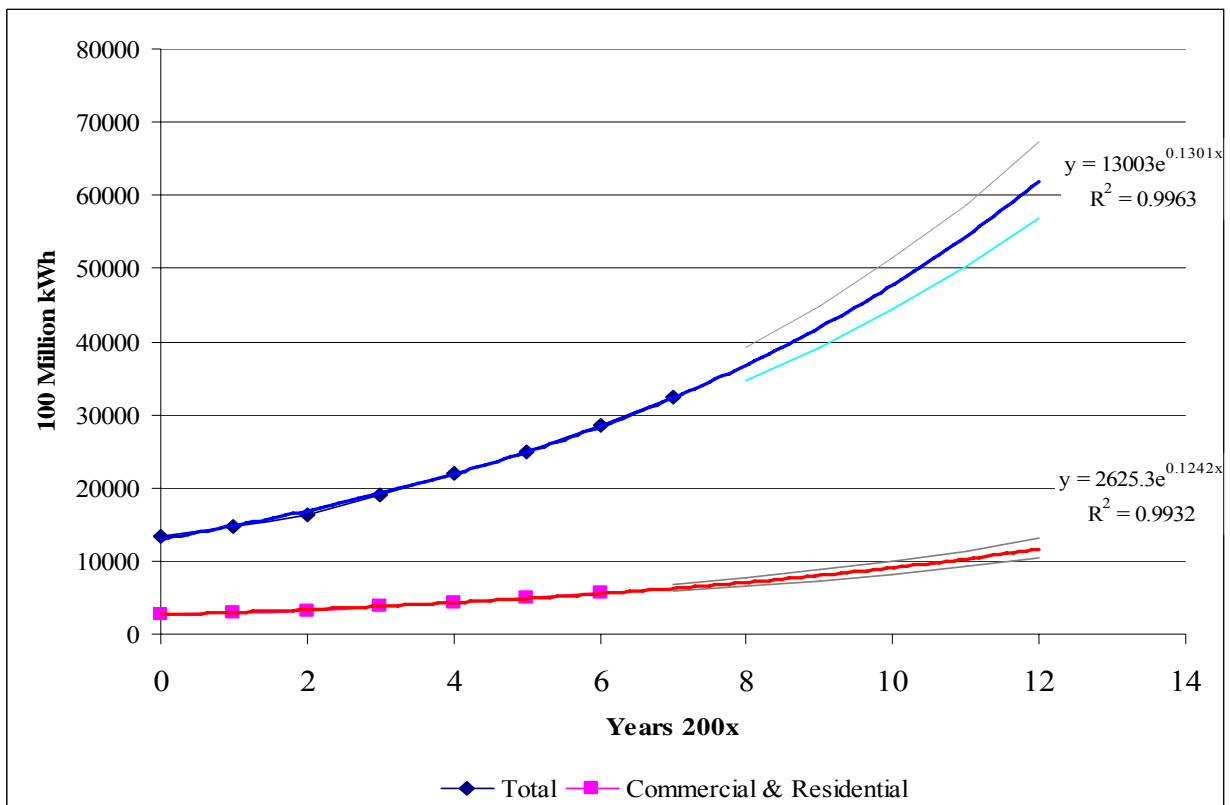
⁵ Status as of August, 2008 based on various online information sources

Figure 4: Production of GLS and ESL in China



9. China will further invest in the lighting industry and particularly in new technologies like ESL and LED lighting. In its quest to build a high technology and value adding production the Government of China (GOC) supports R&D efforts to develop a competitive LED manufacturing base with about 44 Million US\$ under the current 5-year plan. It is predicted that by 2010, the production and sales of electric light source products will be around 13 billion, with the average annual growth maintaining at slightly below 5%. Meanwhile, under a business as usual scenario, of this 13 billion electric light source products, one in three would still be incandescent GLS, while the remaining two thirds will be fluorescent and other efficient lighting products.
10. Under this business as usual scenario, national and international IL phase-out programs and legislation will contribute to a further rise in ESL output, as China is the dominant ESL producer in the world. However, only about 30% of the produced ESLs are currently sold in the domestic market (< 1 billion CFLs, compared to about 50%, or > 2 billion GLS). While the CFL market share is predicted to rise, especially in the industrialized eastern coastal and central regions, the market share of incandescent GLS in rural areas in the absence of substantial promotion efforts will remain high.
11. Reasons for this imbalance are manifold. Firstly, the already booming and still growing demand of developed countries – based on various IL phase-out scenarios - provides a substantial business opportunity for Chinese manufactures. Secondly, the competition in the domestic market is very intense, which renders slightly more expensive good quality lamps with a competitive disadvantage compared to cheap low quality ESL. Low quality ESL undermines consumer confidence in this product, which ultimately results in a setback for the overall ESL market. Finally, the Chinese government provides an export taxation subsidy of about 11% for ESLs, which of course encourages export.

Figure 5: Current (2000 – '07) and Predicted Energy Consumption in China⁶



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14. However, this predicted production increase related to IL phase-out and ESL promotion will pose specific problems. For instance, more rare earth elements and phosphorus resources will be needed, while mercury emissions from ESL production and disposal will rise. Phosphate mining itself has severe environmental impacts.

⁶ Data from: China Statistical Yearbooks 2003 – 2007 and Xinhua News Agency 2008

15. Repercussions of national and international phase-out of IL will also influence Chinese economy and society. The current output of ILs in China is about 4.3 billion lamps, 50% of which are exported. During the course of international phase-out, some Chinese IL manufactures may convert successfully to ESL manufacturing; however other IL manufactures may face insolvency which may lead to numerous lay-offs. The sheer size of this industry segment therefore requires a managed approach to enable a successful and socially balanced transition.
16. Table 2 below summarizes the issues/concerns identified during the project development stage, and indicates the activities that will individually and/or collectively addressed.

Table 2: Summary of Issues & Concerns Regarding the Development and Application of EE Lighting Product Manufacturing and Technology in China

Issue/Concern	Activities Addressing Barrier
Policy/Regulatory	
Lack of supporting policies and practical experiences in the policy support implementation for encouraging the business transformation of local IL manufacturers	Activity 3.1: Annual Investigation and analysis on ESL market improvement Activity 3.2.1 Encourage IL manufactures’ business conversion and increase domestic ESL share of market
Lack of comprehensive national and local policies and laws encouraging energy efficiency in lighting systems, including the regulatory enforcement mechanisms and reporting and monitoring systems	Activity 3.2.2: Developing policy proposal on increasing domestic market share of ESLs Activity 3.3.1: Develop roadmap of IL phase-out and Activity 3.3.2: Plan for sustained ESLs promotion
Absence of policies/regulations on ESL product wastes	Activity 1.3.1: Improvement of the capability to control hazardous substances during the CFLi production process and recycling/ disposal of production waste containing hazardous substances Activity 1.3.2: Improvement of the recovery, recycling and disposal of production waste and used efficient lighting products
Institutional	
No institutional structures established at local levels to sustainably promote ESL	Activity 2.2.1: Feasibility Study of the establishment of Green Lighting Information Centers (GLICs) in China Activity 2.2.2: Monitoring and evaluation of at least 10 ‘GLICs’ in different provinces and cities. Activity 2.2.3: Establishment of a “Green Lights Partnership” Program
Technical	
Lack of processing and recycling of ESL wastes	Activity 1.3.1: Improvement of the capability to control hazardous substances during the CFLi production process and recycling/ disposal of production waste containing hazardous substances Activity 1.3.2: Improvement of the recovery, recycling and disposal of production waste and used efficient lighting products
Financial	
Relatively higher cost of ESL products compared to ILs, making them not	Activity 2.3.3: Facilitate financial assistance programs for low-income families in small cities and rural towns Activity 2.5: Facilitation of more affordable and accessible financing

Issue/Concern	Activities Addressing Barrier
affordable to people in rural areas	options for ESL applications Activity 2.5.4: Development of financial instruments and financial evaluation tools Activity 2.5.5: Identify and cooperate with other EE related financial assistance programs
Lack of attractive and sustainable financing schemes to support the purchase and use of ESLs.	Outcome 2.5: Removal or reduction of financial barriers to ESL application Activity 2.5.1: Discussions on ESL project financing through programs such as DSM, CDM, etc. Activity 2.5.2: Production of information material for ESL project financing Activity 2.5.3: Organization and conduct of workshops for commercial financing institutions and developers of ESL based EE projects on project financing
Lack of incentives to encourage local lighting manufacturers to increase their domestic sale of ESL	Activity 3.2.1: Develop policy proposal on increasing domestic market share of ESLs
Information and Awareness	
Lack of lighting-related knowledge (e.g., lighting technology options) and skills among policy makers, lighting system designers, lighting products manufacturers and operators/maintainers of lighting systems in both public, commercial, residential and industrial facilities	Activity 1.1: Conversion of IL Manufacturing to ESL Production Activity 1.1.4: Training on business conversion strategy and technical issues related to IL manufacturing conversion Activity 2.4: Promotion and awareness campaign to promote demand for ESLs Activity 2.4.1.: Organization and Conduct of international conferences and workshops on ESL promotion Activity 2.4.2.: Design and implementation of ESL promotion campaigns Activity 2.4.3: Design and carry out promotion activities in line with Annual National Energy Efficiency Week and other key events.
Low level of public awareness (particularly in rural areas) on the benefits of ESL products	Activity 2.3: Supporting expanded ESL marketing channels in small cities and rural areas Activity 2.3.1: Establishment of ESL marketing channels in small cities and rural towns Activity 2.3.2: Training of retail personnel on the benefits of ESLs Activity 2.3.4: Design and implementation of promotion events synergized with other central government agencies Activity 2.3.5: Information exchange workshops on ESL promotion in small cities and rural towns Activity 2.4.2.: Design and implementation of ESL promotion campaigns Activity 2.4.3: Design and carry out promotion activities in line with Annual National Energy Efficiency Week and other key events.
Market	
Poor availability of low cost, high quality, energy efficient lighting products, e.g., ESLs;	Activity 2.3: Supporting expanded ESL marketing channels in small cities and rural areas Activity 2.3.1: Establishment of ESL marketing channels in small cities and rural towns Activity 2.3.2: Training of retail personnel on the benefits of ESLs Activity 2.3.3: Design and implement pilot appropriate financial assistance programs for low-income families in small cities and rural towns Activity 2.3.6: Policy recommendations on ESL promotion in small cities and rural areas

Issue/Concern	Activities Addressing Barrier
Lack of local production of affordable and high quality ESL products;	Activity 1.1: Promotion of the conversion of IL Manufacturing to ESL Production
Weak and inadequate promotion of ESL products	Activity 2.2.1: Feasibility Study of the establishment of Green Lighting Information Centers (GLICs) in China Activity 2.2.2: Monitoring and evaluation of at least 10 ‘GLICs’ in different provinces and cities. Activity 2.2.3: Establishment of a “Green Lights Partnership” Program
Practically non-existent or ineffective, marketing network for ESL products, particularly in rural areas	Activity 2.1.1: Selection of 10-15 provinces to establish an improved ESL promotion network Activity 2.1.3: Development and implementation of detailed schemes for comprehensive, large scale ESL promotion programs of ESL , Activity 2.1.4: Compilation of case studies on best practice in the promotion of 4-5 advanced high efficient lighting products Activity 2.1.5: Support the experience exchange on the promotion of energy-saving lamps country-wide

17. The identified issues/concerns were discussed, verified and confirmed in a Logical Framework Analysis (LFA) exercise that was conducted by the project development team. The project framework design was developed during that exercise. The project activities to address these issues/concerns were also reviewed and confirmed. The agreed project planning matrix (PPM) is shown in Section II, Part II.

Institutional, Sectoral and Policy Context

18. During the past years, the Chinese central government issued policies and programs to promote ESLs. Among the programs were the Green Lighting Projects I & II projects and the development of EE standards for lighting products. In 2007, MOF and NDRC issued “... Management Procedures for the Subsidy Fund to Promote Energy-Saving Lamps”. This subsidy scheme provides bulk purchasers, urban and rural residents with a 30% and 50% subsidy, respectively, to purchase energy-saving lamps. In some areas, the subsidy scheme is complemented by provincial, urban and district administrations, enabling the distribution of 1 RMB (0.15 US\$) CFLs. In 2008, this scheme supports the purchase of 50 million energy-saving lamps. The planned numbers of CFLs to be distributed at subsidized prices in some Chinese provinces and cities are listed in Table 3. However, with an installed base of about 3 billion incandescent sockets, such programs can only have a local effect.

Table 3: Examples of ESL Promotion via the GOC Subsidy Scheme in 2008

Province	Volume of ESLs in the Subsidy Scheme
Shan’xi	3,000,000
Beijing	2,000,000
Guangdong	3,000,000
Yunnan	3,000,000
Shandong	3,000,000
Henan	2,000,000
Shanghai	1,000,000

19. In areas where local governments comprise of capable EE agencies promoting ESLs, significant achievements have been made. For example, in Beijing, the 4 Districts of

Dongcheng, Xicheng, Chongwen, Xuanwu launched the “One RMB Energy-Saving Lamps” promotion plan. Residents only pay 10% of the price of such lamps, with 50% subsidies from the central government subsidy, 30% additional municipal subsidy and 10% contribution from the district. The total subsidies amount to about 50 million RMB. Based on the volume of 5 million ESLs involved in the subsidy scheme, the installed ESLs will collectively save (original 200 million KWh/year: 200.000.000.000 Wh) = 200 GWh = 200.000 MWh) a year, equally saving 76,000 tce and reducing the emission of 219,000 tons CO₂. The summer electricity peak load in Beijing is estimated to reach 14.6 million kW, with about 12% of this accounted for in lighting. Therefore, ESL promotion appears as an effective means to ease the power shortages. Similarly, Guangdong Province has arranged for the free distribution of more than 4,600 additional ESLs, on the 16th launch of their "Energy Conservation Week", to 2,000 single-parent families and 2,600 rural families.

20. However, many other local governments, in particular in rural areas, face a substantial capacity barrier to effectively promote ESLs. They do not have specially trained staff within the local EE agencies to promote ESLs. Awareness on green lighting should be improved at local government levels, which will improve local ESL promotion policy implementation. As a matter of fact, there are numerous barriers to explore other potential ESL promotion opportunities. For example, there are no special staff members in many local EE agencies to promote ESLs. There exists no also special ESL promotion scheme in some provinces. Awareness on green lighting should be improved in order to influence the ESL promotion policy implementation. Moreover, there are much more barriers to explore and address in other potential ESL markets.

Stakeholders and Related Activities on Energy Efficient Lighting in China

21. The proposed project is designed to build on previous, ongoing and planned activities in the country in the area of energy efficiency, in general, and energy efficient lighting, in particular, as well as on the outputs and lessons learned from the implementation of previous and ongoing EE activities in the country:
22. This project directly builds on the earlier UNDP/GEF supported Green Lights Project which was completed in 2005. That project, officially known as “Barrier Removal for Efficient Lighting Products and Systems in China”, aimed to improve the quality of Chinese efficient lighting products and stimulate the demand for those products both nationally and internationally. The final project evaluation, completed in December 2005, found that the project delivered the following results:
 - Electricity savings estimated at 15.78 billion cumulative kWh through the end of 2004 (equivalent to US\$ 986 million savings in electricity costs to the consumer);
 - Reduction of 4.9% in lighting electricity use for 2003;
 - Cumulative reduction of 6.8 million tons of CO₂ as carbon (C);
 - Increase in share of automated lighting production lines from 2001 to 2003;
 - Increase in the ratio of high-efficiency products to low-efficiency products.
 - Average lifetime of electronic ballasts doubled, from 8,000 to 15,000 hours;
 - Output and exports of high-efficiency lamps increased substantially (approx. 40%) from 2002 to 2003, but there was no baseline established for comparison;
 - Aggregated, overall awareness of high-efficiency lighting products increased; and,
 - Share of high-efficiency lighting products increased from 32.1% in 2002 to 34.7% in 2003

23. A number of other GEF projects are currently underway in China that supports energy efficiency improvements, including lighting. The China End-Use Energy Efficiency Project (EUEEP) includes a variety of barrier removal and capacity building activities for efficient end-use policy expansion. The World Bank, with GEF support, has had several energy efficiency projects, primarily aimed toward reducing financial barriers to energy efficiency investment. The projects have had a great impact toward establishing an energy performance contracting industry in China, and the latest phase is supporting efficiency investments in national key manufacturing facilities. The International Finance Corporation (IFC)/GEF China Utility-Based Energy Efficiency (CHUEE) Project, also focuses on promoting energy conservation investments, delivered through local energy distribution companies in China.
24. Table 4 below summarizes the previous, ongoing and planned EE lighting technology application projects in the country.

Table 4: Summary of Previous, Ongoing and Planned EE Lighting Projects in China

Project Owner	EE Lighting Technology Applied	Investment Cost, USD	Expected Energy Savings		Date Commissioned or Completed
			Energy, ktoe	Cost, USD	
GOC (SETC): 'China Green Lights'	CFLi, T5 & T8	18,000,000	2,304.8 until 1998	60,000,000 (Budget)	Completed during 2000
GOC (UNDP/GEF) 'China Green Lights II'	Various ESL		1,012.22	26,950,000	Completed during 2005
IFC: 'Efficient Lighting Initiative'	CFLi, T5 & T8, Electronic Ballast		15	1,000,000	To be completed end 2008
IFC: 'China Utility-Based Energy Efficiency Finance Program	Various ESL including Ballast (possible)	Not specified for lighting technologies 500,000,000 - 1,000,000,000	No specific target for lighting technologies		Operational since 2006
GOC - [UNDP/GEF] BRESL ⁷	CFLi, Electronic Ballast	7.8 million GEF funds	120 ⁸	1,340,000 ⁸	Start end 2008/ Beginning 2009
USAID	CFLi		No specific target for China's lighting sector	200,000	Completed in 2009

⁷ This refers to the regional UNDP-GEF project - Barrier Removal to the Cost Effective Development and Implementation of Energy Efficiency Standards and Labeling, participated in by Bangladesh, China, Indonesia, Pakistan, Thailand and Vietnam.

⁸ Estimated for target appliances in China only

			Expected Energy Savings	
AEA Technologies funded by DEFRA UK: Feasibility Study on ESL recovery, recycling and disposal	All fluorescent lighting	Cost: 130,000	No energy savings intended, but reduction of hazardous materials in waste streams, in particular Mercury	Completed 2009

Baseline Scenario

25. Lighting energy efficiency improvement is a key target area identified in China's 11th Five Year Plan for Economic and Social Development (2006-2010). Many of the barrier removal and market development activities initiated through the earlier China Green Lights Project remain in place, and slow but steady increases in the market share of ESLs, particularly driven by urban consumers, would continue under the current baseline scenario.
26. Market studies conducted during the Green Lights Project, and data collected by CALI show improved sales of ESLs, but continued strong sales of lower efficiency ILs, throughout China, and relatively low sales of ESLs in the lower income small cities and rural areas.
27. In the context of this project, the Baseline Scenario is a continuation of current policies and market drivers, which will see an increase in the market share of ESLs in urban and coastal areas and a restrained market growth in rural areas. While CFLs will reach a market share of around 50% until 2012 in urban areas, the market share in rural areas will significantly lag behind.
28. Some business conversion of IL manufacturers will happen based on a reduction of international demand resulting from various international IL phase out activities and much lesser from a reduced GLS/increased CFL demand in China. However, because of the low profit margin for IL production, these manufacturers face severe constraints in financing business conversion, i.e., investing in ESL (e.g., CFL) production lines and capacity building for quality manufacturing. Based on China's significance, both as major producer of ESLs and incandescent GLS international market developments related to current phase-out policies will be an important driver for the Chinese lighting manufacturers' business plans. The reduction of incandescent GLS production in Europe for example may increase the demand from Chinese IL producers and eventually counter plans to reduce Chinese IL output.
29. Based on studies carried out during the project development stage, the baseline, or business-as-usual (BAU), scenario is characterized by the following:
- Substantial urban/rural divide in ESL application, with urban market share of ESL estimated at 5-6 times the respective rural market share of ESLs, which is about 5-10%.
 - Nearly no marketing channels for ESL in rural areas and small cities
 - 50% overall market share of ESL and 5% in rural areas by EOP
 - Practical/effective phase-out of IL manufacturing, sales and use⁹ based on market forces by earliest 2022.

⁹ Practical phase-out is defined here with only marginal stocks of IL remaining installed at places with low to very low lighting demand and usage time of less than 1h/day.

30. Without the PILESLAMP, the practical/effective phasing-out of IL in China will be delayed by 5 years at least. IL products will be continued to be produced in China and sold at very low prices in countries which do not comprise of the technological, political and organizational development to implement IL phase-out policies. Consequently cheap GLS will continue to compete with more efficient lighting products political and organizational development to implement phase-out policies.

PART II: Strategy

Project Rationale and Policy Conformity

31. The proposed GEF-supported alternative to the baseline scenario is intended to reduce greenhouse gas emissions in the Chinese commercial & residential sectors by significant shift in lighting markets to phase-out production of higher energy use ILs, and move toward very high penetrations in China of ESLs. This will be accomplished through three primary activities: lighting industry capacity enhancement; ESL market development and product promotion; and, ESL policy and institutional support.
32. The project duration shall be 3 years, as China will embark on its 12th 5-year plan currently under development and the results of PILESLAMP shall possibly taken into account in developing China's end-user related EE policies in this forthcoming planning period. The approval of policies developed and proposed under this project has to be seen within this wider context, in particular a planning framework still under development and discussion. While this framework will definitively be conducive for further EE policy measures, there is still need for substantial discussion to achieve a consent on specific policy measures targeting EE lighting and their role within this forthcoming 12th 5-year plan.
33. The proposed PILESLAMP aims to reduce the number of IL manufacturers and shift production capacity to ESLs, stimulate sustainable demand for ESLs through a variety of market development activities, and lock in the efficiency improvements through institutional and policy levers that will phase out IL manufacturing.
34. The proposed project will achieve the objective set out in the GEF Strategic Program No. 1, which is on Promoting Energy Efficiency in Residential and Commercial Buildings (SP-1).

Alternative Scenario

35. Under the alternative scenario, the PILESLAMP project will address the barriers identified earlier through a series of activities that will reduce production of inefficient ILs, increase production of ESLs, stimulate market awareness and demand, and create policy mechanisms to ensure the sustainability of the other activities.
36. The realization of the alternative scenario is manifested by and large by the following outcomes:
- Reduction of the current production of IL by about 4% by EOP from the demonstration projects alone¹⁰;

¹⁰ These will be realized from the promotion of the conversion of IL manufacturers, with 2-3 demonstration projects established until EOP. Further reduction will be realized from the implementation of the IL conversion plans and projects of 8-10 companies.

- About 70% of lighting product manufacturers meet key CFL performance specifications for their products until EOP, thereby contributing to the improvement of the supply capacity of high quality ESLs in the country;
- An established ESL promotion network, comprised of, among others, the Energy Conservation Institutes from 10-15 Chinese provinces;
- Compared to BAU established ESL marketing channels comprised of 5-10 supermarkets in small cities and ESL retailers in 10-20 rural areas by EOP.
- About 65% overall market share and 10% for rural areas for ESL by EOP¹¹;

Project Goal, Objective, Outcomes and Outputs/Activities

37. The goal of this project is the reduction in the annual growth rate of GHG emissions from the Chinese C&R sectors. The project objective is the enhanced promotion and implementation of the utilization of energy saving lamps (ESLs) in China through the transformation of the local lighting products market and the phasing-out of incandescent lamp production and sale. It is expected to contribute to the reduction of GHG emissions through the transformation of the Chinese lighting market towards more energy-efficient lighting products, technologies and practices.
38. Tables 5 and 6 below summarizes the characteristics of the Baseline and Alternative Scenarios and the net project impact in terms of electricity savings (GWh/year) and CO2 reductions (Mtons CO2 per year, and cumulative). The summaries of estimated energy savings and CO2 emissions reductions from the widespread application of energy saving lamps and EE lighting systems in the Chinese C&R sectors can be found in Annex D.
39. Estimating single numbers would suggest an accuracy of energy consumption and savings prediction which cannot be achieved within a development context as dynamic as China. Therefore average values are provided indicating the large uncertainties in energy consumption projections – in particular for 8 to 13 years into the future. Rather a ‘best’ – ‘worst’ scenario comparison is provided below. Consequently the following analysis provides a range of probable estimates based on the statistical variation of forecasts on one hand (compare confidence intervals in Fig 5), and on the direct (by EOP) and indirect savings calculation approaches based on the ‘Manual for Calculating GHG Benefits of GEF Projects¹²’ for 5 and 10 years after the project respectively. For ‘Project End’ the direct emission reductions resulting from incandescent manufacturers business conversion plus the rural financial assistance program have been calculated plus some indirect effects estimated, which until EOP will primarily emerging from ESL awareness and promotion campaigns and improved distribution networks. The basic assumption for the energy savings from IL manufacturers conversion is that the ILs no longer produced will be replaced by ESLs in sales and use. The figures are of course corrected for the IL export quota of 50%, i.e. only half of the total possible efficiency gains from this intervention will accrue in China For the post project period both, the ‘bottom-up’ and the ‘top-down’ approaches as described in the manual have been calculated, yielding the lower, respectively higher estimates. The replication factor for the ‘bottom up’ approach was estimated in line with the above cited GEF guidelines as ‘3’, while the top down approach relies on the conservative estimated

¹¹ This increase of rural market share will result from PILESLAMP interventions in the targeted pilot regions

¹² GEF Council: Manual for Calculating GHG Benefits of GEF Projects: Energy Efficiency and Renewable Energy Projects, 2008

potential to replace the current installed incandescent GLS stock in China of about 2 billion lamps¹³.

40. Specifically, the proposed project will reduce carbon emissions by an estimated 4.4 million metric tons (Mtons) per year (cumulative total of 5¹⁴ Mtons) by end of the project. Five years after the project end, carbon emissions are projected to be around 17.3 – 22.9 Mtons lower each year (cumulative total of about 80.3 – 90.0 Mtons), or a reduction of about 2-3% in annual emissions compared to the estimated total 2008 emissions in China. (See Annex D)

Table 5: Estimated CO₂ Emission Reductions from PILESLAMP until EOP

Emission Reduction Topic	Estimates
2008 estimated CO ₂ emissions from electricity generation for the C&R sector in China (Mtons/a)	781 ^a
CO ₂ emission reductions attributed to the widespread application of ESLs and EE lighting systems in China (by end of project, 2012) (Mtons/a)	4.4 ^b
CO ₂ emission reductions attributed to PILESLAMP by end of project as % of total CO ₂ emissions from electricity generation for C&R in China in 2008	0.6

^a Estimated with respective trend-function in figure 5 ± 8% * average grid emission factor for China

^b direct emission reductions calculated according to GEF Manual, cf. Annex D

Table 6: Summary of Expected Results of Baseline and Alternative Scenarios

Indicator	Project Start 2008	Project End 2012	5 Years after EOP	10 Years after EOP
Baseline Electricity Consumption (GWh/yr)	≈ 709,078 ¹⁵	1,172,740 ¹⁶	2,196,516 ¹⁷	4,126,028 ¹⁸
Alternative Electricity Consumption (GWh/yr) ‘bottom up’		1,168,729 ¹³	2,180,636 ¹⁴	4,113,694 ¹⁵
Alternative Electricity Consumption (GWh/yr) ‘top-down’			2,175,684 ¹⁴	4,092,693 ¹⁵
Electricity Savings (GWh realized in each year)		4,011 ¹⁹	15,880 ²⁰ – 20,832 ²¹	12,334 ²⁰ – 33,335 ²¹
Savings compared to Baseline (% lower than baseline)		≈ 0.4	0.7-1 ²²	0.3 – 0.8 ²²
CO ₂ Reductions (Mtons/year)		4.4	17.3 – 22.9	13.5 – 36.6

¹³ Based on Survey Report for Annual Follow-up Evaluation of the Promotion Item of China Green Lighting Project, ACMR, Beijing 2005

¹⁴ Assuming maximum 1 Mton direct savings after year 2

¹⁵ Estimated with trend function from figure 5 ± 8%

¹⁶ ±11%

¹⁷ ±16%

¹⁸ ±21%

¹⁹ Direct energy savings according to the GEF-prescribed Manual for Calculating GHG Benefits of GEF Projects as applied to IL business conversion and CFL subsidy activities

²⁰ Direct savings from investment continued + indirect savings ‘bottom-up’ based on replication factor 3, logarithmic interpolated

²¹ Direct savings continued + indirect savings ‘top-down’ logarithmic interpolated

²² Average of either ‘bottom-up’ or ‘top-down’ calculations

Indicator	Project Start 2008	Project End 2012	5 Years after EOP	10 Years after EOP
CO2 Emission Avoided (% of baseline)		0.4	0.7-1	0.3-0.8
Cumulative CO ₂ Savings (Total Mtons)		5 ¹⁴	80.3 ²⁴ - 90 ²³	174.7 ²³ - 237.4 ²⁴
% market share of ESLs (sales)	30	45	70	≤100

41. The project is comprised of activities aimed at promoting the widespread adoption of energy efficient lighting products (ESLs), improving the Chinese ESL market, and working towards the phasing-out of ILs.

42. A number of outcomes resulting from full project activities are expected. These include:

- Increased volume of investments in ESL manufacturing and conversion of IL production lines to ESLs
- Improved quality of locally manufactured ESL products
- Reduced hazardous waste pollution from ESL production and disposal
- Improved capacity of the energy service institutes and market partners to promote ESLs country widely
- Expanded marketing channels for ESL products in large/medium size cities and big towns
- Significant improvement in the sales of ESL products and reduction in the sales of incandescent lamps in the rural areas (small towns & villages)
- Improved public awareness on the benefits and application of ESL products, especially in the rural areas
- Successful business transformation of incandescent lamp manufacturers to ESL producers
- Improved availability and accessibility of ESLs in the domestic market
- Phasing out of the manufacture, sales and use of incandescent lamps and promotion of ESLs in China.

43. The proposed project is comprised of three (3) major components consisting of complementary activities designed to remove barriers to achieve the project objectives.

- Component 1: Lighting Industry Capacity Enhancement – This component involves supporting the conversion of IL manufacturers to ESL lines, activities to improve the supply of high quality ESLs, and reduction in the environmental waste in production and disposal of ESLs.
- Component 2: ESL Market Development and Product Promotion – This component includes activities to improve awareness about ESL options and applications, especially in lower income, rural areas.
- Component 3: ESL Policy and Institutional Support – This component will support policy and institutional activities that lock in the progress made through the other two components, including policy proposals regarding IL manufacturers business conversion and increasing market share of ESLs, along with a roadmap for IL phase-out and expanded ESL promotion.

²³ Total direct savings from subsidy + accrued 5/10 years savings from business conversion + accrued ‘bottom-up’ savings for 5 years

²⁴ Total direct savings from subsidy + accrued 5/10 years savings from business conversion + accrued ‘top-down’ savings for 5/10 years

44. The following paragraphs describe the various major activities and sub-activities under each project component.

Component 1: Lighting Industry Capacity Enhancement

45. The activities in this Component have been designed to assist manufacturers who currently produce ILs to convert such production lines to more efficient alternatives, while simultaneously providing necessary industry support functions to allow for much higher production levels of ESLs, including improved ESL quality and efficiency standards, and enhanced testing capacity and capabilities on both, quality and hazardous substances of ESLs. This component includes activities to reduce the hazardous material impacts of ESL production and disposal, especially reducing the content of mercury in ESLs, and working to improve capabilities for recycling ESLs at the end of the product life.

46. The Chinese lighting industry actually is driven by an increasing demand for ESL resulting from various international phase-out activities. At the same time the Chinese IL industry also experiences an increase of demand for IL resulting from a stop of IL production in other countries. Within this context the PILESLAMP activities need to focus on (1) operational improvements and (2) providing incentives for IL manufacturers to convert their production. These external market factors, in particular the rising demand for China made ILs from countries and regions not phasing out ILs yet, will be addressed from the GEF Global Phase-Out program.

Outcome 1.1: Conversion of IL Manufacturing to ESL Production

47. The activities that will be carried out to realize this outcome include: (a) conduct of more thorough research to fully understand the risks to the Chinese lighting sector and overall economy of the phase-out of ILs; (b) development of appropriate strategies for mitigating the risks; (c) development of tools to support manufacturer business plans for conversion to ESL production; (d) provision of technical assistance to selected IL manufacturers in developing specific business plans for the IL manufacturing conversion; (e) implementation of IL manufacturing conversion plans in selected manufacturers; (f) training and capacity building for other IL manufacturers in China to share the experience in IL manufacturing conversion.

48. The following table summarizes the various activities that will be carried out, along with their expected outputs.

Activities	Outputs
Activity 1.1.1: Comprehensive research on mitigation/management of risks resulting from IL phase-out & ESL promotion to China’s economy and society ²⁵	<ul style="list-style-type: none"> • Detailed reports from national and international experts on impacts of IL phase-out and ESL promotion • Completed workshops on impacts of IL phase-out and ESL promotion, including the documentation of workshop proceedings • Report from the local lighting industry to

²⁵ This involves the gathering of data that will be used in analyzing and forecasting the impact or influence to the local lighting industry, raw materials supply, supply chain and market demand and economy and social issues of the phase out of the manufacture and sales of ILs. The evaluation involves the conduct of a risk analysis and will come up with suggestions to mitigate/reduce the risks. A workshop will be conducted to discuss with the stakeholders the impacts of IL phase out and ESL promotion to the lighting industry and to the users of lighting products in the country.

Activities	Outputs
	government on impacts of the IL phase-out and ESL promotion
Activity 1.1.2: Planning of IL manufacturers' business conversion ²⁶	<ul style="list-style-type: none"> • 8-10 detailed business conversion plans for diverse types of IL manufacturers to convert to ESL production • Completed international study tour on the IL business conversion and an acceptable study tour report submitted to the GOC
Activity 1.1.3: Implementation of IL manufacturers' conversion pilot projects ²⁷	<ul style="list-style-type: none"> • Report on the technical assistance provided to the IL manufactures hosting the IL business conservation demonstrations • Report on the results of IL to ESL production conversion pilots in 2-3 IL manufacturers
Activity 1.1.4: Training on business conversion strategy and technical issues related to IL manufacturing conversion ²⁸	<ul style="list-style-type: none"> • Variety of training for remaining IL manufacturers <ul style="list-style-type: none"> ○ several 1-2 day sessions for IL management ○ multi-week training for IL technical staff ○ on-site training for IL plant workers • Reports on the completed training • Educational materials used for the trainings

49. *GEF support is required for the technical assistance in risk mitigation and management research, support for business conversion plans, the implementation of selected business plans, and training and technical support to spread experience throughout Chinese lighting industry.*

Outcome 1.2: Improved Supply Capacity of High Quality ESLs

50. To achieve this outcome, the following activities, which are intended to support improved and expanded supply capacity of ESLs, will be carried out. These include: (a) updating of the quality and energy efficiency standards for ESLs to reflect improvements in technology and consumer expectations; (b) capacity building for national testing laboratories to allow more accurate testing of hazardous substances and other quality criteria; (c) assessment of potential production facility improvements and modernization opportunities, both through managerial training and further mechanization of production processes; and, (d) support for major improvements to manufacturers' quality control capabilities.

51. The following table summarizes the various activities that will be carried out, along with their expected outputs.

²⁶ This involves the development of 8 to 10 IL conversion plans based on the circumstances and situation of selected IL manufactures. It will also include the provision of guidelines in the design and implementation of the IL conversion pilot projects (Activity 1.1.3). An international study tour on successful IL business conversion projects (from planning, financing to implementation) for selected IL manufacturers will also be conducted.

²⁷ This entails the selection (based on an agreed criteria with UNDP/GEF) of the host IL manufacturers that will implement the IL business conversion demonstrations. Technical assistance will also be provided to the demonstration hosts in the implementation of the IL business conversion pilots

²⁸ This involves the organization and conduct of training courses for IL manufacturers on IL business conversions. The technical and business planning needs of the IL manufacturers will be considered in the design of the training program. Moreover, the development of the necessary training materials, as well as business planning tools is part of this activity.

Activity	Outputs
Activity 1.2.1: Improvement of quality performance, and energy performance standards for efficient lighting products ²⁹	<ul style="list-style-type: none"> • Proposals for revised national standards for CFLs and Linear FLs, especially to address environmental hazards such as Hg, Pb and other contaminants • Updated energy efficiency standards to reflect changes in industry and consumer expectations • Approved and enforced updated EE standards
Activity 1.2.2: Capacity building for national testing laboratories ³⁰	<ul style="list-style-type: none"> • Report on the results and recommendations of the comparative analysis/review of existing lighting test labs in China • Completed study tour on international testing lab best practices, and acceptable study tour report submitted to the GOC • Trained and qualified lab technicians capable of performing more accurate testing of mercury and other hazardous substances • More accurate quantitative test results of mercury and other hazardous substances produced by test labs
Activity 1.2.3.a: Quality improvement of key raw materials and components for CFLi/CFL, and FL production ³¹	<ul style="list-style-type: none"> • Detailed study report on technical improvement opportunities to improve the production and quality of key raw materials and components use in CFLi/CFL and FL production • Completed training (and training report) for chemical manufacturers/suppliers on improving the quality of key raw materials and components used in the production of quality CFLs • Documented completed technical assistance to selected chemical manufacturers/suppliers in improving the quality of raw materials and components in the manufacture of CFLis/CFLs and

²⁹ This involves the review of the current national CFL and ESL standards, with specific focus on addressing the environmental hazards from the use and disposal of ESLs. The standards will be revised to incorporate provision for the safe levels, and handling of hazardous components of ESLs. Technical assistance will be provided in facilitating the enforcement of the revised ESL standards.

³⁰ This involves the conduct of a comparative analysis/review of existing lighting test labs in China, a study tour on international testing lab best practices, and training of lab technicians to make them capable of performing more accurate testing of mercury and other hazardous substances

³¹ This involves the conduct of a detailed study on technical improvement opportunities to improve the production and quality of key raw materials and components use in CFLi/CFL and FL production. Also part of this activity is the conduct of training for chemical manufacturers/suppliers on improving the quality of key raw materials and components used in the production of quality CFLs. Technical assistance will also be provided to selected chemical manufacturers/suppliers in improving the quality of raw materials and components in the manufacture of CFLis/CFLs and FLs.

Activity	Outputs
	FLs.
Activity 1.2.3.b: Improvement of CFLi production equipment ³²	<ul style="list-style-type: none"> • Detailed report on the feasible and applicable improvements of CFLi production processes • Completed training (and training report) for local lighting product manufacturers on the identification, design and implementation of production process/system equipment improvements • Documented completed TA to selected lighting product manufacturers on the application of feasible production process/system equipment improvements
Activity 1.2.3.c: Enhanced mechanization of CFLi production ³³	<ul style="list-style-type: none"> • Detailed report on the feasible options for enhanced mechanization of CFLi production processes • Completed training for local lighting product manufacturers and equipment suppliers on the enhanced mechanization of ESL production processes • Documented completed technical assistance to selected lighting product manufacturers on the application of enhanced mechanization of ESL production processes
Activity 1.2.4: Improvement of ESL manufacturers' product quality control and management capability ³⁴	<ul style="list-style-type: none"> • Completed training (and training report) on quality control testing and improved production techniques to minimize quality defects • Documented TA to CFL manufacturers on quality control testing and improved production techniques • Completed quality analysis workshops for manufacturers based on findings/results of government quality supervision activities, including the documented workshop proceedings
Activity 1.2.5: Improvement of quality supervision mechanisms ³⁵	<ul style="list-style-type: none"> • 3-5 completed national quality check testing inspections (including inspection reports) to verify ESL quality and actual compliance with all required national standards • Completed and approved revised national supervision plan for implementation after PILESLAMP

³² This involves the conduct of a detailed study on the feasible and applicable improvements of CFLi production processes. Also included is training for local lighting product manufacturers on the identification, design and implementation of production process/system equipment improvements. Technical assistance will also be provided to selected lighting product manufacturers on the application of feasible production process/system equipment improvements

³³ This activity consists of the conduct of a detailed study on the feasible options for enhanced mechanization of CFLi production processes. A training course will also be conducted for local lighting product manufacturers and equipment suppliers on the enhanced mechanization of ESL production processes. Technical assistance will also be provided to selected lighting product manufacturers on the application of enhanced mechanization of ESL production processes

³⁴ This activity consists of the design and conduct of a training course on quality control testing and improved production techniques to minimize quality defects and quality analysis workshops for manufacturers based on findings/results of government quality supervision activities. Technical assistance CFL manufacturers on quality control testing and improved production techniques

52. GEF support is required for the technical assistance in updating of the product standards, national testing lab upgrades, training and technical support for production process improvements, and manufacturer quality control and market supervision system enhancements.

Outcome 1.3: Reduced Environmental/Hazardous Waste from ESL Production and Product Disposal

53. While the utilization of ESLs save substantial energy and consequently result in GHG emissions reductions, they require mercury, a hazardous substance, for their manufacture and operation. Newer production techniques require less mercury than traditional methods, though there is some added cost and the new techniques require new skills. Additionally, there are opportunities for better processing of mercury and other wastes during the production process, as well as alternatives to disposal in landfills at the end of the ESL product life.

54. To realize this outcome, a range of activities tabulated below (along with their expected outputs), will be carried out in order to improve the capacity of local ESL manufacturers to reduce the use of mercury for ESL production, as well as to enhance the recovery of mercury during the ESL production processes. A range of alternative ESL disposal and recycling initiatives will be tested. These are aimed at achieving major reductions in the amount of mercury that ends up in waste disposal in China (and other countries where Chinese ESLs are used), thereby preventing illnesses that can arise from mercury poisoning.

Activity	Outputs
Activity 1.3.1: Improvement of the capability to control hazardous substances during the CFLi production process and recycling/disposal of production waste containing hazardous substances ³⁶	<ul style="list-style-type: none"> • Completed training (and training report) for manufacturers about alternative production processes to minimize mercury content and waste • Documentation of developed cleaner production guidelines for manufacturers, including recycling/disposal guidance • Report on economic and technical feasibility of environmentally friendly materials and components • 4-6 lighting manufacturers employing cleaner production processes, especially on the control of mercury release • Documented completed pilot program showcasing the application of cleaner production processes in lighting product manufacturing • Completed workshops and conference on the findings and recommendations on application of cleaner production processes in the lighting industry

³⁵ This activity involves the conduct of 3 to 5 quality check testing inspections to verify ESL quality and actual compliance with all required national standards. A revised national supervision plan will be prepared and submitted to the relevant GOC agency for approval and for implementation after PILESLAMP.

³⁶ This focuses on mercury in solid form (not liquid), and on reducing the waste produced during the production process.

Activity	Outputs
Activity 1.3.2: Improvement of the recovery, recycling and disposal of production waste and used efficient lighting products ³⁷	<ul style="list-style-type: none"> • Report on feasible and applicable recovery, recycling and disposal options for ESL manufacture in China • Documentation of the evaluation of CIP application pilot program implementation and results (Activity 1.3.1) • Completed workshop on best experiences with CFL disposal initiatives, including the documentation of the workshop proceedings • Completed study tour on international best practices, and acceptable study tour report submitted to the GOC • Completed promotional campaign to improve public awareness of importance of proper CFL disposal, including evaluation report on the results of the promotional campaign

55. GEF support is required for the technology assistance in the implementation of the technology transfer and training to manufacturers regarding lower mercury production methods, for related capacity building activities to reduce hazardous waste use and disposal during the production processes, and for work to understand best practices for ESL recycling and disposal.

Component 2: ESL Market Development and Product Promotion

56. Previous studies³⁸ showed that the key markets for ILs are rural areas and small cities, hence this project will focus on ESL promotion is in rural areas and small cities. The biggest barriers in rural areas are shortage of marketing channels and little awareness of ESL benefits. Because nearly all ESL manufactures do not have experience in establishing marketing channels in rural areas and small cities, this project aims to collect lessons learned and disseminate successful experiences and best practices resulting from the planned pilot projects.

57. Regarding the awareness: sales personnel of retail stores can cost-effectively educate customers on ESL benefits. Meanwhile, some Chinese government agencies (e.g. All-China Women's Federation) have good networks and successful experiences in educating consumers in rural areas and small cities. Therefore the project will improve consumers' awareness through sale persons' participation and cooperation with other agencies.

58. In large cities, up to 70% households already use ESL. However, still a large percentage of incandescent lamps is distributed free together with lighting fixtures. Considering the different markets and related demand for incandescent lamps, the voluntary commitment

³⁷ This activity involves the implementation of a pilot project on the disposal of hazardous materials in ESL waste. The host demonstration companies will be selected from the lighting manufacturers which already expressed interest in supporting PILESLAMP (see Table 9). As part of this activity, a study on the feasible and applicable recovery, recycling and disposal options for ESL manufacture in China will be carried out. A workshop on best experiences with CFL disposal initiatives is also be included, as well as a study tour on international best practices. A promotional campaign to improve public awareness of importance of proper CFL disposal will also be carried out.

³⁸ These are studies conducted under the previous China Green Lights Projects as well as results from surveys conducted under the current national CFL subsidy program

program as planned within this project will support future mandatory policies on stopping free distribution of ILs.

59. Similar to other issues in the energy efficiency sector, efforts related to public awareness on EE benefits need to be persistent. Therefore, the project will implement a series of cost-effective activities to improve public awareness
60. This component includes activities on improving awareness about ESL options and applications, especially in lower income, rural areas. Specifically, the activities include: (a) testing a variety of potential promotion schemes to raise awareness of ESL options in small and medium sized cities and rural areas; (b) establishment of a promotion network for ESLs through existing local energy conservation centers in medium and large cities; (c) setting up both a network and opportunity for competitive innovation in ESL promotion; (d) conduct of a variety of initiatives to explore alternative financing activities through performance contracting to minimize financial barriers; and, (e) publicity and education activities to stimulate demand for ESLs.

Outcome 2.1: Strengthened local ESL Promotion networks

61. A large network of provincial and municipal energy conservation centers (ECCs) are in place around China to provide a variety of services related to energy conservation and efficiency improvements. These centers are involved with information dissemination as well as supervision of some energy conservation regulations and activities in China.
62. To achieve the abovementioned outcome, the activities listed in the table below will be carried out. It should be noted that there will be a competitive process to identify a group of centers that can test different ESL promotion activities, and share best practices among these activities through a coordinated network that regularly meets to discuss what works (and what doesn't). The network will also prepare a range of case studies of both technology applications and best practices of promotion initiatives for other provincial centers to consider implementing.

Activity	Outputs
Activity 2.1.1: Selection of 10-15 provinces to establish an improved ESL promotion network ³⁹	<ul style="list-style-type: none"> • Established local/provincial ESL promotion network, with at least 12 provincial centers including at least 5 centers based in lower income, less developed provinces
Activity 2.1.2: Training on the development of lighting energy management programs, and monitoring of lighting energy consumption	<ul style="list-style-type: none"> • Completed training (training report) for personnel of provincial energy centers and ECCs on the development of lighting energy management programs and lighting energy consumption monitoring
Activity 2.1.3: Development and implementation of detailed schemes for comprehensive, large scale ESL promotion programs of ESL ⁴⁰ .	<ul style="list-style-type: none"> • 5 completed detailed implementation schemes for large scale ESL promotion programs • Report on the implementation of the ESL promotion programs

³⁹ This activity builds on existing ECC activities and supply chain networks, and specifically aiming towards an expanded network in lower income provinces

⁴⁰ This involves the conduct of 5 detailed implementation schemes for large scale ESL promotion programs. This includes development of supporting policies and measures

Activity	Outputs
Activity 2.1.4: Compilation of case studies on best practice in the promotion of 4-5 advanced high efficient lighting products ⁴¹	<ul style="list-style-type: none"> Documentation of the case study compilation. This include at least 10 case studies of successful energy conservation center promotion activities, specifically highlighting those activities that have the most replicability potential
Activity 2.1.5: Support the experience exchange on the promotion of energy-saving lamps country-wide	<ul style="list-style-type: none"> 2 completed workshops on the best practices in ESL promotion for replication throughout China, including documentation of the workshop proceedings

63. GEF support is required for the technical assistance in the development and support of ESL promotion network.

Outcome 2.2: Improved marketing channels for ESLs in large and medium sized cities

64. While there has been increased market share of ESLs in large and medium Chinese cities over the past several years, there is still a fairly high penetration of IL sales. Different cities have varied opportunities for specific promotion activities: in wealthier cities like Beijing and Shanghai, higher end lighting retailers in shopping centers may be able to offer specific programs to promote ESLs among the products they sell, while in less developed large cities there may be more opportunity to sell more fixtures specifically designed to only use ESLs. In order to achieve the expected outcome, a variety of promotion activities, working closely with existing marketing channels of manufacturers, wholesalers, and retailers who sell lighting products to consumers (residential and non-residential) will be tested.

65. There will also be pilot initiatives to test voluntary commitment programs where large end users would commit to long term change out of all economically feasible lighting moving from IL to ESLs, somewhat modeled on US Energy Star and Green Lights Program voluntary commitments from major non-residential end-users. Another type of voluntary commitment program based on agreements by retailers to stop providing ILs along with light fixtures sold in their shops will also be tested, with a plan toward understanding how these commitments might fit in with policy measures being considered in Component 3.

Activity	Outputs
Activity 2.2.1: Feasibility Study of the establishment of Green Lighting Information Centers (GLICs) in	<ul style="list-style-type: none"> Completed and satisfactorily acceptable feasibility study report Detailed report and plan with estimated costs and

⁴¹ This consists of documentation of the case study compilation. At least 10 case studies of successful energy conservation center promotion activities, specifically highlighting those activities that have the most replicability potential will be covered. The documentation will also cover best practices on market based mechanisms, addressing technical details, possible application cases, cost-effectiveness and market opportunities

⁴² GLICs are some kinds of pilot education center to improve public awareness on green lighting, intended for the wide-scale promotion of ESLs in strategic areas where lighting product manufacturers are located. Basically, GLICs will be established in lamp manufacturers and/or lamp retailers that have their own ESL show rooms. This activity includes the conduct of a feasibility study for the establishment and operation of GLICs, including the formulation of the operational plan with estimated costs. The study shall also come up with the expected impacts from GLICs, including plans for sustainability of these GLICs beyond the GEF PILESLAMP funding.

Activity	Outputs
China ⁴²	expected impacts from GLICs, including plans for sustainability of these GLICs beyond PILESLAMP <ul style="list-style-type: none"> • Agreed technical requirements, management and operational arrangements for the operation of GLICs
Activity 2.2.2: Monitoring and evaluation of at least 10 ‘GLICs’ in different provinces and cities. ⁴³	<ul style="list-style-type: none"> • Official list of GLICs, and signed MOUs between the PMO and the GLIC owners. • 10 operational GLICs of various set ups • Detailed annual reports of the energy savings impacts of the GLIC activities
Activity 2.2.3: Establishment of a “Green Lights Partnership” Program ⁴⁴	<ul style="list-style-type: none"> • Report on the inventory of lighting technologies and lighting energy use in all facilities of the partner end users, and their plans for implementing all identified cost-effective lighting improvements • Consolidated annual reports of lighting energy consumption (and energy savings) from the participating companies.
Activity 2.2.4: Voluntary commitment program on the stoppage of the sale of lighting fixtures with ILs ⁴⁵	<ul style="list-style-type: none"> • Formal commitment by at least 5-10 lighting product retailers, with estimated energy savings impacts, in the form of MOUs
Activity 2.2.5: Evaluation of the achievements of the voluntary commitment program ⁴⁶	<ul style="list-style-type: none"> • Evaluation report of different voluntary commitment schemes with selected retailers, with specific recommendations for ongoing, sustainable operation of the schemes beyond the PILESLAMP project

66. GEF support is required in the establishment of the GLICs, testing a variety of voluntary commitment programs, and evaluation of the success of these programs toward longer term policy recommendations.

Outcome 2.3: Support expanded ESL marketing channels in small cities and rural areas

67. Lower income rural areas and smaller cities have many very poor consumers who have not had the means to purchase and test out ESLs as an alternative to ILs. ESLs, while having

Furthermore, agreed technical requirements, as well as management and operational arrangements for the operation of GLICs will be established.

⁴³ This activity involves the signing of MOUs between the PMO and the owners of 10 operational GLICs of various set ups, as well as detailed reporting of the energy savings impacts of the GLIC activities

⁴⁴ This involves the participation of at least 100 large end-users of lighting products that will commit themselves to long-term use of efficient lighting products. Lighting energy utilization will be regularly monitored by the participating companies and reported to PILESLAMP PMO.

⁴⁵ This involves the development of voluntary agreements with selected lighting products retailers (lighting product stores, home shopping malls, large supermarkets) aimed at stopping the sales of IL-equipped lighting fixtures. The participating retailers have to also come up with a plan detailing publicity efforts and management measures. The lighting product retailers will be identified and selected based on a selection criteria that will be developed for this purpose.

⁴⁶ Based on the monitored data from each retailer, the implementation of the program will be evaluated in terms of the energy saving impacts and on the gradual reduction in the sale of ILs and IL-equipped lighting fixtures. The evaluation report shall include findings and recommendations concerning the sustainability of the program and proposed policy recommendations for the central government on gradual reduction of supply of incandescent lamp and promotion of ESLs.

lower life-cycle cost, have a higher purchase price that makes it very difficult for low income consumers to move toward the higher efficiency lighting products.

68. To realize the anticipated outcome, a number of initiatives will be carried out toward improving the availability and awareness of ESLs in small cities and rural areas, and also facilitate testing of different financial subsidy or assistance schemes allowing the poorest consumers to afford more expensive ESLs. This will include some additional subsidies for ESLs beyond the GOC subsidies from the PILESLAMP budget, testing out what level of subsidy is required to have high penetrations of ESLs in the poorest regions of China. This testing of varied subsidy levels will feed into the policy development framework of Component 3, so that GOC policies for full phase-out will include any expansion of the current ESL subsidy.
69. Additionally, targeted promotion activities will be developed in cooperation with manufacturers and other market actors to maximize the awareness level of ESL economics and environmental benefits.

Activity	Outputs
Activity 2.3.1: Establishment of ESL marketing channels in small cities and rural towns ⁴⁷	<ul style="list-style-type: none"> • Signed agreements between the PMO and selected supermarkets in 5-10 cities and towns • Signed agreement between the PMO and the pilot lighting product manufacturer • Documented reports on the ESL marketing channels prepared and distributed to other manufacturers and retailers for potential replication
Activity 2.3.2: Training of retail personnel on the benefits of ESLs ⁴⁸	<ul style="list-style-type: none"> • Completed workshops for supermarket sales personnel, including documentation of workshop proceedings • Reports on case studies on ESL promotion to be disseminated to other manufacturers and retailers around China
Activity 2.3.3: Facilitate financial assistance programs for low-income families in small cities and rural towns ⁴⁹	<ul style="list-style-type: none"> • Report on the various options for providing financial assistance for low-income families in small cities and rural towns. Recommended options for piloting will be highlighted. • Documentation of the selected and approved pilot financial assistance program • Evaluation report on the results and impacts of the piloted financial assistance program

⁴⁷ This involves the design and establishment in collaboration with a pilot lighting product manufacturer of marketing channels enabling the promotion and sales of ESL products available in 5-10 pilot supermarkets in small cities and 10-20 pilot towns in rural areas. The selection of the pilot supermarkets will be carried out as part of this activity and will be based on a set of selection criteria that will be developed for that purpose. It will also include assisting the selected pilot manufacturer to develop ESL promotion materials and slogans adapted to the small cities and rural areas.

⁴⁸ This involves the conduct of workshops for supermarkets sales personnel in small cities and rural areas on the benefits of and promotion of ESL products in conjunction with the pilot manufacturer

⁴⁹ This involves the facilitation for various options for financial assistance to low-income families in small cities and rural areas to enable them stopping using ILs and instead use ESLs. Appropriate levels of government subsidy will be established for uptake in different rural areas to make the ESL price the same as that of ILs, whereas PILESLAMP will contribute to reduced transaction cost and evaluate results.

Activity	Outputs
	<ul style="list-style-type: none"> • Report on numbers of ESLs sold as a result of subsidies and plans for ongoing administration of local subsidies from GOC and provincial/local government entities
Activity 2.3.4: Design and implementation of promotion events synergized with other central government agencies ⁵⁰	<ul style="list-style-type: none"> • Documentation of the designed promotion events • Reports on the results and impacts of the implementation of specially targeted promotion events for potential replication around China
Activity 2.3.5: Information exchange workshops on ESL promotion in small cities and rural towns ⁵¹	<ul style="list-style-type: none"> • Completed workshop • Documentation of the workshop proceedings highlighting best practices in ESL promotion, and recommendations to ESL manufacturers and retailers on activities to implement in other small cities and rural towns in China
Activity 2.3.6: Summarizing experiences made under this component and communicate this to stakeholders and government, in particular also as input to component 3 activities	<ul style="list-style-type: none"> • Documentation of lessons learnt, which will be used as inputs to Component 3 activities.

70. GEF support is needed for the development of ESL promotion schemes, the design and facilitation of pilot financial assistance programs for low-income consumers and to test and evaluate the effectiveness of both promotion schemes and varied subsidy levels.

Outcome 2.4: Promotion and awareness campaign to promote demand for ESLs

71. In addition to the specific market development and promotion initiatives that will be carried out in Activities 2.1 through 2.3, there is a need for other national level, coordinated campaign to raise the awareness among consumers about ESL benefits and expected changes in lighting markets in China. The activities described below, by enhancing the awareness of ESL benefits, in particular in rural areas, will support previous described activities by enhancing the overall demand for ESL in China.

Activity	Outputs
Activity 2.4.1.: Organization and Conduct of international conferences and workshops on ESL promotion ⁵²	<ul style="list-style-type: none"> • Documentation of the proceedings of international conferences/workshops organized and conducted • Completed major international efficient lighting

⁵⁰ This can be done with organizations like the All-China Women's Federation targeting families in small cities and rural areas

⁵¹ These workshops are intended for sharing experiences on how to effectively promote ESL in small cities and rural areas, and will be participated in by lighting product manufacturers and retailers.

⁵² One international conference that can be organized is a follow-up to the successful RightLight 6 conference that took place in Shanghai in 2005 that helped lead to global IL phase-out activities

Activity	Outputs
	conferences
Activity 2.4.2.: Design and implementation of ESL promotion campaigns ⁵³	<ul style="list-style-type: none"> • Documentation of designed ESL promo programs • Documentation of market transformation tools that will be developed, and all other ESL promo materials • Completed ESL promotional programs using the tools & materials produced • Evaluation reports on completed promo campaigns
2.4.3: Design and carry out promotion activities in line with Annual National Energy Efficiency Week and other key events.	<ul style="list-style-type: none"> • Documentation of the designed promotion activities • Reports on the results and impacts of the implementation of specially targeted promotion activities for potential replication around China

72. *GEF support is needed for supporting the national promotion and awareness campaign that will communicate efficient lighting to consumers and all other affected stakeholders in China and beyond.*

73. Outcome 2.5: More affordable and accessible financing options for ESL applications

74. Financial barriers, such as high ESL prices, difficulty for mobilizing commercial lending for EE projects, remain a significant obstacle to full market penetration of ESLs, particularly in the lower income areas of China. A number of other broad energy efficiency financing activities are underway through several national initiatives, including the World Bank/GEF Energy Conservation programs, the IFC/GEF CHUEE project, and others. The following activities will support the inclusion of lighting projects in all alternative finance projects, such as those implemented by China's growing ESCO industry, utility DSM initiatives, and any other initiatives to be identified that aim toward reduction of financial barriers to wider ESL application. Actual co-operation options with other programs and projects will be actively identified and synergies developed from the PILESLAMP PMO.

Activity	Outputs
Activity 2.5.1: Discussions on ESL project financing through programs such as DSM, CDM, etc. ⁵⁴	<ul style="list-style-type: none"> • Completed workshops • Documentation of workshop proceedings highlighting best practices, and gaps for specific PILESLAMP activities to overcome remaining financial barriers
Activity 2.5.2: Production of information material for ESL project financing ⁵⁵	<ul style="list-style-type: none"> • Documentation of the produced information materials

⁵³ The campaigns will highlight market transformation tools such as ESL energy labels, market-based mechanisms, etc. Such campaigns can be in line with Annual National Energy Efficiency Week and other key events.

⁵⁴ This involves the conduct of 2- 3 workshops for representatives of the power sector, ESL manufacturing industry, engineering companies and local Energy Conservation Agencies to discuss and share international best practice in project financing based on DSM, ESCOs, CDM and other mechanisms that are appropriate for the small cities and rural areas.

⁵⁵ These materials will be provided mainly to the banking/financial sector and potential ESL project developers/owners informing about the economics and financing of ESL based EE projects in China. These will be prepared collaboratively with ongoing GEF supported (and other) initiatives to develop innovative financing

Activity	Outputs
Activity 2.5.3: Organization and conduct of workshops for commercial financing institutions and developers of ESL based EE projects on project financing	<ul style="list-style-type: none"> • Completed workshop • Documentation of workshop proceedings highlighting findings and recommendations
Activity 2.5.4: Development of financial instruments and financial evaluation tools ⁵⁶	<ul style="list-style-type: none"> • ESL Financing Handbook
Activity 2.5.5 Identify and cooperate with other EE related financial assistance programs.	<ul style="list-style-type: none"> • Documentation of the cooperation with financial assistance programs. • Reports on the results and impacts of the implementation of financial assistance programs for potential replication around China

GEF support is needed for the development of the cooperation and synergy, e.g. with specifically designed lighting related materials for DSM, ESCO, CDM and other alternative finance products that are available to improve EE in China.

Component 3: ESL Policy and Institutional Support

75. This component will support policy and institutional activities that lock in the progress made through the other two components, including policy proposals regarding IL manufacturers' business conversion and increasing market share of ESLs, along with a roadmap for IL phase-out and expanded ESL promotion. The policy proposals will be developed in close coordination with the lighting industry and with NDRC and other relevant government agencies to ensure that the proposed policies can be quickly implemented. With regard to the project duration of 3 years on one hand and the quite complex policy development and implementation process in China on the other hand, the output of the PILESLAMP activities will be highly instrumental to design and implement policies conducive for a wider ESL market share. However, it cannot be guaranteed from the project onset that policies will be enacted until EOP.
76. The activities in this component closely complement the other two components, by developing policy instruments that will “lock-in” the improvements in lighting efficiency that result from the lighting industry capacity enhancement and the market development and promotion activities.
77. In particular the designed activities shall address the following policy barriers to wider ESL market share, mainly including (1) No sustainable and supporting policies of business transformation within IL manufacturers; (2) Lack of attractive and sustainable national incentives encouraging lighting manufacturers to increase their domestic sales of ESL. (3) Missing road map and special plan for China's ESL promotion/ IL phase-out..

schemes for energy efficiency development, ESL specific case studies on alternative financing of ESL initiatives will be included.

⁵⁶ This involves the development of financial instruments like credit guarantees and preferential loans to promote ESL based EE projects, as well as financial evaluation tools. These will all be embodied in an ESL financing handbook to be made available to EMCs, banks, major non-residential consumers and others to disseminate best practices of innovative financing of ESL projects.

Activity 3.1: Annual Investigation and Analysis of China’s ESL Market Improvement Initiatives

78. Policy makers will need substantial and significant data on the ESL (and IL) market developments to design programs, directives and take decisions which will support the ESL uptake and IL phase-out.

79. Specific activities and related outputs will be delivered from the sub-activities as shown below:

Activity	Outputs
Activity 3.1.1: Detailed investigation and analysis of the ESL market in China ⁵⁷	<ul style="list-style-type: none"> • Completed detailed survey and investigation plan • Completed survey reports of manufacturers, lighting wholesalers and retailers,
Activity 3.1.2: Investigation on typical users including commercial, industrial and residential users ⁵⁸	<ul style="list-style-type: none"> • Report on commercial lighting users and households, commercial and residential IL data collection and analysis
Activity 3.1.3: Analyze the barriers to phasing-out IL, and to increase market share of ESLs as an input to policy establishment.	<ul style="list-style-type: none"> • Phase-out/ ESL promotion barriers identification and analysis

80. *GEF support is required for the in-depth analysis of the Chinese lighting market, understanding the most relevant for Chinese trends, and then preparing draft policies for consideration for implementation by the GOC.*

Activity 3.2: Encouragement of IL Manufactures’ Business Conversion and Increasing Domestic ESL Market Share

81. In order to supplement policy initiatives and proposals regarding IL conversion, there need to be complementary policies to support business conversion, expanded production and of course increased sales of ESLs in China. Some ESL promotion activities have already taken hold in China, and new activities will grow through component 2 of this project. This activity will develop specific policy proposals to significantly increase market share of ESLs, including potential regulations, financial and fiscal policies for ESL market growth, and any other policy initiatives that might be found relevant from the review of international best policy practices in ESL promotion and market development.

Activity 3.2.1: Development of Policy Recommendations on IL Manufactures’ Business Conversion

Activity	Outputs
3.2.1.1 Review outputs from the above project activities under 3.1.and compare to international experience and best practice.	<ul style="list-style-type: none"> • Report of international experience and best practice

⁵⁷ According to published statistics and researched data, summarize and analyze the market data in for ESL and IL regarding sales numbers, price, share of market, import and export by types (CFL, T8, EB etc..).

⁵⁸ As for residential users, the survey will include rural and urban areas in eastern, middle and western China

Activity	Outputs
Activity 3.2.1.2: Development of policy recommendations on IL manufacturing business conversion ⁵⁹ .	<ul style="list-style-type: none"> • Draft financial and fiscal policy proposal on IL manufactures' business conversion
Activity 3.2.1.3: Public hearing on the proposed policies ⁶⁰	<ul style="list-style-type: none"> • Documentation of the public hearings/meetings highlighting comments and suggestions on proposed policies
Activity 3.2.1.4: Finalization and submission of the policy proposals to NDRC and other relevant government agencies	<ul style="list-style-type: none"> • Documentation of the finalized policy recommendations.
Activity 3.2.1.5: Design activities to facilitate the relevant government agencies to approve the proposed policy recommendations ⁶¹	<ul style="list-style-type: none"> • Documented results of activities for approval of the proposed policy

82. *GEF support is needed for the review of international best practice, understanding what is most relevant for Chinese situation, and then preparing draft policies for consideration for implementation by the GOC.*

Activity 3.2.2: Development of policy proposals on increasing domestic market share of ESLs

Activity	Outputs
Activity 3.2.2.1: Review of international experience and best practice on ESL promotion ⁶²	<ul style="list-style-type: none"> • Report of international experience and best practice
Activity 3.2.2.2: Development of policy recommendations on increasing domestic market share of ESLs ⁶³	<ul style="list-style-type: none"> • Documentation of the proposed draft policies
Activity 3.2.2.3: Public hearing on the proposed policies	<ul style="list-style-type: none"> • Documentation of the public hearings/meetings highlighting comments and suggestions on proposed policies
Activity 3.2.2.4: Finalize and submit the policy proposals to NDRC and other relevant government agencies	<ul style="list-style-type: none"> • Documentation of the finalized policy recommendations
Activity 3.2.2.5: Design activities to facilitate the relevant government agencies to approve the proposed policy recommendations ⁶⁴	<ul style="list-style-type: none"> • Documented results of activities for approval of the proposed policy

⁵⁹ Based on the findings on the review of international experience and best practices, policy proposals on IL manufactures' business conversion including national industry development, taxation and fiscal measures and financing solutions will be developed

⁶⁰ This involves the holding of a series of meetings with stakeholders to solicit their comments and suggestion on the proposed policies

⁶¹ After the proposed policy recommendations are submitted to the relevant government agencies, the subcontractor should initiate relevant activities to facilitate the approval of proposed policy by the government agencies.

⁶² This also considers the results of all policy-related activities that were carried out in Components 1 & 2.

⁶³ This also includes the development of financial and fiscal policies, and policies on creating market mechanisms to support ESL promotion and thereby increase the market share of ESLs.

Activity 3.3: Development of a roadmap for IL phase-out and plan for expanded ESL promotion

83. In order to lock-in all of the savings potential of IL phase-out and expanded ESL promotion, it will be critical to have a wide variety of industry stakeholders supportive of a comprehensive roadmap for ending IL production in China. First steps will include detailed surveys to determine where the key markets for IL use remain, and the best ways to move those IL consumers to ESLs. The surveys will build on survey work done in the earlier China Green Lights project, and will seek detailed information from manufacturers, wholesalers, retailers, and commercial, industrial and residential lighting consumers.
84. Based on the findings of the detailed investigation of remaining potential and target market areas, the roadmap for long term IL phase-out and ESL promotion will be proposed to the broad group of lighting industry stakeholders, with several iterations likely to be made before a final roadmap is set for China’s lighting future.

Activity 3.3.1: Development of China’s roadmap of IL phase-out Activities:

Activity	Outputs
Activity 3.3.1.1: Review and analysis of draft international IL phase-out timetable and roadmap	<ul style="list-style-type: none"> Report of IL phase-out timetable and roadmap in foreign countries
Activity 3.3.1.2: Development of roadmap of IL phase-out ⁶⁵	<ul style="list-style-type: none"> Draft roadmap of IL phase-out in China
Activity 3.3.1.3: Discussions on the proposed IL phase-out roadmap ⁶⁶	<ul style="list-style-type: none"> Documentation of the comments and suggestions on proposed roadmap
Activity 3.3.1.4: Finalization of the IL phase-out roadmap taking into consideration the inputs on the analyses made and of the project stakeholders	<ul style="list-style-type: none"> Documentation of the finalized IL phase-out roadmap
Activity 3.3.1.5: Design activities to facilitate the relevant government agencies to approve the proposed China roadmap of IL phase-out ⁶⁷	<ul style="list-style-type: none"> Documented results of activities for approval of China roadmap of IL phase-out

85. *GEF support is needed for the detailed investigation work, workshops to develop and review the roadmap, and final preparation and implementation of the long term roadmap for IL phase-out and ESL promotion.*

⁶⁴ After the proposed policy recommendations are submitted to the relevant government agencies, the subcontractor should initiate relevant activities to facilitate the approval of proposed policy by the government agencies.

⁶⁵ This involves holding of a series meeting and workshops to design and draft roadmap basing on experience leant from international practice. The roadmap will be prepared in China

⁶⁶ This involves the documentation of the agreed roadmap.

⁶⁷ After the proposed policy recommendations are submitted to the relevant government agencies, the subcontractor should initiate relevant activities to facilitate the approval of proposed roadmap by the government agencies.

Activity 3.3.2 Development of China’s Medium and Long-term Plan for ESL Promotion

Activity	Outputs
Activity 3.3.2.1: Consolidation of outputs from the previous project activities and benchmark with international experience and best practice.	<ul style="list-style-type: none"> Report of international experience and best practice in long term ESL promotion
Activity 3.3.2.2: Conduct of scenario analysis for different policy approaches to promote ESLs in China ⁶⁸	<ul style="list-style-type: none"> Designed scenarios for ESLs promotion and market share development under the different policy approaches
Activity 3.3.2.3: Draft a medium and long-term plan for ESL promotion in China ⁶⁹	<ul style="list-style-type: none"> Documented draft a medium and long-term plan for ESLs promotion
Activity 3.3.2.4: Public hearing on the proposed ESL promotion plan	<ul style="list-style-type: none"> Documentation of the public hearings/meetings highlighting comments and suggestions on proposed ESL promotion plan
Activity 3.3.2.5. Finalization a medium and long term ESL promotion plan	<ul style="list-style-type: none"> Documentation of a medium and long-term ESL promotion plan
Activity 3.3.2.5: Design activities to facilitate the relevant government agencies to approve the proposed master plan for ESL promotion ⁷⁰	<ul style="list-style-type: none"> Documented results of activities for approval of China master plan for ESL promotion

86. *GEF support is needed to collate the basis data, compare international experiences and approaches and consequently to work out a medium to long term ESL promotion plan*

Project Indicators, Risks and Assumptions

87. The project success indicators are shown in the Project Planning Matrix (PPM) in Section II, Part II. The target values for these indicators based on the PPM, which will be monitored during the course of the PILESLAMP implementation, are summarized in Section IV, Part V. Various indicators in the PILESLAMP PPM are output, rather than impact related. Earlier it was explained that e.g. the lighting industry is facing a transition phase, where it appears to be extremely difficult to project current trends and to establish concrete, time bound and quantified indicators beyond those already identified. Similarly the policy framework is rapidly changing. While of course in favor of additional EE measures and targets, the contents and impacts of these forthcoming policies are not known yet, which does not allow specifying additional policy related impact indicators for the time being.

88. While all possible efforts have been made to ensure the effective design and implementation of the project activities in the project design phase, there are inevitably some unavoidable residual risks that will have to be carefully monitored and managed during the project to ensure its success. The different risks that were identified during the project formulation and the recommended mitigation measures and a commentary on the need for mitigation measures are provided in detail in Section IV, Part IV.

⁶⁸ This includes energy-saving potential, cost-effective analysis, alternative technology availability, resource limitation, etc

⁶⁹ This involves the holding of a series of meetings with stakeholders to solicit their comments and suggestion on the documented draft medium and long-term plan for ESL promotion in China.

⁷⁰ After the proposed master plan for ESL promotion are submitted to the relevant government agencies, the subcontractor shall initiate relevant activities to facilitate the approval of proposed master plan by the government agencies.

Main Project Risks and Mitigation Strategy (by component)

89. **Component 1** – Business conversion demonstration projects – the main risk is identified in lacking interest or financing of/for manufacturers to invest in business conversion. The adequate mitigation strategy will rely on demonstrating the business opportunities accruing from national and international phase-out strategies for ESL producers on one hand and on co-operation with the financing sector and targeted programs (e.g. the IFC supported ‘Utility Based Energy Efficiency Financing Program’) as well as identifying and responding to the needs of the targeted manufacturers⁷¹.
90. **Component 2** – Promotion of ESL risks having only short term impact if sustainability aspects are not adequately considered. The project intends therefore to build on existing structures wherever possible and enhancing their capacity to deploy sustained ESL promotion programs in rural areas in co-operation with stakeholders like ESL manufacturers but also the electricity sector. A second risk under Component 2 is failure to reach the target group of low income rural families as these are not easily reachable via mainstream media and special campaigns need to be designed to appeal to their needs. Further, adequate partners having an outreach to this target group need to be identified and mobilized to co-operate on the program implementation.
91. **Component 3** – Policy development: the inherent risk lies in the fact that policies might be recommended but not implemented. However, the project will be implemented under the guidance of leading policy developing bodies in China, NDRC and NECC together with CSC and CNIS. This coalition will ensure that provided the macroeconomic framework remains stable and current energy policies world-wide will follow their current trajectory, the policies developed under this project will indeed be taken up and implemented.

Expected Global, National and Local Benefits

92. Global Benefits

- Reduced GLS production in China, leading to less market pressure from cheap but energy wasting incandescent lamps
- Improved production of CFLs, with respect to quality and quantity – able to meet peak demand triggered from the current global phase out movement
- Eventually reduced CFL prices resulting from higher production
- Global energy savings and CO₂ emission reductions. As the export quota for incandescent lamps stands at about 50%, roughly the same amount as the targeted overall national Direct Emission Reductions of about 13.5 to 36.6 Mtons CO₂ can be credited as indirect effects internationally to PILESLAMP

93. National Benefits

- Energy and emissions savings as summarized in Tables 5 and 6
- Development of a policy roadmap leading to a Phase-out of inefficient lighting in China
- Improvement of the China Quality inspection and supervision system, including the relevant product quality and efficacy standards

⁷¹See activities under component 2.5

- Improvement of the environmental performance of the Chinese Lighting sector, including trial project(s) on collection and recycling of fluorescent lights
 - Improved capacity of Chinese test laboratories in particular related to environmental testing
 - Improved lighting in particular in China's rural areas
 - Managed industry transition and support programs from incandescent GLS manufacturing to ESL production
 - More active participation of the private sector in the development of the rural countryside
94. The project aims to reduce GHG emissions from the utilization of inefficient ILs by 4.4 Mtons of CO₂ by project end. It is envisioned that the overall project impact will be at least 3-folds 10 years after EOP and possibly around 8-folds considering all indirect effects including a possible total phase-out of IL in China until 2022.

Country Ownership: Country Eligibility and Country Drivenness

95. China has ratified the UNFCCC in June 1992 and the Kyoto Protocol in May 1998. It has completed and submitted its First National Communications under the framework of the UNFCCC, which highlighted that EC&EE, in general, and ES&L, in particular and among the measures each country are considering for the reduction of GHG emissions. It is now preparing its Second National Communications to the UNFCCC.
96. National Development & Reform Council (NDRC), a Government of China agency involved in the development and implementation of industry and energy policy, has presided over the development of this project. NDRC has responsibility for energy efficiency policy, and has overseen a range of earlier GEF projects including China Green Light, the World Bank Energy Efficiency Project, and a variety of others.
97. A national stakeholders' consultation workshop, aside from the LFA exercise, was also conducted to discuss the issues/concerns (i.e., barriers) regarding the development of ESLs, phase out of incandescent lamps, and application of EE lighting technologies. The LFA exercise came up with the activities that are proposed to be carried out under the PILESLAMP, including the project implementation and management arrangements.
98. PILESLAMP includes ongoing and planned EE lighting technology development and application projects of selected project partners, namely the China Association of the Lighting Industry (CALI), the Energy Research Institute (ERI) of NDRC, the China Standards Certification Center (CSC), China National Institute of Standardization (CNIS), and China's National Lighting Test Center (NLTC). Some of these are among the demonstration activities of the project. These parallel activities that, as per agreement with the project proponents/owners, would be subsumed in the PILESLAMP.
99. It should be noted that the demonstration projects are funded separately and are among the co-financed activities of PILESLAMP. As part of the project (and indicated in the PPM), their results are reported as among the outputs of PILESLAMP. Where necessary, GEF resources will be used for technical assistance in the implementation of some of these parallel activities. The matching of these parallel activities and PILESLAMP's technical assistance is very important in achieving the reduction of the identified barriers to ESL manufacturing and application and EE lighting technology applications in the Chinese C&R sectors.

Sustainability

100. Sustainability is an integral element of the PILESLAMP activities and is ensured through the outputs of most of the project components. The sustainability of the institutional elements of the project will be ensured through the adoption of collaborative approaches and strategies that seek to foster and reinforce the long-term sustainability of existing institutional and coordination structures that have been established and are operational at both the national and provincial levels with regards to projects dealing with lighting energy efficiency.
101. Sustainability of the project is ensured through the outputs of the different project components, e.g., endorsed policy and financial frameworks, technical guidelines on ESL applications, EE lighting system installation, operation and maintenance, and educated consumers and policy/decision makers, increased know-how and upgraded capacity of service providers.
102. In the final year of the project, a follow-up national program will be designed considering the different achievements and lessons learned. The follow-up program, with a long-term target that is to be achieved in the subsequent China development plans, will create a significant impact to the energy performance of the Chinese C&R sectors.

Replicability

103. PILESLAMP is designed to have a balanced mix of capacity building and enabling environment activities tailor-made to China's specific conditions, markets and regulatory environment. Such balanced mix of activities is expected to promote the application of EE lighting systems and technologies. Replication is an integral component of the project design as the expected energy savings from the application of EE lighting technologies in Chinese commercial and residential buildings (and the corresponding GHG emissions reduction from the reduced electricity demand) rely on the replication of the relevant PILESLAMP activities.
104. Replicability of the proposed project components will be ensured through the documentation of the package of activities/inputs that went into each energy efficiency projects that are in one way or another, directly or indirectly influenced by PILESLAMP.

PART III: MANAGEMENT ARRANGEMENTS

105. Given the past experience with UNDP-supported projects, UNDP seeks to implement an innovative management approach based on a partnership where accountability and responsibility for managing and achieving project outputs are equally shared among the PILESLAMP partners. This approach is intended to minimize overall management and overhead costs, while ensuring effective implementation of the project. The organizational structure is shown in Fig. 6.

Project Implementation Arrangements

106. The management structure of the PILESLAMP project will be as follows: A Project Steering Committee (PSC) will be established and will comprise of the representatives of NDRC, MOF, and also including the National Project Manager of the Project Management

Office. The PSC will play the role of an advisory committee. The PSC members will also be invited to participate in the annual project review meetings. The Project Management Office (PMO) will be also established to be responsible for coordinating and implementing the project activities of the project. The PMO Director will serve as the Secretary of the PSC. PILESLAMP will be Nationally-Executed (NEX) by the Chinese Government. It will assume the overall responsibility of ensuring that all activities are executed accordingly and as per the approved Project Document. The National Development & Reform Commission (NDRC) will be the Implementing Partner (or Executing Agency) for the PILESLAMP project while the National Energy Conservation Center is the Designated Implementing Partner (or Designated Implementing Agency).

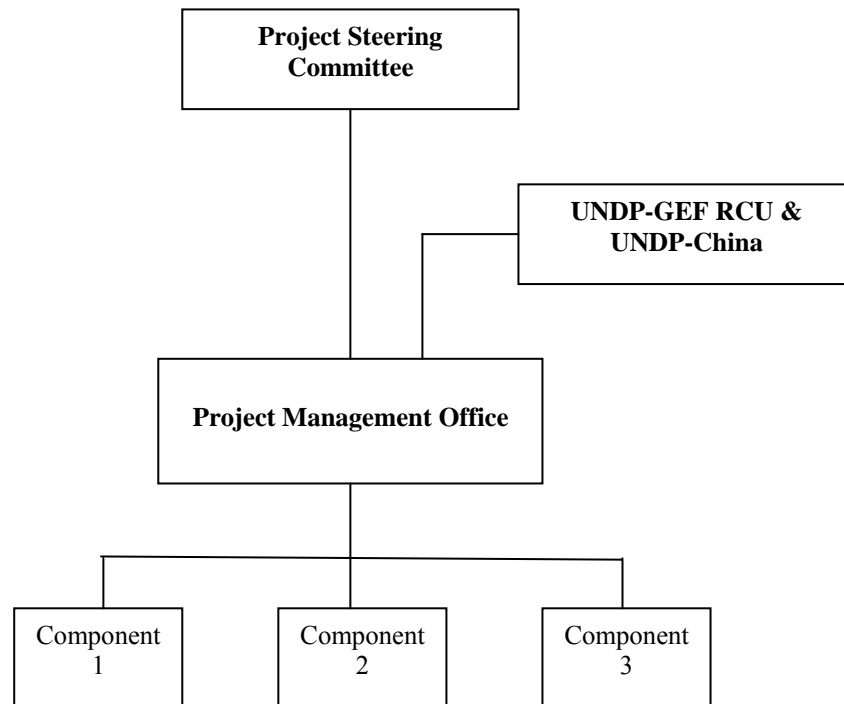


Fig. 6: PILESLAMP Project Organizational Structure

107. The PSC will be established with the key responsibilities as follow: (a) Reviewing of annual progress reports for necessary guidance; (b) Reviewing and approving the annual work plans and budgets; (c) Providing guidance on the effectiveness of PILESLAMP implementation, and its linkages to corporate UNDP policy decisions, and other UNDP initiatives; and, (d) Monitoring and evaluating the implementation of PILESLAMP towards the intended outputs, after two years of project execution. As a minimum, the PSC will meet at least once a year, allowing for the stakeholders to review the progress with the project implementation and to agree on a coordinated annual project implementation strategy and plan.
108. UNDP-China, together with the UNDP-GEF Regional Technical Advisor for Climate Change in the Asia-Pacific region will carry out the GEF oversight. Working in conjunction with the various project partners, UNDP-China will be responsible for monitoring and evaluation (M&E), including organizing project reviews, approving annual implementation work plans and budget revisions, monitoring progress, identifying problems, suggesting actions to improve project performance, facilitating timely delivery

of project inputs, and provide linkages to the other sub-regional, Asia-Pacific regional and global initiatives. All M&E functions will be carried out in line with standard UNDP and UNDP-GEF procedures. UNDP China will also provide country office support for all the activities of the project as agreed with the implementation partner of China.

109. As the Implementing Partner for this project, China's NDRC will appoint a National Project Director (NPD) to be in charge of overall responsibilities, including planning, coordination, administration and financial management of the project with support by UNDP-China. The NPD will be responsible for the achievement of the project objectives, for all projects' reporting, including the submission of Annual Work Plans (AWP) and financial reports. He/She will ensure the delivery of the project outputs and the judicious use of the project resources. This will ensure that expected outputs are delivered using the most efficient and cost-effective implementation strategies and procedures. The NPD will be also a member of the PSC. As the project's Implementing Partner, the NDRC will also provide in-kind contribution to implement the PILESLAMP.
110. As the Designated Implementing Partner for this project, the National Energy Conservation Center, will take responsibility of supporting NDRC and UNDP-China in managing and implementing the PILESLAMP. The Director of National Energy Conservation Center will be a member of the PILESLAMP PSC.
111. A Project Management Office (PMO) will be established by the NDRC, together with UNDP-China. The PMO will be responsible for the day-to-day management of all the project activities including those on capacity building, demonstration sub-projects and dissemination activities both at the provincial and national levels. PMO will be managed by a PMO Director, who will be supported by three staff members, a PMO secretary, a full time National Technical Advisor, along with a part time International Technical Advisor.
112. A service organization, CICETE⁷², designated by NDRC and MOF, will be responsible for all financial management services. This entity will provide all financial disbursement and accounting of project funds, and will work with the PMO to select and negotiate contracts with all subcontractors and experts.
113. National government professionals and other relevant national stakeholders from the private sector and civil society will, to the extent possible, manage, coordinate and implement the PILESLAMP activities.
114. The proposed PILESLAMP will be implemented for a period of three years. Considering the duration of the process of obtaining GEF funding, it is anticipated that the project will kick-off by the second quarter of 2009 and will conclude by the end of 2012.
115. To accord proper acknowledgement to GEF for providing funding, a GEF logo will appear on all relevant publications and documents produced by the project, including among others, project hardware purchased with GEF funds. Any citation from any of the PILESLAMP publications and documents will also accord proper acknowledgment to GEF. The UNDP logo should be more prominent and separated from the GEF logo if possible, as UN visibility is important for security purposes.

⁷² For its services related to foreign currency transfers and contracting CICETE charges 3% of the project funding in foreign currency, i.e. US\$ 420,000 for PILESLAMP

PART IV: MONITORING AND EVALUATION PLAN AND BUDGET

116. Project monitoring, evaluation and dissemination will be undertaken in accordance with UNDP and GEF established procedures. The executing agency will be required to prepare Annual Project Reports and Project Implementation Review reports (APR/PIR) to UNDP.
117. The APR/PIR will provide a more in-depth summary of work-in-progress, measuring performance against both implementation and impact indicators. Any adjustments in project approach will be reported to the Project Steering Committee who will evaluate and approve the adjustments recommended.
118. The project is subject to two in-depth independent reviews. One will be conducted in the mid-term (fourth quarter of the second year) and the other will be scheduled upon project termination. A terminal report would be completed prior to the completion of the project and would detail project achievements and lessons learned. Additional independent evaluation may be conducted if UNDP and the GEF deem it necessary.
119. As executing agency, NDRC will carry out continuous self-monitoring of the project implementation performance. The in Section II, Part II states all the success indicators and means of verification for each activity that will be carried out under this project. These indicators are the parameters that will be monitored by NDRC under this project.
120. To ensure coherent, coordinated and timely implementation of project activities, appropriate practical mechanisms, monitoring and evaluation (M&E) procedures and implementation arrangements will be developed between and among national and local government agencies, financial institutions, private sector partners, local NGOs and consumer groups. Specifically, an M&E plan for the PILESLAMP implementation will be developed together with the key stakeholders, and this plan will be based on the identified success indicators and means of verification for the project goal, project purpose, project outcomes, and project activities. The PSC will advise and approve this M&E plan. The budget shown in Part V (M&E Plan and Budget) includes formal evaluation activities as well as input from market survey activities that will take place as part of each of the components. During the project inception workshop a detailed plan for coordination of market data to be collected, to support measurement and tracking of the success indicators, will be agreed by all parties.
121. Surveys will be conducted during the project to track these and other indicators of project impact. Monitoring and Evaluation (M&E) activities will be undertaken to best international practice standards with reference to the International Monitoring and Verification Protocol (IPMVP) methodology. This reference to established international best practice IPMVP methodologies will be a vital element in the presentation of the results of the overall PILESLAMP to the full range of project stakeholders, including but not limited to GEF.
122. Success indicators for each objective and activity in the PPM will be monitored and evaluated during the course of project implementation. Section IV, Part VI provides the annual targets and the monitoring plan. The extent by which the GEF developmental goal is achieved will be evaluated from the monitored results. Annual target values for the indicators will be confirmed during project document finalization.
123. The project will coordinate with all the project partners. The continuous monitoring and evaluation of all project activities, even after completion of the project period, will bring sustainability of the project with desired benefits in the long run. All evaluation reports will

be uploaded to the project website for widespread dissemination. A formal Monitoring and Evaluation Strategy will be developed and implemented in the full-scale project to track the activities and contributions of the activities by all the project partners, in terms of both in-cash and in-kind contributions as detailed in the attached letters of commitment. These M&E findings will be reported on in the project's two in-depth independent reviews.

Audit Clause

124. The PMO on behalf of the NDRC will provide the UNDP-China Country Director with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP and GEF) funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

PART V: PARTNERSHIPS STRATEGY

125. The successful implementation of PILESLAMP will depend on the development of effective partnerships between numerous different agencies at multiple levels. Partnerships will be pursued with international and national agencies, as well as international partners to enrich and further project aims. The project will form a partnership strategy with three elements: (a) international coordinating and implementation function; (b) national coordination and implementation function; and, (c) Technical and commercial function.

Key Partners

126. PILESLAMP will undertake the following activities to ensure that the project work is synergized with on-going national and provincial level activities, as well as to benefit from the expertise available in the region:
- Strengthen its links by developing Inter-agency Partnerships with key energy-related projects nationally and internationally. These will include the EUEEP, World Bank Energy Conservation Projects, the international Efficient Lighting Initiative, and the Global Lighting Market Transformation Program that is expected to support IL phase-out initiatives around the globe. PILESLAMP will work with financing institutions in the region to provide support for energy service related initiatives.
 - Partner with the NGO funding and implementation agencies to broaden the reach and impact of the PILESLAMP project.

PART VI: LEGAL CONTEXT

127. This Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement between the Government of China and the United Nations Development Program, signed by the parties on 29 June 1979. The host country implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement.
128. UNDP acts in this Project as Implementing Agency of the Global Environment Facility (GEF), and all rights and privileges pertaining to UNDP as per the terms of the SBAA shall be extended mutatis mutandis to GEF.

129. The UNDP Resident Representative in China is authorized to affect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by the UNDP-GEF Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes:

- Revision of, or addition to, any of the annexes to the Project Document;
- Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;
- Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and,
- Inclusion of additional annexes and attachments only as set out here in this Project Document

SECTION II: Strategic Results Framework and GEF Increment

PART I: Incremental Cost Analysis

Broad Development Goals

1. China has seen tremendous economic growth over the past two decades, with corresponding fast growth in the demand for electric energy. Because much of China's energy consumption is coal based, increased electricity demand results in deterioration of local air quality and increased GHG emissions. Reducing energy waste and demand growth is a key goal for the GOC.
2. The production and sales of energy efficient lighting equipment, including ESLs, have been a growing, sustainable export business for China, and maintaining and growing "green business" activities is an economic development goal for China.

Global Environmental Objective

3. The global environmental objective is reduced GHG emissions, which will be achieved by lower electricity consumption as a result of higher efficiency lighting products in use. Reduced use of inefficient ILs, and growth in the market share of ESLs, will reduce the expected electric load growth, resulting in lowered GHG emissions.
4. With China as the primary manufacturer of lighting equipment globally, enhanced ESL manufacturing capacity and lower production of ILs in China will provide environmental benefits globally.

Baseline Activities

5. Without the PILESLAMP project, the lighting industry will continue to develop and evolve in China as it has in recent years, with some activities by manufacturers and other market actors to increase the sales levels of ESLs. More details of expected activities are included in the Incremental Cost Matrix, Table 10.
6. The level of government policy activity without the Project would likely continue to promote some support for more efficient lighting as part of the GOC's overall emphasis on improving energy efficiency and reducing the energy waste. Higher efficiency lighting is a high priority in China's 11th Five Year Plan, and some support for ESLs has been targeted through Central Government subsidies for ESLs during the Five Year Plan period, though less efficient ILs would still be available for consumer purchase.

GEF Alternative

7. Under the alternative scenario, there will be a dramatic decrease in the production and use (both within China and globally) of inefficient ILs, with a corresponding increase in the use and market penetration of higher efficiency, high quality ESLs.
8. The GEF alternative (i.e., PILESLAMP) will reduce electricity use in the commercial and residential sectors through a coordinated set of activities to enhance lighting industry capacity, initiatives aimed toward ESL market development and promotion, and ESL policy and institutional support to lock in efficient market developments.

9. In line with the GEF Strategic Program No. 1, the following interventions will be carried out under the PILESLAMP

- Increased volume of investments in ESL manufacturing and conversion of IL production lines to ESLs
- Improved quality of locally manufactured ESL products
- Reduced hazardous waste pollution from ESL production and disposal
- Improved capacity of the energy service institutes and market partners to promote ESLs country widely
- Expanded marketing channels for ESL products in large/medium size cities and big towns
- Significant improvement in the sales of ESL products and reduction in the sales of incandescent lamps in the rural areas (small towns & villages)
- Improved public awareness on the benefits and application of ESL products
- Successful business transformation of incandescent lamp manufacturers to ESL producers
- Improved availability and accessibility of ESLs in the domestic market
- Phasing out of the manufacture, sales and use of incandescent lamps and promotion of ESLs in China.

10. The following are the expected outcomes by end of the project:

- GHG emissions reduced by 4.4 Mtons/yr CO₂ compared to business-as-usual scenario and a cumulative savings of about 5 Mtons by the end of the project (2012).
- Electricity savings of ≥ 4000 GWh/yr compared to business-as-usual scenario and cumulative electricity savings of about ≤ 5000 GWh by end of project.
- 45 % market share of ESLs in the local lighting market by end-of-project

11. The proposed project is comprised of three major components consisting of complementary activities designed to remove barriers to achieve the project objectives. A separate component on project management is also included. The project components are as follows:

- Component 1: Lighting Industry Capacity Enhancement – This component involves support for the conversion of IL manufacturers to ESL lines, activities to improve the supply of high quality ESLs, and reduction in the environmental waste in production and disposal of ESLs.
- Component 2: ESL Market Development and Product Promotion – This component includes activities to improve awareness about ESL options and applications, especially in lower income, rural areas.
- Component 3: ESL Policy and Institutional Support – This component will support policy and institutional activities that lock in the progress made through the other two components, including policy proposals regarding IL manufacturers business conversion and increasing market share of ESLs, along with a roadmap for IL phase-out and expanded ESL promotion.

12. **Component 1: Lighting Industry Capacity Enhancement** - This component has three primary activities: promote the conversion of IL manufacturers; improving supply capacity of high quality ESLs; and, reduced environmental/hazardous waste during ESL production and product disposal. The activities under this component will collectively cost about US\$ 47.459 million to implement. The incremental activities will cost US\$ 7.959 million which will be financed by the GEF.

13. **Component 2: ESL Market Development & Product Promotion** - This component will address several barriers including lack of awareness about ESL options, particularly in lower income rural areas, and financial barriers. A wide variety of market development activities, working in close cooperation with key market actors such as lighting manufacturers and retailers, will spur markets for ESLs as an alternative to lower efficiency ILs. The activities under this component will collectively cost around US\$ 30.345 million to implement. The incremental activities, which will be financed by the GEF will cost US\$ 3.895 million.
14. **Component 3: ESL Policy & Institutional Support** - This component has been primarily designed to develop long term policies to lock in IL phase-out and ESL market promotion gains. The activities under this component will collectively cost about US\$ 3.011 million to implement. The GEF will finance the US\$ 1.111 million required for the incremental activities.

Incremental Cost Matrix and Project Indicative Budget

15. The proposed budget for each project component is shown in Table 7 below. In total we are requesting US\$ 14,000,000 from the GEF.

Table 7: Summary Cost of Each Project Component (US\$)

Project Component	Baseline	Incremental	Total Cost	%
1. Lighting Industry Capacity Enhancement	39,500,000	7,958,900	47,458,900	56.5
2. ESL Market Development and Product Promotion	26,500,000	3,895,100	30,395,100	36.2
3. ESL Policy & Institutional Support	1,900,000	1,111,000	3,011,000	3.6
Project Management	2,100,000	1,035,000	3,135,000	3.7
Total	70,000,000	14,000,000	84,000,000	100

16. Tables 8 and provide the summary of budget cost sharing among GEF and the co-financiers of the full-scale project by components/activities. A significant level of co-financing will come from IL manufacturers that are part of the IL manufacturing business conversion activities. While these manufacturers have not yet committed to specific investment levels, these manufacturers have submitted letters expressing interest in participating in the pilots for conversion of manufacturing lines (see Table 9 below)

Table 8: PILESLAMP Cost Sharing Matrix (US\$)

COMPONENTS	GEF	National Gov't.	Private Sector	Others	Total
1. Lighting Industry Capacity Enhancement	7,958,900	5,300,000	35,000,000	1,000,000	49,258,900
2. ESL Market Development & Product Promotion	3,895,100	20,000,000	5,000,000	1,500,000	30,395,100
3. ESL Policy & Institutional Support	1,111,000	1,400,000	0	500,000	3,011,000
Project Management	1,035,000	300,000	0	0	1,335,000
TOTAL	14,000,000	27,000,000	40,000,000	3,000,000	84,000,000

Table 9: Summary of Project Co-Financing

Contributor	Classification	Type	Amount (US\$)	Status
Government of China (GOC) ⁷³	Government	cash	18,900,000	Confirmed
GOC ⁷⁴	Government	in kind	2,000,000	Confirmed
GOC ⁷⁵	Government	in kind	6,100,000	Confirmed
Hangzhou Youchang Lighting Co., Ltd	Private Sector	cash/in kind	TBD	EOI
NVC Lighting Technology Corporation	Private Sector	cash/in kind	TBD	EOI
Baoji KeruiXing Lighting Co., Ltd	Private Sector	cash/in kind	TBD	EOI
Chongqing Yaohui Electrician and Electricity Co., Ltd	Private Sector	cash/in kind	TBD	EOI
Chisen Newlight Co. Ltd.	Private Sector	cash/in kind	TBD	EOI
Qusun Electric Co., Ltd.	Private Sector	cash/in kind	TBD	EOI
Deqing New Minghui Electric Lighting Co., Ltd.	Private Sector	cash/in kind	TBD	EOI
Changhan Oppel Lighting Co., Ltd.	Private Sector	cash/in kind	TBD	EOI
Xiamen Topstar Lighting Co., Ltd.	Private Sector	cash/in kind	TBD	EOI
Lanxi Electric Light Source Co., Ltd.	Private Sector	cash/in kind	TBD	EOI
Jiangsu Sung & Moon Lighting Co. Ltd.	Private Sector	cash/in kind	TBD	EOI
Yantai Haolibest Lighting Co. Ltd.	Private Sector	cash/in kind	TBD	EOI
Anhui Shilin Lighting Co. Ltd.	Private Sector	cash/in kind	TBD	EOI
Chengdu Tianxing Lighting Co., Ltd	Private Sector	cash/in kind	TBD	EOI
Hangzhou Yuzhong Gaohong Lighting Electrical Equipment Co. Ltd.	Private Sector	cash/in kind	TBD	EOI
Xiangfan Haihua Lighting Electronic Equipment Co. Ltd.	Private Sector	cash/in kind	TBD	EOI
Shanghai Lvyuan Electricity Co., Ltd	Private Sector	cash/in kind	TBD	EOI
GE Lighting Co. Ltd.	Private Sector	cash/in kind	TBD	EOI
Hangzhou Baoshan Electronic Co. Ltd.	Private Sector	cash/in kind	TBD	EOI
Shanghai Tungle Electrical Lighting Co., Ltd.	Private Sector	cash/in kind	TBD	EOI
Zhongshan Odeer Lighting Co., Ltd	Private Sector	cash/in kind	TBD	EOI
Others ⁷⁶	Government & Foundations	cash & in kind	TBD	Under Discussion
Total confirmed			27,000,000	
<i>Total Expected^{67, 68}</i>			<i>70,000,000</i>	

17. Table 10 shows the incremental cost matrix. The baseline and alternative courses of actions are presented together with the costs of achieving them.

⁷³ CFL Subsidies (15,600,000), Support for IL-ESL business conversion (US\$ 3,300,000)

⁷⁴ Support to IL manufacturers that convert to ESL manufacturing

⁷⁵ Support to PMO (US\$ 300,000), Market Promotion Activities (US\$ 4,400,000) and to Policy Development (US\$ 1,400,000)

⁷⁶ Discussions are ongoing with other governments and foundations on supporting the PILESLAMP project. Overall contributions of about US\$ 600,000 in cash and US\$ 2,400,000 in kind are expected.

Table 10: Incremental Cost Matrix

Component	Baseline	Alternative	Increment
Global Environmental Benefits	Energy use in China's C&R sectors will grow from about 709.1 TWh/yr in 2008 to 1,041.2 TWh/yr by 2012, estimated 3,264.2 – 4,987.9 TWh/yr by 2022	Energy consumption will grow to 1,037.2 TWh /yr by EOP (2012) and 3,230,9 – 4,954.5 TWh/yr 2022,	Reduced energy consumption of around 4 TWh/yr by EOP and 12 – 33 TWh/yr by 2022 with corresponding annual reduction in GHG emissions of 4.4 (2012) and 13.5 – 36.6 (2022) Mtons CO ₂ . Accrued GHG emission reduction totaling 5 Mtons by EOP and 175 - 237 Mtons CO ₂ by 2022
Domestic Benefits	<ul style="list-style-type: none"> Some ongoing increase in market share of ESLs, but continued rapid growth in lighting energy use in C&R sectors 	<ul style="list-style-type: none"> Rapid decline in sales of ILs and corresponding increase in market share of ESLs, annual electricity savings of ≥4000 GWh at EOP rising to about ≥12.000 – about 33.000 GWh/yr until 2012 	<ul style="list-style-type: none"> Reduction in the C&R sectors electricity consumption in the range of about 1% compared to baseline
Component 1: Lighting Industry Capacity Enhancement	Business as Usual Substantial activities toward LED lighting technology development, but ongoing production of large quantities of ILs	Proposed Situation Significant efforts to convert IL manufacturers to ESL production, improvement in quality and performance of ESLs	Additional Features Activities to convert IL manufacturing lines to ESL production, reduced hazardous waste as a result of production and product disposal
	Domestic Benefits <ul style="list-style-type: none"> IL manufacturers continue to produce significant numbers of ILs, resulting in lost opportunity of energy savings 	Domestic Benefits <ul style="list-style-type: none"> Growth in supply capacity of ESLs, and reduced supply of lower efficiency ILs 	Domestic Benefits <ul style="list-style-type: none"> Significant energy savings from greater penetration of ESLs Reduced hazardous waste resulting from lower mercury content in ESLs
	Global Benefits While other countries begin phase-out initiatives, China will continue on business as usual path	Global Benefits <ul style="list-style-type: none"> Improved availability of high quality ESLs Reduction in quantity of ILs on the market globally 	Global Benefits <ul style="list-style-type: none"> Reduced energy waste from IL lighting Greater global availability of high quality ESLs
COST	US\$ 39,500,000	US\$ 47,458,900	US\$ 7,958,900
Component 2: ESL Market Development and Product Promotion	Business as Usual Some ESL promotion activities through manufacturers and retailers; promotion of ESLs as part of Five Year Plan	Proposed Situation Dramatically increased promotion activities; scaled up incentives for ESL markets in lower income rural areas	Additional Features Significantly scaled up market development and promotion activities, major improvements in ESL awareness and market share in small cities and rural areas
	Domestic Benefits	Domestic Benefits	Domestic Benefits

Component	Baseline	Alternative	Increment
	<ul style="list-style-type: none"> Some increase in sales of ESLs Government and manufacturer promotion of benefits of ESLs 	<ul style="list-style-type: none"> Higher market awareness and market penetration of ESLs Significant reduction in IL use, especially in lower income rural areas 	<ul style="list-style-type: none"> Energy savings from higher penetration of ESLs, and reduced GHG and other emissions for improved air quality
	Global Benefits <ul style="list-style-type: none"> Negligible; some reductions in energy use and GHG emissions 	Global Benefits <ul style="list-style-type: none"> Reduced availability of ILs regionally and globally as more Chinese manufacturers convert from IL production due to changes in Chinese consumer behavior ESL market development and promotion activities that can be used in other countries 	Global Benefits <ul style="list-style-type: none"> Much greater awareness of ESL cost savings opportunities Wide range of market development initiatives tested, with lessons that can be transferred to other lower income countries and regions
COST	US\$ 26,500,000	US\$ 30,395,100	US\$ 3,895,100
Component 3: ESL Policy and Institutional Support	Business as Usual Some government promotion of ESLs, but no coordinated industry approach to major transition of industry Policies toward more use of ESLs, especially in public buildings and other uses	Proposed Situation Detailed policy proposals for conversion of IL manufacturing facilities, and expansion of ESL promotion activities Well conceived industry roadmap with buy-in from broad range of stakeholders who will be affected	Additional Features Proposed policies in place to phase-out IL manufacturing and grow ESL market promotion activities Detailed industry roadmap
	Domestic Benefits <ul style="list-style-type: none"> Some energy savings, and reductions in power plant construction needs 	Domestic Benefits <ul style="list-style-type: none"> Policies to have long term energy savings effect for lighting use in China Increased availability of ESLs throughout China, with greater selection and lower prices for high quality products 	Domestic Benefits <ul style="list-style-type: none"> Policies that will limit inefficient lighting use within China, resulting in lower energy consumption and reduced energy bills for consumers
	Global Benefits <ul style="list-style-type: none"> Some reduction in energy consumption from ongoing ESL promotion and policies 	Global Benefits <ul style="list-style-type: none"> Substantially reduced energy use with resulting GHG emissions reduction Much greater availability of high quality, lower priced ESLs globally 	Global Benefits <ul style="list-style-type: none"> Model policies for IL phase-out and ESL promotion for other countries to adopt
COST	US\$ 1,900,000	US\$ 3,011,000	US\$ 1,111,000
Project Management	US\$ 2,100,000	US\$ 3,135,000	US\$ 1,035,000

Component (including M&E)	Baseline	Alternative	Increment
TOTAL COST	US\$ 70,000,000	US\$ 84,000,000	US\$ 14,000,000

PART II: Logical Framework Analysis (Project Planning Matrix)

Table 11: Project Planning Matrix (PPM)

<i>Project Strategy</i>	<i>Objectively Verifiable Indicators</i>			<i>Means of Gauging Success</i>	<i>Critical Assumptions</i>
	<i>Indicator</i>	<i>Baseline</i>	<i>Target</i>		
GOAL: Reduction of GHG emissions from the use of lighting products in the commercial and residential (C&R) sectors in China.	<ul style="list-style-type: none"> • CO2 emission reduction from C&R by end-of-project (EOP = 2012) • Reduction in the annual growth rate of CO2 emissions by EOP (compared to BAU) 	<ul style="list-style-type: none"> • 0⁷⁷ • 0⁷⁸ 	<ul style="list-style-type: none"> • 4.4 Mtons/yr⁷⁹ • 0.5 % 	<ul style="list-style-type: none"> • Official energy consumption data from Chinese Bureau of Statistics converted to CO₂ emissions with average grid emission factor for China 	<ul style="list-style-type: none"> • Continuous and committed support and participation from the C&R sectors
OBJECTIVE: Enhanced promotion and implementation of the utilization of energy saving lamps (ESLs) in China through the transformation of the local lighting products market and the phasing-out of incandescent lamp production and sale.	<ul style="list-style-type: none"> • Reduction in total electricity usage in the Commercial & Residential (C&R) sectors by EOP • % improvement in market share of ESLs by EOP 	<ul style="list-style-type: none"> • 0⁸⁰ • 2-3 % per year 	<ul style="list-style-type: none"> • ≥ 4.000 GWh/yr⁸¹ • Around 5 % 	<ul style="list-style-type: none"> • Annual surveys of the Chinese lighting market • Market share of ESL • Official statistical data 	<ul style="list-style-type: none"> • Interest in energy issues will remain at current levels or will increase over time • Proactive participation of equipment suppliers, engineering firms, and financial institutions
• OUTCOMES					
Component 1: Lighting Industry Capacity Enhancement	<ul style="list-style-type: none"> • Number of IL manufacturers that converted to ESL production by EOP • Annual volume of ESL production each year starting Year 2 	<ul style="list-style-type: none"> • 0 • 3 billion 	<ul style="list-style-type: none"> • At least 2 • 3.5 billion 	<ul style="list-style-type: none"> • Industry and customs data on production and export of different lighting products 	<ul style="list-style-type: none"> • TA and Pilot Incentives adequate to motivate IL manufacturers to consider conversion • Continued global demand

⁷⁷ CO2 emissions from electricity generation for the C&R sector in 2008 = 719 - 844 Mtons/yr

⁷⁸ related CO2 emission generation in 2012 = 1.143,4 - 1.432,4 Mtons/yr

⁷⁹ CO2 emission generation in year 2012 = 1.139,0 – 1.428,0 Mtons/yr

⁸⁰ Electricity usage in C&R Sectors = 709.078 GWh/year in 2008; Electricity usage in Year 3/2012 = 1.041.179 – 1.304.300 GWh/yr (business-as-usual scenario)

⁸¹ Electricity usage in 2012 = 1.037.168 – 1.300.289 GWh/yr

<i>Project Strategy</i>	<i>Objectively Verifiable Indicators</i>			<i>Means of Gauging Success</i>	<i>Critical Assumptions</i>
	<i>Indicator</i>	<i>Baseline</i>	<i>Target</i>		
	<ul style="list-style-type: none"> • Annual volume of ESL product exports from China starting Year 2 	<ul style="list-style-type: none"> • 2.1 billion 	<ul style="list-style-type: none"> • 2.4 billion 		<ul style="list-style-type: none"> growth for high quality ESLs sends appropriate market signal to manufacturers
Activity 1.1: Promotion of conversion of IL manufacturers	<ul style="list-style-type: none"> • I No of IL manufacturers that were trained on all aspects of IL to ESL production conversion by EOP • II Number IL to ESL conversion pilot projects implemented until EOP • III No of trained IL manufacturers that have developed business plans for IL to ESL production conversion by EOP • IV No of IL manufacturers (mfr's) that start replicating pilot conversion projects: convert (partly and/or full) to ESL production by EOP • V Cumulative value of investments (US\$ million) on IL production conversion by EOP • VI Cumulative value of investments on ESL manufacturing by EOP (US\$ million) 	<ul style="list-style-type: none"> • I = 0 • II = 0 • III = 1 -2⁸² • IV = 0 • V = 7 • VI = 7 	<ul style="list-style-type: none"> • I = 30 • II = 2⁸³ • III = 8 • IV = 2 • V = 14 • VI = 14 	<ul style="list-style-type: none"> • I from participants list of training courses • II from project reports • III from project reports • IV information collected by CALI • V project report on pilot projects and CALI • VI CALI communication with industry members 	<ul style="list-style-type: none"> Global economic situation growing, allowing for investment in new capacity in ESL production CALI able to collect production and investment data on manufacturers who do not participate in pilot projects
Activity 1.2: Improvement of supply capacity of high quality ESL	<ul style="list-style-type: none"> • I % of locally manufactured ESLs that meet established quality criteria each year starting Year 2 • II Number of new and amended EE 	<ul style="list-style-type: none"> • I 70 %⁸⁴ • II 0⁸⁵ 	<ul style="list-style-type: none"> • I 80% • II 2⁸⁸ 	<ul style="list-style-type: none"> • I Quality supervision, market surveillance and increased testing show improved quality and performance 	<ul style="list-style-type: none"> • Manufacturers recognize value of investments in quality

⁸² These are manufacturers that are reacting to change in international demand

⁸³ At least two plants, with reduction from conversion of at least 150 million ILs/year compared to baseline levels

⁸⁴ Lower quality products continue to taint the market

⁸⁵ No amendments of EE standards; quality and efficiency levels don't meet market expectations

⁸⁶ 2007 data

<i>Project Strategy</i>	<i>Objectively Verifiable Indicators</i>			<i>Means of Gauging Success</i>	<i>Critical Assumptions</i>
	<i>Indicator</i>	<i>Baseline</i>	<i>Target</i>		
	standards for ESLs proposed by EOP • III Annual volume of locally made ESLs (billion pieces) <ul style="list-style-type: none"> • Produced • Exported • Sold and used domestically each year starting Year 1 • IV No of local ESL manufacturers that have ISO 9000 Quality Control Certifications by EOP • V No of national laboratories that can carry out tests on ESLs and of hazardous substances in ESL by EOP	<ul style="list-style-type: none"> • III.1 3⁸⁶ • III.2 2.1 • III.3 0.9 • 50 • V 0⁸⁷ 	<ul style="list-style-type: none"> • III.1 3.5 • III.2 2.4 • III.3 1.1 • 100 • V 1 	<ul style="list-style-type: none"> • II Draft standards circulated for comment • III CALI & China Customs data • IV Certification bodies publish list of certified companies • V Laboratories successfully participate in international round robin tests 	<ul style="list-style-type: none"> • Consumers willing to pay small increment for higher quality products
Activity 1.3: Reduction of environment-relevant /hazardous waste during ESL production and product disposal	<ul style="list-style-type: none"> • I: # of lamp manufacturers that were trained on cleaner ESL production processes minimizing Hg content and (hazardous) waste by Year 2 • II: # of local lamp manufacturers assisted with cleaner production audits by end Year 2 • III: # of local lamp manufacturers employing clean production processes by EOP • IV: # of waste ESL recycling/recovery facilities built and operational by EOP 	<ul style="list-style-type: none"> • I 0 • II 0 • III 3 • IV 1 	<ul style="list-style-type: none"> • I 50 • II 3 • III 8 • IV 3 	<ul style="list-style-type: none"> I Project report/ participants list II Project & audit reports III CALI communication with industry members IV (same as III) 	<ul style="list-style-type: none"> • GOC policies and enforcement, and international demand, to reduce mercury content in ESLs • Local governments' and the private sector's interest in ESL recycling initiatives and consumer willingness to participate in the initiatives are high and sustained.

⁸⁷ No improvement in test lab capacity for increased ESL production

⁸⁸ New standards covering EE and hazardous substance issues published and implemented

<i>Project Strategy</i>	<i>Objectively Verifiable Indicators</i>			<i>Means of Gauging Success</i>	<i>Critical Assumptions</i>
	<i>Indicator</i>	<i>Baseline</i>	<i>Target</i>		
Component 2: ESL Market Development and Product Promotion	<ul style="list-style-type: none"> • I: % Increase in market share of ESL in rural pilot areas by EOP • II: % increase in share of ESL in the national lighting market by EOP • III: % of households that are utilizing ESLs each year starting Year 2 <ul style="list-style-type: none"> • III.1 Large and medium-size cities • III.2 Small cities and rural areas • IV: % of commercial buildings in major urban areas that are using ESLs each year starting Year 2 	<ul style="list-style-type: none"> • I = 5% • II = 50%⁸⁹ • III.1: 70% • III.2: 5% • IV > 80% 	<ul style="list-style-type: none"> • I = At least 10%⁹⁰ • II = 65% • III.1: 90% • III.2: 10% • IV 95% 	<ul style="list-style-type: none"> • Market monitoring data retrieved from annual surveys conducted in the project framework • Project annual progress report 	<ul style="list-style-type: none"> • Retailers/manufacturers/local government agencies/other stakeholders are interested in joint efforts on ESL promotion
Activity 2.1: Strengthening of ESL promotion networks to implement large scale promotion campaigns	<ul style="list-style-type: none"> • I A widely known, widely-supported and improved ESL promotion network established by Year 1 • II No of ESL promotional schemes developed under the project and implemented in the provinces each year starting Year 1 • III No of ESL promotional schemes developed by the ESL promotion network and implemented in the provinces by EOP • IV No of local energy conservation 	<ul style="list-style-type: none"> • I no network • II: 1-2 • III 5-6 • IV 0 	<ul style="list-style-type: none"> • I Network covering at least 10 provinces • II: > 10 • III = 20 • IV > 10 	<ul style="list-style-type: none"> • Project annual progress report 	<ul style="list-style-type: none"> • Local government will support large-scale ESL promotion programs

⁸⁹ Based on current sales figures projection

⁹⁰ Equivalent to 100% increase in market share by EOP

<i>Project Strategy</i>	<i>Objectively Verifiable Indicators</i>			<i>Means of Gauging Success</i>	<i>Critical Assumptions</i>
	<i>Indicator</i>	<i>Baseline</i>	<i>Target</i>		
	centers, that are active members of the ESL promotion network by EOP • V No of local energy service providers that benefited (in terms of projects contracts) from the ESL promotion network by EOP	• V 0	• V > 20		
Activity 2.2: Improvement of marketing channels for ESLs in large and medium sized cities	<ul style="list-style-type: none"> • I No of signed and implemented voluntary commitment programs each year starting Year 1 • II Annual average % change in the volume of ESL and IL sales from the retailers that implemented the voluntary commitment programs starting Year 2⁹¹ • III Annual % increase of ESL sales in large/medium size cities and big towns starting Year 2 • IV No of operational GLICs established by EOP • V Number of participants in the ‘Green Lights Partnership’ program • VI Number of visitors each year in to GLICs 	<ul style="list-style-type: none"> • I = 0 • II = 0 • III 10% • IV = 0 • V = 0 • VI = 0 	<ul style="list-style-type: none"> • I = 10 • II = 20% • III 15% • IV > 10 • V = 100 • VI = 100,000 	<ul style="list-style-type: none"> • Project annual progress report • Market surveys • Sales reports from retailers participating in the voluntary commitment program • GLIC data and reports 	<ul style="list-style-type: none"> • Retailers are interested in the voluntary commitment program • Consumers will accept retailer’s commitment not to distribute incandescent lamps for free
Activity 2.3: Supporting	• I Number of supermarkets	• I = 0	• I = 10	Project Reports	• Manufacturers/ retailers are

⁹¹ This translates to decrease in sales of lighting fixtures with ILs

⁹² This refers to access of low-income groups to efficient lighting products

<i>Project Strategy</i>	<i>Objectively Verifiable Indicators</i>			<i>Means of Gauging Success</i>	<i>Critical Assumptions</i>
	<i>Indicator</i>	<i>Baseline</i>	<i>Target</i>		
expanded ESL marketing channels in small cities and rural areas	participate in pilot program for small cities selling ESL by EOP • II Number of towns with operating marketing channels established in pilot rural areas by EOP • III Annual % increase in no of ESL retailers in pilot small cities and rural areas starting Year 2 • IV Annual % increase of ESL sales in pilot small cities and rural areas starting Year 2 • V % increase market share of ESL in pilot small cities and rural areas by EOP • VI % share ESL types that are available at about 8 RMB by EOP ⁹³	• II = 0 • III = 5% • IV = 5% • V = 30% • VI = < 10%	• II = 15 • III = 10% • IV 10% • V 100% • VI = > 10% ⁹³	Market surveys	interested to co-operate on increasing ESL sales in small cities and rural areas
Activity 2.4: Promotion and awareness campaign to improve demand for ESLs	• I Number of ESL awareness raising and promotion events designed and carried out by EOP • II Number of types of ESL promotional materials produced and disseminated each year starting Year 1 ⁹⁴ .	• I = 0 • II = 0	• I = 3 • II = ≥ 2	• Report from GLICs established across China • Project annual progress report	• Manufacturers with show rooms and relevant agencies (Energy Conservation Centers) will be interested to apply for GLIC status • Other central government agencies will be interested to develop synergy with the PILESLAMP project • Events in other central government agencies contribute to ESLs promotion

⁹³ See component 1 for definition of 'quality lamp'

⁹⁴ See general market share indicators for component 2 above

<i>Project Strategy</i>	<i>Objectively Verifiable Indicators</i>			<i>Means of Gauging Success</i>	<i>Critical Assumptions</i>
	<i>Indicator</i>	<i>Baseline</i>	<i>Target</i>		
Activity 2.5: Facilitation of more affordable and accessible financing options for ESL applications	<ul style="list-style-type: none"> • I Number of promotion workshops on ESL projects⁹⁵ for the financial sector conducted by EOP • II Number of guidebooks on ESL project evaluation and ESL project design and financing printed and distributed by EOP • III Number of banks & financial institutions that are interested in supporting ESL projects by EOP • IV Number of training courses for the banking/financial institutions designed and conducted by EOP • V Number of identified and/or designed financing schemes that are acceptable to banks and financial institutions by EOP • VI Number of banks and financial institutions that are adopting financing schemes developed under the project by EOP 	<ul style="list-style-type: none"> • I = 0 • II = 0 • III = 3⁹⁶ • IV = 0 • V = 3⁹⁷ • VI = at least 3 	<ul style="list-style-type: none"> • I = 2-3 • II = 1 • Around 10 • IV = 2-3 • V = 5⁹⁸ • VI: 6 	<ul style="list-style-type: none"> • Project annual progress report • Seminar Materials • Press clippings • Participants list • Annual reports from participating banks and financial institutions 	<ul style="list-style-type: none"> • High initial purchase cost for ESL • Difficulty to mobilize commercial financing for ESL based EE projects
Component 3: ESL Policy and Institutional Support	<ul style="list-style-type: none"> • I Number of accepted policies on the phasing out of the production and use of ILs by EOP • II Number of accepted policies on the widespread production and application of ESLs in the domestic market by EOP 	<ul style="list-style-type: none"> I = 0⁹⁹ II = 0¹⁰⁰ 	<ul style="list-style-type: none"> I= 1¹⁰² II= 1¹⁰³ 	<ul style="list-style-type: none"> • Documentation of accepted policies/rules/ regulations on ESL production and applications • Documentation of accepted policies/rules/regulations on widespread production and application of ESL 	<ul style="list-style-type: none"> • GOC will continue to develop and deploy policies improving China's energy intensity, by requesting and promoting addition EE measures

⁹⁵ ESL projects include conversion of IL production lines to ESL manufacturing, ESL manufacturing, ESL applications in lighting systems (households and buildings)

⁹⁶ Signed up to IFC's Utility based end-user energy efficiency program

⁹⁷ ESCO business models are already existing

⁹⁸ These include additional market based business models designed, including CDM options

Project Strategy	Objectively Verifiable Indicators			Means of Gauging Success	Critical Assumptions
	Indicator	Baseline	Target		
	<ul style="list-style-type: none"> • III A ready-to-implement roadmap developed for IL phase-out and expanded ESL promotion by EOP 	III = 0 ¹⁰¹	III= Approved road map ¹⁰⁴	<ul style="list-style-type: none"> • Documentation of roadmap and a medium and long-term ESL promotion 	
Activity 3.1: Annual investigation and analysis of ESL market development	<ul style="list-style-type: none"> • I Number of annual reports produced and published together with an analysis of trends by EOP • II % Increase in sales of ESLs by EOP 	I = 0 ¹⁰⁵ II = 30%	I = 3 II = 40%	Annual surveys providing feedback on project impact, and remaining energy savings opportunity areas	<ul style="list-style-type: none"> • Highly qualified organizations will be guaranteed and obtained to design and oversee the implementation
Activity 3.2.1: Development of policy recommendations on IL manufacturers business conversion	<ul style="list-style-type: none"> • I Comprehensive policy study on the conversion of ILs manufacturing completed, accepted and submitted to relevant GOC agencies (including NDRC) by year 2 • II Recommended IL phase out policy/legislation/regulation (IL policies) from completed policy study developed, and fed into the GOC law making process by EOP 	I = no study II = no policy	I study completed II policy developed	<ul style="list-style-type: none"> • Documentation of proposed IL policies • Documented results of IL policies accepted by relevant GOC agencies¹⁰⁶. • Documentation of proposed ESL policies 	<ul style="list-style-type: none"> • International lighting market developments resulting from the various ongoing and planned IL phase out activities will continue and motivate GOC to continue current policies promoting EE lighting and China's lighting industries to continue expanding ESL production
Activity 3.2.2:	<ul style="list-style-type: none"> • I One comprehensive policy study on increasing the domestic market share of ESLs completed, accepted 	I = no study	I study completed		See above

⁹⁹ No detailed approved policies on the phasing out of the production and use of ILs

¹⁰⁰ No detailed approved policies on the widespread production and application of ESLs in the C&R sectors

¹⁰¹ No roadmap and a medium and long-term ESL promotion in place

¹⁰² Policy developed is accepted by the government agencies ready for implementation in the period of the 12th Five-year Plan (2011-2015)

¹⁰³ Policy developed is accepted by the government agencies ready for implementation in the period of 12th Five-year Plan (2011-2015)

¹⁰⁴ Roadmap and ESL promotion plan developed and completed ready for publicizing during the period of 12th Five-year Plan (2011-2015)

¹⁰⁵ Presently no continuous market monitoring

¹⁰⁶ The proposed policy recommendations are expected to be issued in the 12th Five-year Plan period (2011-2015), according to national policy requirements

<i>Project Strategy</i>	<i>Objectively Verifiable Indicators</i>			<i>Means of Gauging Success</i>	<i>Critical Assumptions</i>
	<i>Indicator</i>	<i>Baseline</i>	<i>Target</i>		
Development of policy recommendations on increasing domestic market share of ESLs	<ul style="list-style-type: none"> and submitted to relevant GOC agencies (including NDRRC) by year 2 • II Relevant policy/legislation/regulation (ESL policies) from completed policy study developed, and fed into the GOC law making process by EOP 	II = no policy	II policy developed	<ul style="list-style-type: none"> • Documentation of ESL policies accepted by relevant GOC agencies. The proposed policy recommendations are expected to be issued in 12th Five-year Plan period (2011-2015), according to national policy requirements 	
Activity 3.3.1: Development of China’s roadmap of IL phase-out Activity 3.3.2: Development of China’s medium and long-term plan for ESL promotion	<ul style="list-style-type: none"> • An accepted and ready for implementation roadmap for IL phase-out and expanded ESL promotion by EOP • An accepted and ready for implementation medium and long term plan for ESL promotion 	<ul style="list-style-type: none"> • No roadmap • No medium and long term plan 	<ul style="list-style-type: none"> • Developed road map • Developed medium and long term plan 	<ul style="list-style-type: none"> • Documentation of the GOC/stakeholder agreed and accepted roadmap for lighting industry ready for enforcement in 12th Five-year Plan period (2011-2015) Documentation of the GOC/stakeholder agreed and accepted medium and long term plan for ESL promotion ready for enforcement in 12th Five-year Plan period (2011-2015) 	<ul style="list-style-type: none"> • Availability of organizational, human and financial resources to implement the roadmap and the medium and long term plan within the agreed timeframe

SECTION III: Total Budget and Work Plan

Award ID:	00050358
Award Title:	PIMS 4166 CC FSP: Phasing-out Incandescent Lamps & Energy Saving Lamps Promotion (PILESLAMP)
Business Unit:	CHN10
Project ID:	00062179
Project Title:	PIMS 4166 CC FSP: Phasing-out Incandescent Lamps & Energy Saving Lamps Promotion (PILESLAMP)
Implementing Partner	National Development and Reform Commission (NDRC)

Table 12: PILESLAMP Project Budget by Component

Component	Responsible Agency	Source	Budget Code	Description	Annual Expenses, US\$			Total
					Year 1	Year 2	Year 3	
Component 1: Lighting Industry Capacity Enhancement								
Activity 1.1: Promotion of the conversion of IL manufacturers	NDRC	GEF	71200	International experts	75,000	86,500	75,400	236,900
	NDRC	GEF	71300	National experts	220,000	147,600	188,000	555,600
	NDRC	GEF	72100	Contractual Services - Company	810,000	1,060,000	700,000	2,570,000
	NDRC	GEF	71600	Travel	9,000	7,000	6,000	22,000
	NDRC	GEF	74200	Documentation & Reproduction	35,000	26,000	58,000	119,000
	NDRC	GEF	74500	Workshops and miscellaneous	205,000	200,000	120,000	525,000
Sub-Total					1,354,000	1,527,100	1,147,400	4,028,500
Activity 1.2: Improvement of the Supply Capacity of High Quality ESL	NDRC	GEF	71200	International experts	78,200	82,100	32,000	192,300
	NDRC	GEF	71300	National experts	115,000	139,600	70,400	325,000
	NDRC	GEF	72100	Contractual Services - Company	715,000	820,000	495,000	2,030,000
	NDRC	GEF	72200	Equipment	80,000	0	0	80,000
	NDRC	GEF	71600	Travel	4,000	2,500	3,500	10,000

Component	Responsible Agency	Source	Budget Code	Description	Annual Expenses, US\$			Total
					Year 1	Year 2	Year 3	
	NDRC	GEF	74200	Documentation & Reproduction	30,000	35,000	42,000	107,000
	NDRC	GEF	74500	Workshops and miscellaneous	129,000	146,000	125,000	400,000
Sub-Total					1,151,200	1,225,200	767,900	3,144,300
Activity 1.3: Reduction of environmental/hazardous waste during ESL production and product disposal	NDRC	GEF	71200	International experts	42,000	35,400	31,000	108,400
	NDRC	GEF	71300	National experts	40,000	38,200	30,000	108,200
	NDRC	GEF	72100	Contractual Services - Company	80,000	95,000	60,000	235,000
	NDRC	GEF	71600	Travel & Study Tour	3,000	0	2,500	5,500
	NDRC	GEF	74200	Documentation & Reproduction	40,000	0	40,000	80,000
	NDRC	GEF	74500	Workshops and miscellaneous	95,000	55,000	99,000	249,000
Sub-Total					300,000	223,600	262,500	786,100
Total for Component 1					2,805,200	2,975,900	2,177,800	7,958,900
Component 2: ESL Market Development and Product Promotion								
Activity 2.1: Strengthening ESL Promotion networks to implement large scale promotion campaigns	NDRC	GEF	71200	International experts	26,740	26,740	0	53,480
	NDRC	GEF	71300	National experts	10,000	9,000	0	19,000
	NDRC	GEF	71600	Travel	5,800	5,750	0	11,550
	NDRC	GEF	72100	Contractual Services - Company	180,000	180,000	160,000	520,000
Sub-Total					222,540	221,490	160,000	604,030
Activity 2.2: Improvement of marketing channels for ESLs in large and medium sized cities	NDRC	GEF	71200	International experts	26,740	26,740	0	53,480
	NDRC	GEF	71300	National experts	4,750	9,500	0	14,250
	NDRC	GEF	71600	Travel	5,800	5,750	0	11,550
	NDRC	GEF	72100	Contractual Services - Company	120,000	120,000	70,000	310,000

Component	Responsible Agency	Source	Budget Code	Description	Annual Expenses, US\$			Total
					Year 1	Year 2	Year 3	
Sub-Total					157,290	161,990	70,000	389,280
Activity 2.3: Supporting expanded ESL marketing channels in small cities and rural areas	NDRC	GEF	71200	International experts	26,740	53,480	26,740	106,960
	NDRC	GEF	71300	National experts	9,500	9,500	0	19,000
	NDRC	GEF	71600	Travel	5,800	5,750	0	11,550
	NDRC	GEF	72100	Contractual Services - Company	700,000	1,100,000	260,000	2,060,000
Sub-Total					742,040	1,168,730	286,740	2,197,510
Activity 2.4: Promotion and awareness campaign to promote demand for ESLs	NDRC	GEF	71200	International experts	14,740	0	0	14,740
	NDRC	GEF	71300	National experts	9,500	9,500	0	19,000
	NDRC	GEF	71600	Travel	5,800	5,750	0	11,550
	NDRC	GEF	72100	Contractual Services - Company	150,000	150,000	120,000	420,000
Sub-Total					180,040	165,250	120,000	465,290
Activity 2.5: Facilitation of more affordable and accessible financing options for ESL applications	NDRC	GEF	71200	International experts	0	14,740	0	14,740
	NDRC	GEF	71300	National experts	7750	15,200	15050	38,000
	NDRC	GEF	71600	Travel	5,800	5,750	0	11,550
	NDRC	GEF	74500	Workshops and Misc	22,350	22,350	0	44,700
	NDRC	GEF	72100	Contractual Services - Company	0	65,000	65,000	130,000
Sub-Total					35900	123040	80050	238990
Total for Component 2					1,337,810	1,840,500	716,790	3,895,100
Component 3: ESL Policy and Institutional Support								
Activity 3.1: Annual investigation and analysis of ESL market development	NDRC	GEF	71300	National experts	15,000	15,000	11,000	41,000
	NDRC	GEF	72100	Contractual Services - Company	70,000	80,000	60,000	210,000
Sub-Total					85,000	95,000	71,000	251,000
Activity 3.2.1: Development	NDRC	GEF	71300	National experts	15,000	20,000	10,000	45,000

Component	Responsible Agency	Source	Budget Code	Description	Annual Expenses, US\$			Total
					Year 1	Year 2	Year 3	
of policy recommendations on IL manufacturers business conversion	NDRC	GEF	72100	Contractual Services - Company	50,000	70,000	30,000	150,000
Sub-Total					65,000	90,000	40,000	195,000
Activity 3.2.2: Development of policy recommendations on increasing domestic market share of ESLs	NDRC	GEF	71200	International experts	20,000	25,000	20,000	65,000
	NDRC	GEF	71300	National experts	10,000	12,000	18,000	40,000
	NDRC	GEF	72100	Contractual Services - Company	40,000	80,000	40,000	160,000
Sub-Total					70,000	117,000	78,000	265,000
Activity 3.3.1 Development of China's roadmap of IL phase-out	NDRC	GEF	71300	National experts	10,000	10,000	0	20,000
	NDRC	GEF	72100	Contractual Services - Company	30,000	30,000	0	60,000
Sub-Total					40,000	40,000	0	80,000
Activity 3.3.2 Development of a medium and long-term plan for ESLs promotion	NDRC	GEF	71300	National experts	25,000	30,000	12,000	67,000
	NDRC	GEF	72100	Contractual Services - Company	80,000	80,000	60,000	220,000
	NDRC	GEF	74500	Workshops and Misc	11,000	11,000	11,000	33,000
Sub-Total					116,000	121,000	83,000	320,000
Total for Component 3					376,000	463,000	272,000	1,111,000
Project Management Cost								
1. Project Management	PMO	GEF	71200	International CTA	65,000	67,000	67,000	199,000
	PMO	GEF	71300	Local Consultants (National CTA)	30,000	30,000	30,000	90,000
	PMO	GEF	71300	Local Consultants (PMO Director)	30,000	30,000	30,000	90,000
	PMO	GEF	71300	Local Consultants (PMO Staff 3)	60,000	60,000	60,000	180,000
	PMO	GEF	71400	Contractual Svc – Individual (Secretary)	10,000	10,000	10,000	30,000

Component	Responsible Agency	Source	Budget Code	Description	Annual Expenses, US\$			Total
					Year 1	Year 2	Year 3	
	PMO	GEF	72200	Equipment	40,000	4,000	4,000	48,000
	PMO	GEF	71600	Travel	20,000	30,000	30,000	80,000
	PMO	GEF	74200	Documentation & Reproduction	15,000	15,000	15,000	45,000
	PMO	GEF	74500	Workshops and Misc.	70,000	70,000	78,000	218,000
Sub-Total					340,000	316,000	324,000	980,000
2. Monitoring & Evaluation	PMO	GEF	74100	Professional Services (Audit)	2,000	2,000	2,000	6,000
	PMO	GEF	71300	National Experts	0	4,500	4,500	9,000
	PMO	GEF	71200	International Experts	0	20,000	20,000	40,000
Sub-Total					2,000	26,500	26,500	55,000
Total for Project Management					682,000	658,500	674,500	1,035,000
GRAND TOTAL					5,201,010	5,937,900	3,841,090	14,000,000

SECTION IV: Additional Information

PART I: Other Agreements (See attached)

- A. GEF Operational Focal Point Letter of Endorsement (LOE)
- B. Co-Financing Letters (LOC) and Expression of Interests (EOI)

Attached separately

PART II: Stakeholder Involvement Plan

During the project development stage, several stakeholders were consulted through a survey, and round table discussions. The following are the stakeholders of the PILESLAMP project and their expected role in the project:

Table 13: Role of Stakeholders

Institution	Role in PILESLAMP
NDRC	Overall management of the project development and implementation activities
NECC	Coordination of project development and implementation activities.
CSC	Involved in the project development activities; Expected to be involved in the implementation of ESL market development and in the ESL product promotion activities
CALI	Involved in project development activities; Coordination of the implementation of the lighting industry capacity enhancement activities
NLTC	Involved in project development activities; Expected to be involved in the implementation of lighting industry capacity enhancement activities
CNIS	Involved in project development activities; Expected to be involved in the implementation of lighting industry capacity enhancement activities
Lighting Manufacturers	Involved in the stakeholder consultation processes during the project development stage; Expected active involvement in the demonstration activities, and in the consultations regarding ESL policy making and regulatory framework development activities
EMCA	Expected active involvement in ESL market promotion activities
China Academy of Lighting	Expected active involvement in the technical capacity development activities
China Energy Conservation Association	Expected active involvement in the technical capacity development activities
Local Governments ¹⁰⁷	Support the development and implementation of PILESLAMP project activities within their constituency and areas

¹⁰⁷ This refers to local governments where the promotional and pilot/demonstration activities will be carried out

PART III: CO₂ Emissions Reduction Estimates

Summary

Direct CO₂ Emissions Reductions

1. The PILESLAMP includes the implementation of activities intended to promote the widespread applications of ESLs and EE lighting technologies in the commercial & residential sectors.
2. The assumptions used in the estimation of CO₂ emissions reductions are as follows:
 - Continued economic, technological and societal development
 - As the project does not foresee a continuously operating financing mechanism after the project's end, direct emission reductions will only result from activities during the project's lifetime: i.e. the conversion of IL manufacturing lines to ESL manufacturing and from subsidizing CFLs for low income rural families. However, depending on the investment lifetime will continue to accrue in the subsequent years.
 - Direct emission reduction will in particular result from the project's supported demonstration projects of incandescent GLS manufacturer's conversion to ESL manufacturing, whereas the energy savings from the CFLs produced on the converted lines and used nationally are counted as *direct* energy savings from PILESLAMP implementation
 - Any 40-60W Incandescent GLS (average 50W) *not produced* will be exchanged with 13W CFL at the end-user side.
 - Average lifetime of a production line conversion project will be 10 years
 - Further direct emission reductions will accrue from the subsidized distribution of about 1.8 Million CFLs to low income rural households. Here, in rural areas, on average a 40W incandescent GLS will be exchanged with 9 W CFL
 - Average lifetime for efficient lighting EE projects (from GEF manual) will be 5 years
 - Average CO₂ emission factor for China's electricity generation is 1.0982 Mt per MWh
 - Average transmission and distribution losses are ≤10%
 - Only 50% of the overall emission savings from business conversion will accrue nationally, as the Chinese lighting industry is strongly export oriented. Export statistic show that around 50% of incandescent GLS are exported.

Table 14: Direct Energy Savings during PILESLAMP Implementation

Year	Baseline electricity consumption (GWh/yr)	GEF electricity consumption (GWh/yr)	Project electricity savings (GWh/yr)	Percent electricity savings (%)	Cumulative Project electricity savings (GWh)
2009-2010	709,078	Not significantly different			
2011	1,034,750 ¹⁰⁸	1,033,750 ⁷⁷	1,000	≈0.1	1,000
2012	1,172,650 ¹⁰⁹	1,168,750 ⁷⁸	4,000	≤ 0.4	5,000

¹⁰⁸ ±10%

¹⁰⁹ ±11%

Table 15: Direct CO₂ Emissions Reductions during PILESLAMP Implementation

Year	Baseline CO ₂ emissions (Mtons/yr)	Alternative CO ₂ emissions (Mtons/yr)	GEF CO ₂ reduction (Mtons/yr)	% CO ₂ Reduction	Cumul. CO ₂ Reduction (Mtons)
2012	1,288 ⁷⁸	1,284 ⁷⁸	4.4	≤ 0.4	≥ 5 ^a

^a Compared to Table 15 above

Indirect CO₂ Reductions

3. There will be a significant amount of indirect CO₂ emissions reductions due to the PILESLAMP project. The indirect impacts will result from the following the following:
 - Further manufacturers will follow the business conversion case studies and convert their incandescent GLS manufacturing business to ESL manufacturing. For demonstration activities coupled with capacity building and market transformation activities the GEF GHG benefits calculation guideline proposes a replication factor of ‘3’ within 10 years¹¹⁰. As initially 2-3 manufacturers and with a total production capacity of 150 Million ILs are targeted, it is assumed that 6-9 manufacturers with another 450 Million IL production capacity will be converting their business as an indirect result from PILESLAMP after EOP.
 - Increased awareness on the benefits of ESL
 - Significant promotion capacity efforts for ESL in particular in rural areas
 - Improved EE standards
 - Improved ESL promotion policies
 - According to the GHG Benefit Calculation Manual the ‘bottom-up’ replication factor from GEF is ‘3’ for demonstration projects (business conversion of IL manufacturers) and market transformation activities (CFL subsidy in rural areas)
 - Below ‘top-down’ calculations are based on the market and technology replacement potential of about 2 billion installed incandescent GLS in China. This equals a practical phase-out of GLS.
 - The ‘top-down’ GEF causality factor is estimated as 40% as the current baseline shows already a strong shift towards ESL – however, particular restricted to urban areas.

4. Considering the barrier removal activities that will be carried out under PILESLAMP, it is deemed that the GEF influence in achieving the abovementioned CO₂ emission reductions during the influence period, which in this case is until 2022, would be substantial, relative to what would happen during the project period. In this regard, some of the indirect CO₂ reduction can be attributed partly to the interventions that will be carried out by PILESLAMP such as the business conversion case studies, promotion activities and ESL promotion policy development. Although the impacts would be high, it is estimated that PILESLAMP impacts can be taken as conservatively with 40% of the estimated direct CO₂ emission reductions based on the market and technology potential approach.

¹¹⁰ Manual for Calculating GHG Benefits of GEF Projects: Energy Efficiency and Renewable Energy Projects, GEF 2008, page 16

Total CO₂ Emissions Reduction

Table 16: Total CO₂ Emissions Reduction Attributed to PILESLAMP

Particulars	Quantity (Mtons)	Remarks
Direct CO ₂	43.7	resulting from business conversion demonstration projects and subsidized distribution of CFLs to low income households in rural areas
Direct Post-Project CO ₂	0 ¹¹¹	
Indirect CO ₂	131.1 – 193.7	‘bottom- up’ versus ‘top-down’ approach ¹¹²
Total	174.8 – 237.4	‘bottom- up’ versus top-down’ approach

$$\text{Total CO}_2 \text{ reduction} = \text{Direct CO}_2 + \text{Direct post-project CO}_2 + [\text{Indirect CO}_2 \text{ ‘top-down’} * \text{GEF Causality Factor}]$$

or + Indirect CO₂ ‘bottom up’

$$\text{Total CO}_2 \text{ Reduction} = 175 - 237 \text{ million metric tons}$$

¹¹¹ The post project energy savings from continuously operating CFLs are already included in the direct energy savings. According to the GEF GHG calculation guideline (see previous footnote) all energy savings accruing from an investment made during the project duration over the investment lifetime (for efficient lighting EE projects 5 years, for converted manufacturing lines 10 years) are considered direct emission reductions from the project. Direct post – project emission reductions are, according to GEF, defined as emission reductions from investments facilitated from the project after EOP, i.e. with continuously operating revolving investment funds.

¹¹² Refer to the GEF Manual for Calculating GHG Benefits

PART IV: PROJECT RISKS AND ASSUMPTIONS

1. While all efforts are made to ensure the effective design and implementation of the project activities, there are some risks that have to be addressed to ensure success of the project. The Project Planning Matrix (Sec II, Part II) shows a detailed overview of the project's risk and assumptions. The principal risks, which can potentially hinder the successful project implementation and/or reduce project effectiveness, relate to:
 - Component 1 – Business conversion demonstration projects – the main risk is identified in lacking interest or financing of/for manufacturers to invest in business conversion. The adequate mitigation strategy will rely on demonstrating the business opportunities accruing from national and international Phase-out strategies for ESL producers one hand and on co-operation with the financing sector and targeted programs (e.g. the IFC supported 'Utility Based Energy Efficiency Financing Program) as well as identifying and responding to the needs of the targeted manufacturers.
 - Component 2 – Promotion of ESL risks having an only short term impact if sustainability aspects are not adequately considered. The project intends therefore to build on existing structures wherever possible and enhancing their capacity to deploy sustained ESL promotion programs in rural areas in co-operation with stakeholders like ESL manufacturers but also the electricity sector. A second risk under Component 2 is reaching the target group of low income rural families. Here the program management intends to work with organizations, which have an established outreach to this target group.
 - Component 3 – Policy development: the inherent risk lies in the fact that policies might be recommended but not implemented. However, the project will be implemented under the guidance of leading policy developing bodies in China, NDRC and ERI together with CSC and CNIS. This coalition will ensure that provided the macroeconomic framework remains stable and current energy policies world-wide will follow their current trajectory, the policies developed under this project will be indeed taken up and implemented
2. To address these risks, the project has to establish effective means to monitor and to the extent possible mitigate these risks. Mitigation measures include reviewing project implementation strategy including the regional and sectoral targets, discussion with stakeholders and mobilization of additional institutional support. The different risks that were identified during the PILESLAMP formulation exercise and the recommended mitigation measures are the following:

Table 17: Summary of Risk Mitigation measures for the PILESLAMP

Risk	Level of Risk	Mitigating Actions
Lacking interest or financing of/for manufacturers to invest in business conversion	Moderate	<ul style="list-style-type: none"> • Co-operation with the financing sector and targeted programs (e.g. the IFC supported 'Utility Based Energy Efficiency Financing Program) • Identifying and responding to the needs of the targeted manufacturers
Promotion of ESL risks having an only short term impact	Medium	<ul style="list-style-type: none"> • Build on existing structures wherever possible • Enhancing capacity of partners to deploy sustained ESL promotion programs

Risk	Level of Risk	Mitigating Actions
		<ul style="list-style-type: none"> Co-operation with stakeholders like ESL manufacturers but also the electricity sector.
Difficulty in reaching target group of low income rural families.	Moderate	<ul style="list-style-type: none"> Work with partner organizations, which have an established outreach to this target group.
Policies might be recommended but not implemented	Low	<ul style="list-style-type: none"> Project implementation via leading policy development bodies Involvement of policy makers in the policy development and review process

3. At the inception stage of PILESLAMP the project risks and assumptions will be reviewed, and where necessary additional project risks will be identified. In addition, also as part of the project inception activities, a detailed risk management strategy for project implementation will be prepared.

Part V: Monitoring & Evaluation Plan and Budget

The following summarizes the annual targets for high-level success indicators that will be monitored to gauge the effectiveness and impacts of the PILESLAMP. More detailed indicators for each project activity are shown in the Project Planning Matrix (Part II)

Table 18: Annual Targets for Project Outcomes

Project Strategy	Success Indicators	Annual Target			
		Yr 0	Yr 1	Yr 2	Yr 3
GOAL	CO2 emission reductions, Mtons/yr	0	0	2.2	4.4
OBJECTIVE	Electricity savings, GWh/yr				4,000
Component 1: Lighting Industry Capacity Enhancement	# of IL manufacturers that convert production to ESL	0	0	1	2-3
	Annual volume of ESL production (billion)	0	3	3.2	3.5
	# of IL manufacturers trained on conversion techniques	0	5	20	30
	# of new EE standards proposed	0	1	2	-
	# of national labs that test hazardous materials	0	0	1	2
	# of lamp manufacturers trained on cleaner ESL production	0	15	30	50
	# of waste ESL recycling/recovery facilities operational	0	1	2	-
Component 2: ESL Market Development & Product Promotion	Rural area ESL market share	5%	6%	8%	10%
	% of households using ESLs in large cities	70%	75%	80%	90%
	% of households using ESLs in small cities & rural areas	5%	6%	8%	10%
	# of provinces actively participating in ESL promotion network	0	10	10	10

Project Strategy	Success Indicators	Annual Target			
		Yr 0	Yr 1	Yr 2	Yr 3
	# of GLICs operational and tracking results	0	5	10	10
	# of retailers/supermarkets participating in small city ESL pilots	0	5	7	10
	# of banks/financial institutions trained on ESL finance programs	0	0	5	10
Component 3: ESL Policy & Institutional Support	Detailed lighting market survey completed and updated	0	1	1	1
	Policy proposal on IL manufacturers' business conversion completed and submitted	0	Formulated policy	Implementing rules and regulations	1
	Policy proposal on increasing domestic market share of ESL completed and submitted	0	Formulated policy	Implementing rules and regulations	1
	Roadmap completed for IL phase-out and expansion of ESLs	0	Drafted roadmap & designed promotion plan	1 roadmap	1 promotion plan

Monitoring Plan

The following table summarizes the monitoring plan for the high-level success indicators of the PILESLAMP

Table 19: Monitoring Plan for PILESLAMP

Success Indicators	Targets (EOP)	Means of Verification	Sampling Frequency	Location
GHG emission reductions	4.4 Mtons/yr	<ul style="list-style-type: none"> Monitoring reports on changes in average lighting products efficiency and sales; to be provided to the PMO Official statistical data on electric power consumption Project reports indication the progress and results of business conversion projects as well as the planned subsidy activity 	Annually, starting with year 1	PMO National Bureau of Statistics/China
Electricity savings	4.011 GWh/yr	<ul style="list-style-type: none"> Same as above 	Same as above	PMO
Improvement in % market share	15	<ul style="list-style-type: none"> Monitoring reports on changes in average lighting products efficiency and sales 	Annually	PMO
# of IL manufacturers that convert production to ESL	2-3	<ul style="list-style-type: none"> CALI reports and information provided by manufacturers 	Annually	PMO
Annual volume of ESL production (billion)	3.5	<ul style="list-style-type: none"> Industry and Customs data on production levels 	Annually	PMO
# of IL manufacturers trained on conversion techniques	30	Project reports and training participant lists	Annually	PMO

Success Indicators	Targets (EOP)	Means of Verification	Sampling Frequency	Location
# of new EE standards proposed	2	• Draft standards available for review by stakeholders	EOP	PMO
# of national labs that test hazardous materials	2	• Results of international test lab round robin results and lab reports	EOP	PMO
# of lamp manufacturers trained on cleaner ESL production	50	• Project reports and training participant lists	Annually	PMO
# of waste ESL recycling/recovery facilities operational	2	• Project reports and information submitted by manufacturers	EOP	PMO
Rural area ESL market share	10%	• Market monitoring information from annual surveys	Annually	PMO
% of households using ESLs in large cities	90%	• Market monitoring information from annual surveys	Annually	PMO
% of households using ESLs in small cities & rural areas	10%	• Market monitoring information from annual surveys	Annually	PMO
# of provinces actively participating in ESL promotion network	10	• Project annual progress report	Annually	PMO
# of GLICs operational and tracking results	10	• Project annual progress report	Annually	PMO
# of retailers/supermarkets participating in small city ESL pilots	10	• Project annual progress report	Annually	PMO
# of banks/financial institutions trained on ESL finance programs	10	• Project reports and information submitted by manufacturers	EOP	PMO
Detailed lighting market survey completed and updated	1	• Results of detailed survey showing regularly updated, accurate market data	Annually	PMO
Policy proposal on IL manufacturers' business conversion completed and submitted	1	• Detailed policy proposal submitted to relevant government agencies	EOP	PMO
Policy proposal on increasing domestic market share of ESL completed and submitted	1	Detailed policy proposal submitted to relevant government agencies	EOP	PMO
Roadmap completed for IL phase-out and expansion of ESLs	Roadmap & detailed long-term promotion plan	Roadmap and plans completed, with detailed reports documenting stakeholder review process and results	EOP	PMO

Monitoring & Evaluation Budget

The following table summarizes the budget for the various monitoring & evaluation (M&E) activities that will be carried out to manage and gauge the effectiveness of the PILESLAMP implementation. The table also shows the parties responsible for each M&E activity and the time frame of each activity.

Table 20: M&E Budget for PILESLAMP Project

Type of M&E Activity	Responsible Parties	Budget US\$ ¹¹³	Time Frame
Inception Workshop (IW)	<ul style="list-style-type: none"> ▪ Project Manager ▪ UNDP-China ▪ UNDP/GEF 	Part of PM Budget	Within first 2 months of project start up
Inception Report (IR)	<ul style="list-style-type: none"> ▪ Project Team ▪ UNDP China; UNDP/GEF 	Part of PM Budget	a) Draft IR before IW b) Final IR after IW
Measurement of Means of Verification & M&E for the demos, pilots, voluntary commitment activities.	<ul style="list-style-type: none"> ▪ Project Manager ▪ Project team members 	185,000	Start, mid and end of project
Measurement of Means of Verification for Project Progress and Performance	<ul style="list-style-type: none"> ▪ Oversight by UNDP-GEF Technical Advisor and PM ▪ Measurements by NDRC 	Part of PM Budget	Annually prior to APR/PIR and annual work planning
APR and PIR	<ul style="list-style-type: none"> ▪ Project Team ▪ UNDP China ▪ UNDP-GEF 	Part of PM Budget	Annually
Tri-Partite Review (TPR) and TPR report	<ul style="list-style-type: none"> ▪ GOC Counterparts ▪ UNDP China ▪ Project team ▪ UNDP-GEF RCU 	Part of PM Budget	Every year, upon receipt of APR
PSC Meetings	<ul style="list-style-type: none"> ▪ Project Manager ▪ UNDP China 	Part of PM Budget	Following Project IW and subsequently at least once a year
Periodic status reports	<ul style="list-style-type: none"> ▪ Project team 	Part of PM Budget	To be determined by Project team and UNDP China
Technical reports	<ul style="list-style-type: none"> ▪ Project team ▪ Hired consultants as needed 	30,000	TBD
Mid-term External Evaluation	<ul style="list-style-type: none"> ▪ Project team ▪ UNDP- China ▪ UNDP-GEF RCU ▪ External Consultants 	24,500	At the mid-point of project implementation.
Final External Evaluation	<ul style="list-style-type: none"> ▪ Project team ▪ UNDP China ▪ UNDP-GEF RCU ▪ External Consultants 	24,500	At the end of project implementation
Terminal Report	<ul style="list-style-type: none"> ▪ Project team ▪ UNDP China ▪ External Consultant 	Part of PM Budget	At least one month before the end of the project
Lessons learned	<ul style="list-style-type: none"> ▪ Project team ▪ UNDP China ▪ UNDP-GEF RCU 	5,000	Annually
Audit	<ul style="list-style-type: none"> ▪ UNDP China ▪ Project team 	6,000	Annually
Visits to field sites (UNDP staff travel costs to be charged to IA fees)	<ul style="list-style-type: none"> ▪ UNDP China ▪ UNDP-GEF RCU (as appropriate) ▪ Government representatives 	Part of the PM Budget ¹¹⁴	Annually
TOTAL INDICATIVE COST (Excluding project team staff time and UNDP staff and travel expenses)		\$275,000	

¹¹³ Most of the listed M&E activities listed in the table are among the project management activities. Hence the budgets for such activities are included in the PM budget.

¹¹⁴ This is part of the PM travel budget.

Annex I: Preliminary List of EE Lighting Production & Application Demonstrations

Demonstration Project	Project Owner	Type of Business	Total prod'n vol. replaced /Lighting system cap	Investment Cost, US\$	Expected Savings		Brief Description
					Energy	Total Cost, US\$	
Conversion of 2- 3 manufacturing lines for ILs	2-3 Chinese IL manufacturers, from the list of manufacturers expressing interest in supporting PILESLAMP ¹¹⁵	IL manufacturing	150 Million Lamps/a ≈ 5.32 TWh/a ^a	36,500,000	39.4 TWh/10 ^b years	1,122,000/TWh ≈1 US\$/ton CO ₂	Manufacturers will convert their IL production business to ESL production and will reduce their IL output by total 150 million lamps/year
CFL distribution program	GOC, several provinces to be decided upon during project implementation	---	1.8 Million CFL distributed	2,700,000	0.4 TWh/5 ^c years	6,750,000/TWh ≈ 6.2 US\$/ton CO ₂	1.8 Million CFLs will be distributed to rural households replacing 40W IL

^a based on an average wattage of 50W as discussed with Chinese industry representatives

^b assumed lifetime of an ESL production line

^c based on GEF lifetime for EE lighting pilot

¹¹⁵ See Table 9, page 52