# PROJECT DOCUMENT

## Section 1: project identification

| | | |
|---|---|---|
| **1.1** | **Project title**: | Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam |
| **1.2** | **Project number:** | GFL/<br>PMS: |
| **1.3** | **Project type:** | FSP |
| **1.4** | **Trust Fund:** | GEF Trust Fund |
| **1.5** | **Strategic objectives:** | |
| | GEF strategic long-term objective: | CC1 |
| | Strategic programme for GEF IV: | |
| **1.6** | **UNEP priority:** | Climate Change |
| **1.7** | **Geographical scope:** | Vietnam |
| **1.8** | **Mode of execution:** | Internal |
| **1.9** | **Project executing organization:** | UNEP/ DTIE in cooperation with the Institute of Strategy and Policy on Natural Resources and Environment (ISPONRE) under Ministry of Natural Resources and Environment (MONRE) in collaboration with Ministry of Industry and Trade (MOIT), Ministry of Science and Technology (MOST), Vietnam-based incandescent lamps (ILs)/energy saving lamps (ESLs) producers |
| **1.10** | **Duration of project:** | 48 months<br>Commencing: July 2010<br>Completion: June 2014 |

**1.11 Cost of project**

| | **$** | **%** |
|---|---|---|
| Cost to the GEF Trust Fund | **2,940,000** | 11.7 |
| Co-financing | **22,212,000** | 88.3 |
| **Cash** | | |
| QUATEST 1(testing laboratory) | 30,000 | 0.1 |
| Rang Dong (lighting manufacturer) | 1,790,000 | 7.1 |
| Dien Quang (lighting manufacturer) | 150,000 | 0.6 |
| ***Sub-total*** | **1,970,000** | **7.8** |
| **In-kind** | | |
| Vietnam Energy Efficiency and Conservation Office, Science and Technology Department, MOIT | 1,000,000 | 4.0 |
| ISPONRE | 585,000 | 2.3 |
| Institute of Energy of MOIT | 300,000 | 1.2 |
| Vietnam Environment Administration (VEA) | 550,000 | 2.2 |
| Vietnam Standard Quality Institute | 600,000 | 2.4 |
| QUATEST 1(testing laboratory) | 580,000 | 2.3 |
| QUATEST 3 (testing laboratory) | 5,000,000 | 19.9 |
| Vietnam Lighting Association | 150,000 | 0.6 |
| Rang Dong (lighting manufacturer) | 8,127,000 | 32.3 |

| | | |
|---|---|---|
| Dien Quang (lighting manufacturer) | 3,350,000 | 13.3 |
| ***Sub-total*** | **20,242,000** | **80.5** |
| **Project Total** | **25,152,000** | **100.0** |

### 1.12 Project summary

1. The world is moving fast towards energy-efficient lighting, this was the consensus reached by policy makers, industry representatives, scientists and other stakeholders at an international conference held in Shanghai in May 2008. The phase-out of inefficient lighting is considered as one of the most important short-term initiative nations can take in combating climate change created by GHG emissions. According to the IPCC's Fourth Assessment Report released in 2007, global GHG emissions reduction needs to peak no later than 2015 in order to keep the projected global temperature rise under 2°C.

2. The Global Environment Facility (GEF) has been seeking an approach to assist developing countries in achieving significant measurable change in their energy patterns and securing a low-carbon energy future. To this end, the GEF launched the Global Lighting Initiative in November 2007. It aims at accelerating global market transformation of environmentally sustainable, energy efficient lighting technologies as well as to develop a strategy to phase-out incandescent bulbs, thereby reducing global greenhouse gas emission from the lighting sector and the co-benefit of reducing mercury release from coal combustion being the main source of energy. The low-energy light bulbs and other efficient lighting systems could have a dramatic impact on global warming and cut energy bills, if disseminated worldwide. In this context, the Project will build on the encouraging market development rates already achieved in some countries and will seek to further reinforce and expand the market in other countries. Cognizant of the mercury content in CFLs, the Project will likewise seek to find feasible energy efficient alternatives to CFLs, in addition to addressing the current need to find environmentally sound recycling and disposal of CFL waste.

3. The overall aim of the project is to phase out Incandescent Lamps (ILs) production and sale through the transformation of the lighting products market as well as the promotion of high quality Energy Saving Lamps (ESLs) in Vietnam. The phase out of ILs will reduce greenhouse gas (GHG) emissions from the lighting sector and accelerate commercialization and sustainable market transformation of energy efficient lighting technologies in Vietnam.

4. To achieve the overall goal mentioned above, the Project will be structured around four components which include: (i) Local Lighting Industry Capacity Enhancement Program, (ii) Improved Quality Assurance (QA)/Quality Control (QC) Framework, (iii) ESL Market Transformation and Consumer Education and Awareness, and (iv) National Policy and Institutional Support Program towards Phasing-out of Incandescent Lamps and Promotion of ESLs.

5. The activities under the Project will be properly coordinated with the "Global Market Transformation for Efficient Lighting" project. In particular, the global project will facilitate the establishment of methodologies for the development of labeling procedures and quality certification; the identification of appropriate policy options for phasing out ILs and introducing latest technology ESLs; and the development of financing mechanisms, appropriate standards, and detailed environmental safeguards under the project. Vietnam will also be able to learn from the experiences and actions taken in other countries that were at a similar stage of market transformation for ESL products as Vietnam is at present.

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**Abbreviations and Acronyms**

| | |
|---|---|
| ADB | Asian Development Bank |
| APR | annual project report |
| BEE | Indian Bureau of Energy Effciency |
| CDM | clean development mechanism |
| CFL | compact fluorescent lamp |
| CLASP | Collaborative Labelling Appliance Standards Programme |
| DFID | Department for International Development (United Kingdom) |
| DoE | Department of Energy (United States) |
| DOST | Department of Science and Technology |
| DSM | demand-side management |
| DTIE | Division of Trade, Industry, and Economics |
| ECO-Asia | Environmental Cooperation-Asia |
| EE | energy efficient |
| EE&C | energy efficiency and conservation |
| ELI | Efficient Lighting Initiative (EU) |
| ESL | energy saving lamp |
| EuP | energy using product |
| EUSE | efficient use and saving energy |
| EVN | Electricity of Vietnam |
| GDP | gross domestic product |
| GEF | Global Environment Facility |
| GHG | greenhouse gas |
| GoV | Government of Vietnam |
| GTZ | German Agency for Technical Cooperation |
| GWh | gigawatt-hour |
| HDI | human development index |
| IEA | International Energy Agency |
| IEC | International Electrotechnical Commission |
| IFC | International Finance Corporation |
| ILs | incandescent lamps |
| ISPONRE | Institute for Strategy and Policy on Natural Resources and Environment |
| IW | Inception Workshop |
| kV | kilovolt |
| kWh | kilowatt-hour |
| LED | light emitting diode |
| LEP 2005 | Law on Environmental Protection (enacted in 2005) |
| mg | milligram |
| M&E | monitoring and evaluation |
| MOET | Ministry of Education and Training |
| MOF | Ministry of Finance |
| MOIT | Ministry of Industry and Trade |
| MONRE | Ministry of Natural Resources and Environment |
| MOST | Ministry of Science and Technology |
| MPI | Ministry of Planning and Investment |
| Mt | million ton |
| MW | megawatt |
| NDP | National Project Director |
| NSEP | National Strategy for Environmental Protection |

| | |
|---|---|
| OES | Office for Energy Saving |
| PIR | Project Implementation Review |
| PMO | Project Management Office |
| PoA | Program of Activities |
| QA | quality assurance |
| QC | quality control |
| QUATEST | Quality Assurance and Testing Center |
| RoHS | Restriction on Hazardous Substances (EU) |
| STAMEQ | Directorate for Standard, Measurement, and Quality |
| STR | Thematic Reports |
| T&D | transmission and distribution |
| toe | ton of oil equivalent |
| TPR | Tripartite Review |
| TTR | Terminal Tripartite Review |
| TWh | terawatt-hour |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| USEPA | United States Environment Protection Agency |
| VEA | Vietnam Environment Administration |
| VLA | Vietnam Lighting Association |
| VND | Vietnam Dong |
| VSQI | Vietnam Standards and Quality Institute |
| VTV2 | National Television |
| WB | World Bank |

## Section 2: Background and Situation Analysis (Baseline course of action)

### *2.1 Background and context*

1. Vietnam is one of the fast growing economies of the Southeast Asian region. It has a population of about 86 million and the average gross domestic product (GDP) growth rate is around 8% per annum. The rapid growth in its economy has contributed to improvement in the human development index (HDI) from 0.68 in 1995 to 0.725 in 2007, particularly in education, health and increased standard of living.

2. Vietnam has rich energy resources such as coal, oil, natural gas, hydro, and renewable energies, and it is a net exporter country. The GDP per capita of Vietnam is $1,034 and the per capita energy consumption is 0.3 ton of oil equivalent (toe), which is relatively low in comparison with other countries in the region. To cater to the increased growth in the economy, energy consumption is increasing rapidly. It is also expected that to match the anticipated pace of economic development there will be a seven-fold increase in energy consumption over the next 20 years. In this context energy demand in Vietnam is expected to increase by 2.5 times in 2015, and 5 times in 2025, in comparison with the present level of energy consumption. This would in effect change the supply structure of the energy resources and Vietnam would become a net importer of energy rather than an energy exporter as it is at present.

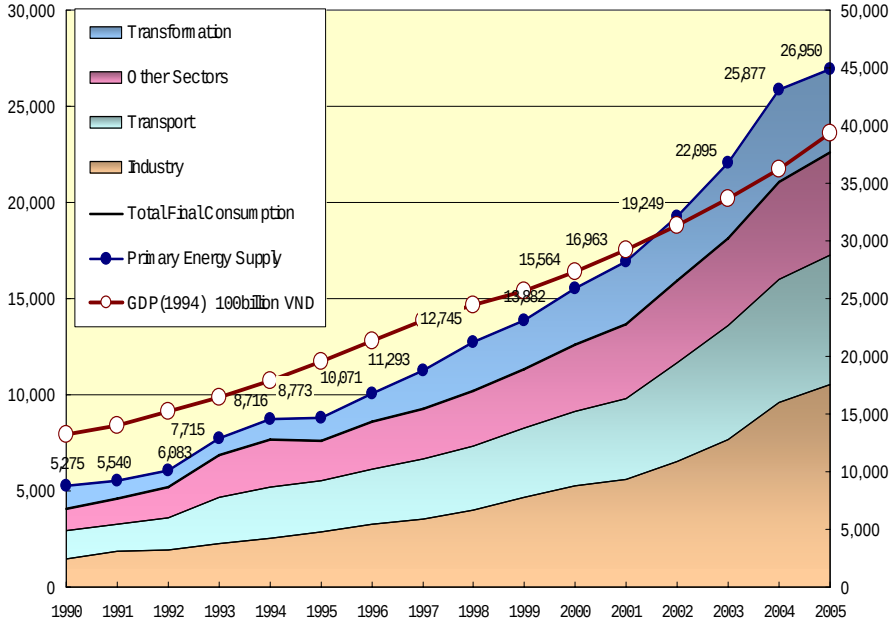



**Figure 1: Economic Development and Energy Demand Trend in Vietnam**[1]

3. Vietnam has abundance of water and forest resources. The share of non-commercial energy in the total supply is as high as 40% of the total primary energy supply; however, this is rapidly changing towards the supply and use of other traditional commercial energy sources such as coal, oil, and gas. The average growth rate of total primary energy supply from 1995 to 2007 was 11% a year, and in particular, natural gas consumption increased as a result of its increased use in power plants. On the other hand, coal and petroleum products were mainly consumed in the industry and transportation sectors. Currently, Vietnam is a net oil exporter, which contributes

[1] Source: Energy supply companies and others

to its foreign exchange reserves. Until now the development of its oil, natural gas, coal, and hydropower resources has been quite successful. However, it is expected that it will become increasingly difficult to maintain the present production level for crude oil and to increase coal and natural gas production to meet projected domestic demand. Therefore, to meet projected increased electricity demand, Vietnam is also considering introducing nuclear power, importing electricity from neighbor countries, and constructing new, imported coal-fired power plants.

4. In the power demand sector, as result of the rapid growth and expansion of the Vietnamese economy for the last decade, power demand has increased dramatically. With an average annual growth of power demand over the last 12 years (1996 to 2008) of about 17.3%, power consumption reached 65,926 gigawatt-hour (GWh) in 2008, which was about 4.9 times more than in 1996 when it was about 13,375 GWh. At the same time, peak power demand more than tripled from 3,200 megawatt (MW) to 12,636 MW. Potential peak demand was even higher since electricity supply was cut off through load shedding during peak hours due to power shortage. As for the daily load curve, the increasing rate of electricity consumption in the daytime (8 a.m. to 5 p.m.) is higher than nighttime (6 p.m. to 10 p.m.), and peak hours are changing to 6 p.m. to 7 p.m. for evenings and to 10 a.m. to 11 a.m. for mornings. These trends are more noticeable during the summer season and the consumption in the evening and the morning has been the same since 2003. It is projected that the trend of increasing and longer peak hours will continue in the future.

5. To meet the rapidly growing demand, Vietnam's power industry has struggled to expand and improve the power supply, transmission, and distribution system through the development of new power generation capacity, enhancement of high voltage transmission lines connecting the country's three regions (north, center and south), and reduction of transmission and distribution (T&D) losses. Not only investments made by Electricity of Vietnam (EVN)'s (a vertically integrated power utility that is responsible for the development, management, and operation of the state's electric power industry assets) own investments contributed to its expansion and improvement but also private capital under Build-Operate-Transfer (BOT) and Independent Power Producer (IPP) schemes. Also, power imports from Yunnan Province and Guangxi Autonomous Region in China have started through 110/220 kilovolt (kV) power transmission lines and T&D losses fell sharply from 21.4% in 1995 to 9.35% in 2008. Figure 2 presents the total installed power capacity according to source.

Unit: MW

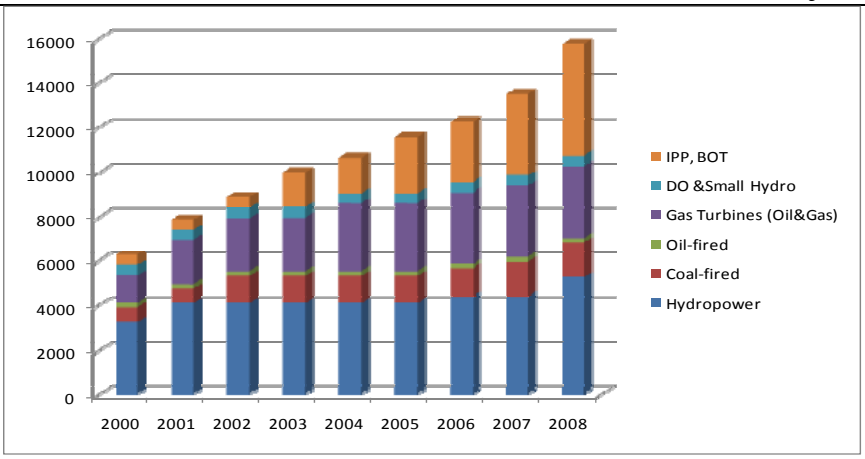



**Figure 2: Installed Capacity by Power Sources[2]**

6. Despite steady progress with regard to expansion of power generation and power transmission capacity, serious power shortages occurred during the summer of 2005. During that period from May to July, power shortage was estimated at 800 to 1,300 MW and the whole northern region, including Hanoi, experienced load shedding for several weeks. The power shortage was mainly due to the decrease in hydropower output due to drought conditions and an inadequate reserve margin against peak demand. To cope with the increasing demand for electricity, Vietnam is planning to construct 74 additional power plants, including 48 hydroelectric, 17 coal-fired, 5 gas-fired, 2 nuclear, and 2 renewable power plants at a total investment of around $5 billion a year[3].

7. In July 2007, the Master Plan for "National Power Development for the period 2006-2015, perspective up to 2025" was adopted. It presented the targets for increased power generation capacity to meet the projected electricity demand under the assumption of a minimum annual GDP growth rate of 8.5-9% during 2006-2010. To meet such an increase in demand two possible scenarios were developed, i.e., one based on an annual 17% increase in electricity demand (base case scenario) and one based on an annual increase of 20% (high case scenario). In addition, the Government of Vietnam (GoV) has proposed another scenario to cope with possibly an even more dramatic annual increase in the demand for electricity of 22% for 2006-2025.

8. The Master Plan presents the following power demand forecast scenarios:

- Base case scenario: Sales electricity growth rate will increase by 15.6% in period 2006-2010, 18.8% in period 2011-2015 (average annual growth rate is 17.2% in period 2006-2015), 12.6% in period 2016-2020 and 9.8% in period 2021-2025. For this case, the electricity generation will reach 110 TWh in 2010 and 257 TWh in 2015.

- High case scenario: Sales electricity growth rate will increase by 17.3% in period 2006-2010, 23.2% in period 2011-2015 (average growth rate is 20.2% in period 2006-2015), 14.9% in period 2016-2020 and 10.8% in period 2021-2025. For this case the electricity generation will reach 117 TWh in 2010 and 330 TWh in 2015.

[2] EVN annual reports
[3] http://www.vfabric.com/electric/

9. The challenge for GoV is to meet the exploding demand for electricity, relieve the shortages that currently pose significant barriers to economic development, and help reduce greenhouse gas emissions. Therefore, in response to the concern about the ongoing energy consumption in all sectors of Vietnam, GoV, took an action in order to promote Energy Efficiency and Conservation (EE&C) to maintain high economic growth. In 2003, GoV issued a decree that was followed by the "Circular No.1/2004/TT-BCN: The Guidance of Energy Efficiency in Industrial Facilities" in 2004. Further, in April 2006, the Ministry of Industry and Trade (MOIT) established the National Strategic Program on EE&C (for 2005-2015). The program consists of 11 projects including dissemination of EE&C knowledge and education; promotion of EE&C for commercial, residential, industrial and transportation sectors; EE&C for buildings; etc. Implementation of the EE&C organizational, institutional, and regulatory system and related road maps/action plans is urgently required; however, they are yet to be developed. At the same time GoV has agreed to begin phasing out incandescent lamps (ILs) through market transformation for energy efficient (EE) lighting products in Vietnam. To support this effort the Ministry of Natural Resources and Environment (MONRE), in collaboration with the United Nations Environment Program (UNEP), has therefore prepared the project "Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam" (the Project).

***Lighting Industry***

10. National and local efforts to promote EE lighting have been gathering momentum in Asia and other parts of the world. These efforts include plans by more than forty different countries to phase out the use of ILs. Many of these efforts rely on CFLs as substitutes, which use up to 75% less energy and last up to ten times longer than the original ILs (DoE, 2008). However, one of the main factors that require a deeper understanding of the mechanism involved in the replacement of the ILs is the quality of the CFLs that will replace them. Although the term "quality", is yet not been properly defined in most of the countries, the expected life-time of the CFLs is one of the most crucial factors in determining the success of any IL phase-out program. The negative impacts of poorly-performing CFLs are significant. First, if CFLs do not meet performance claims, they will not meet energy savings or greenhouse gas reduction targets. Second, poor-quality CFLs create dissatisfied consumers as well, jeopardizing the continuation and increased adoption of this energy-saving technology. Other energy-saving technologies may also suffer the same perception as a consequence. Third, compared to high-quality CFLs, sub-standard CFLs will burn out sooner and create more waste for landfills – including mercury, of which small amounts occur in CFLs.

11. Around 30 to 35% of the national electricity consumption in Vietnam is used for lighting of which 20% is in rural areas where 76% of the population lives. Although several GEF and non-GEF projects have targeted the energy and lighting sector, such as the ongoing United Nation Development Programme (UNDP)/GEF Public Lighting project, none has been targeting specifically the rural and residential households and commercial sector, or has aimed at phasing out the production and/or use of ILs. GoV is aware that the large number of ILs in use in the country contributes to the increasing energy demand in the household sector. Targeting the market transformation from ILs to the adequate production, quality, and consumption of Energy Saving Lamps (ESLs) would contribute greatly to achieving energy savings at household level, where many are poor, as well as reducing the increase in power demand, which would help EVN avoid substantial future investments in additional power generation, transmission, and distribution capacity.

12. EVN estimates that at present there are still about 60 million ILs in use. In addition to its existing IL industry with an anticipated annual production of about 40 million light bulbs in 2010, Vietnam has a nascent CFL industry that will have grown from a production of 5.4 million units in 2003 to about 21.5 million units in 2010. However, most of the production is exported with

only about 1.5 million low quality units being sold in Vietnam. Vietnam's strong growth follows that of other regional markets (China's output was 2.4 billion units in 2006, with 100 and 90 million units each for India and Indonesia, respectively, in the same year) and has led to a shortage of some raw materials (including phosphorus, glass, and electronic components) that are used to manufacture CFLs and a wide and diverse range of quality with regard to CFL products. A comprehensive market study of lighting products in Vietnam[4] by Environmental Cooperation-Asia (ECO-Asia)[5] in 2007 indicates that up to 39% of total domestic production of CFLs may be of low quality.

13. At the same time, EVN estimates that illegal imports of poor quality CFLs (mainly illegally imported from China) are as much as 23.5 million units a year, which has a negative impact on the dissemination of high quality CFLs. It is also estimated that nearly half of the CFLs produced in Asia in 2006, about 1 to 1.3 billion units, are of questionable quality. The same can be said of the CFLs produced in 2007 and 2008. If this issue is not addressed in the near term, programs and consumers depending on CFLs to reduce energy use and greenhouse gas emissions will not achieve the desired results[6].

14. End-users in Vietnam are therefore confronted with cheap, low quality CFLs that typically last on average for one year only or less than half the time of higher quality CFLs. The result is that CFLs not only fail to attain promised energy reduction targets but also undermine the image of ESL products and make consumers reluctant to buy them. Furthermore, recent studies in India have also revealed that the poor quality CFLs have low power factors, which results is low carrying capacity of current (ampere) in distribution system of the utility company and increased distribution losses. Finally, low quality CFLs do not give the same luminance over a period of time and therefore consumers are inclined to purchase CFLs of larger wattage than they actually require.

15. At present there are three main manufacturers of lighting products in Vietnam. These include: (i) Rang Dong Light Source Lask Vacuum Joint Stock Company (RALACO); (ii) Philips Electronics Vietnam Limited; and (iii) Dien Quang Lamp Company. In addition, there are some small lighting product manufacturers such as PG Investment Development Co Ltd, Viet Nhat Company, and IMPAC Joint Stock Company, but their production is relatively small in comparison with the three major manufacturers. These small companies only assemble CFL products and they were established recently only. As a result their products are not popular in comparison with those of the three main manufacturers. Figure 3 below shows the development of the demand for CFLs in Vietnam.

[4] http://www.energyrating.gov.au/pubs/2008-phase-out-slideshow-ton.pdf, p.7 (visited on December, 1st 2009).
[5] Environmental Cooperation-Asia (ECO-Asia) is a regional program of the United States Agency for International Development (USAID) that implements regional activities in: clean development and climate, natural resources and biodiversity conservation, clean water and sanitation, environmental governance, and tsunami response and reconstruction.
[6] http://usaid.eco-asia.org/programs/cdcp/reports/phasing_in_quality.pdf

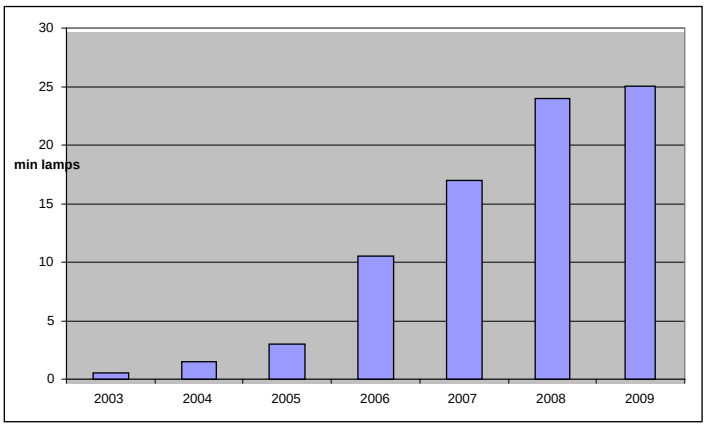



**Figure 3: Demand for CFLs in Vietnam[7]**

### *2.2 Global significance*

16. Globally, ILs are estimated to have accounted for 970 TWh of the final electricity consumption in 2005 and resulted in about 560 million ton (Mt) of $CO_2$ emissions. About 61% of this demand was in the residential sector with most of the remaining demand in commercial and public buildings. If the current trends continue, ILs could use up to 1610 TWh of final electricity by 2030. In a hypothetical case where all these lamps were to be replaced by CFLs, it would save roughly 800 TWh and reduce the emissions by 470 Mt $CO_2$ in 2010, rising to 1200 TWh and 700 Mt $CO_2$ in 2030. A market shift from inefficient ILs to energy-efficient alternatives would cut the world's electricity demand for lighting by 18%.

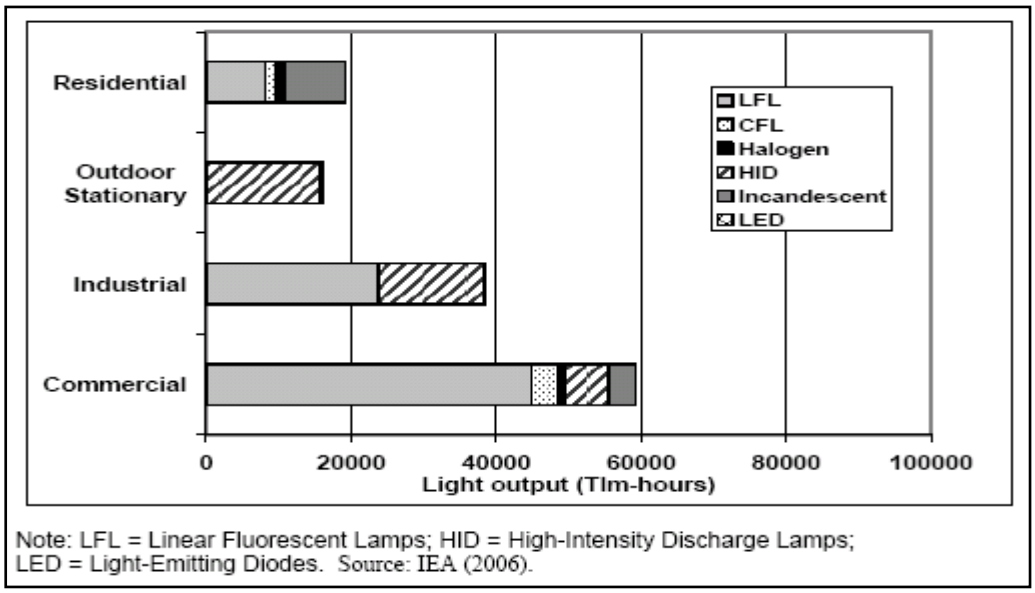



**Figure 4: Estimated Light Production by User Sector and Lamp Type (Source: International Energy Agency [IEA], 2006)**

[7] Final evaluation of CFL Program, EVN, 2007.

17. The Project is global in essence. However, its success will depend on the commitment of the Vietnam's government to carry out market transformation at national level. Experience from implementing GEF-funded lighting projects has been extremely positive. Furthermore, a number of key developing countries have express support for the GEF global initiative and willingness to participate with the GEF to phase out the production and consumption of incandescent lighting at national level. Some of them have already started instituting programs to that end, including China, India, Vietnam, the Philippines, Thailand, South Africa, Egypt, Tunisia, Ghana, Colombia, and Caribbean countries. Improving lighting efficiency is consistent with the national priorities of these countries, and will directly contribute to their sustainable development.

### *2.3 Threats, root causes and barrier analysis*

**Common barriers to EE lighting technologies diffusion**

18. The main barriers hampering the natural uptake of energy-efficient lighting technologies, particularly CFLs, can be classified into four groups: (i) cost and technological properties; (ii) organization of the lighting market; (iii) behavioral or consumer preferences; and (iv) health risk (mercury content). Each type of barrier is discussed below.

> ***Box 1: Barriers* to EE lighting technologies diffusion**
> Although strong market development has been evidenced in some GEF program countries, notably in China, in many others, CFL is hardly utilized despite the most cost-effective conditions. If efficient lighting is so economical, why does the market not deliver it automatically? The explanation can be found in a number of barriers that limit deployment of cost-effective lighting technologies. End-users and market actors are often unaware of the savings potentials and lighting-quality advantages and without information are inclined to use the technologies that they have always used. Some efficient lighting has higher initial costs and thus users are less likely to invest in it unless they are aware of the future savings. Most lighting is not installed and directly paid for by the end-user, thus different cost incentives exist for installers and users. Furthermore, most public and private organisations manage their equipment and operations budget separately and thereby create an incentive to minimise equipment costs at the possible consequence of higher operating costs. These and similar obstacles all slow the rate at which markets learn about and adopt cost-effective choices. (IEA, 2006, Light's Labour's Lost).

***Cost and technological barriers to the diffusion of EE lighting products***

19. Historically, the main barrier hampering the deployment of energy-efficient lighting products has been their high initial cost. When first launched in the early 1980s, CFLs were 20 to 30 times more expensive to produce than their incandescent equivalents. CFL costs have since steadily declined through deployment and increased competition and now retail for as little as four times the price of an incandescent lamp. Table 1 shows the life cycle cost to an end-user of both ILs and CFLs. The cost assumptions adopted in this exercise are conservative. In reality, costs (and in particular those of CFLs) vary depending on where the lamp is produced. It shows that, even when considering an initial cost that is 20 times higher than that of an incandescent lamp, when energy costs are taken into consideration, CFLs cost less than a third of the cost of ILs.

**Table 1: Economics of CFLs compared to ILs**

| | Incandescent Lamp | Compact Fluorescent Lamp (CFL) |
|---|---|---|
| Initial cost of bulb (US$) | 0.50 | 10 |
| Light output (lm) | 900 | 900 |
| Lamp power (W) | 75 | 15 |
| Efficacy (lm/W) | 12 | 60 |
| Lifespan of bulb (h) | 10,000 | 10,000 |
| **Calculation over a 10,000 h operating period, assuming an electricity tariff of US$ 0.1/ kilowatt-hour (kWh)** | | |
| Electricity consumption (kWh) | 750 | 150 |
| Cost of electricity (US$) | 75 | 15 |
| Cost of lamps (US$) | 5 | 10 |
| Total cost of lamps and electricity (US$) | 80 | 25 |
| **Total savings for CFL (US$)** | | **55** |

Source: IEA (2006)

20. This simple analysis does not take into account the impact of displaced heat. As noted in the introduction, about 25% of the energy consumed by CFLs is converted to visible light compared to only 5% for a conventional incandescent lamp. This means that 75% of the input energy is output heat in the case of CFLs compared to 95% in the case of incandescent lamps. In some circumstances and, particularly in cold climates, the introduction of CFLs to replace ILs may therefore lead to a greater heat demand with associated costs. In warmer climates however, CFLs may displace the demand for air conditioning thus reducing cooling costs. The financial impact is therefore highly dependent on the climate and on heating fuel used.

21. Globally, significantly more electricity networks experience summer peaking in response to air conditioning demands than networks experiencing winter peaking due to space heating demands where non-electric commercial fuels usually dominate. Thus, overall, the high correlation between air conditioning and the peak in electricity demand in the summer will most likely give greater global weight to the additional benefits of lowering the air conditioning demand as opposed to an increase in space heating energy needs.

22. As shown in Table 1, whereas, on a life-cycle basis, CFLs are far more economical than ILs[8], the higher initial cost remains an important barrier to the broad diffusion of CFLs. Incandescent bulbs are the dominant technology in most countries to a large extent because they are so inexpensive. On the one hand, higher income consumers often regard ILs as disposable. In this case therefore, the higher initial cost/lower life cycle cost characteristic of CFLs is a market barrier because of incomplete or inaccurate consumer awareness about competing technologies and because of their limited confidence in new technologies. These issues are addressed in the subsections below. On the other hand, for the poorer sections of a community, the capital cost of CFLs can be a substantial barrier even if they save money in the long run. Many will always opt for the cheapest option if there is a price differentiation. In this case, the higher initial cost of CFLs is a purely financial barrier.

[8] Even in this example where rather high CFL costs are assumed, a CFL that displaces an IL represents an investment with an internal rate of return of over 180%.

23. In parallel to high costs, early CFLs, while compact when compared with tubular fluorescent lamps, were still more bulky than the ILs they were designed to displace. With most residential light fittings having been designed over many decades to fit the highly standardized dimensions of incandescent bulbs, the additional length and bulk of CFLs acted as a significant disincentive for residential buyers. CFLs have also had a number of quality and suitability issues to address. The first CFLs had limited color ranges and tended to only be available in the higher cooler-light values. CFLs using magnetic ballasts were also prone to delayed starts and long warm-up times and could suffer from flickering.

24. Market-driven improvements, accompanied by various market transformation efforts have to a large extent addressed these technical issues. The size of CFLs has been significantly reduced. There are now also a far greater range of sizes and shapes available on the market. Current generations are available in the same warm colors provided by ILs. In addition, the introduction of higher quality lamps using electronic ballasts has overcome much of the delayed-start and flickering problems.

***Barriers related to the organization of the lighting market***

25. As in any market, the availability of accurate and complete information is a necessary element to ensure the effective allocation of resources. Energy-efficient lighting systems cover a wide range of technologies and it is difficult for consumers, and even distributors and installers, to learn about all their attributes, including quality. The comparatively high running costs of incandescent bulbs are, for example, often poorly understood. Most consumers receive electricity bills infrequently and have no way of understanding which part of the bill is accounted for by lighting. Information is also often not readily available at the point of sale, making it all the more complicated for consumers to make informed choices. Lack of information hampers the decision-making process and often leads consumers to prefer known technologies.

26. Another important characteristic of the lighting market is that generally, those making the decisions about lighting equipment are not the ones who pay directly for the system's energy use and hence lack an incentive to minimize operating costs. This is referred to as the "split incentive" barrier.

27. Indeed, when a developer or landlord is constructing or retrofitting a building they may have every incentive to lower their initial costs, including by installing less efficient lighting systems. The tenant or purchaser of the building then has to pay for the operating and maintenance costs associated with the chosen system. In the case of CFLs, they can be used as substitutes to most types of incandescent bulbs. So a tenant or purchaser can often easily choose to replace an incandescent bulb with a CFL if that is the system installed. Yet CFLs cannot replace all incandescent lamp types. In some cases the tenant or purchaser is therefore bound to the less efficient technology. In addition, in many commercial buildings, tenants hire a management company to take care of the building including its lighting systems. Depending on the maintenance contract, the managing company may have little incentive to replace the ILs with CFLs.

28. Finally, there are barriers pertaining to the very purchase of lighting equipment. Light bulbs and lamps suitable for residential applications are readily available in a wide range of retail outlets, ranging from grocery stores, corner stores, large department stores and specialty lighting stores, to appliance or building-supply stores. However, the EU's Atlas project[9] estimates that 40% of all general lighting sources are purchased from supermarkets. CFLs are beginning to be displayed more prominently in retail outlets, including supermarkets, although still much less so

[9] www.europa.eu.int/comm/energy_transport/atlas.

than incandescent bulbs. Movable lamps are typically an important component of the total lighting use in the residential sector. For this reason, unlike in the commercial and industrial building sector, building energy codes rarely prescribe maximum lighting energy requirements for residential housing[10]. Decisions about lighting are therefore made without regulatory guidance on energy efficiency.

***Barriers related to the behavioral and consumer preferences***

29. Most users are time-constrained and have to balance the benefits of optimizing their decision making about lighting efficiency with many other competing demands on their schedule. Given the need to prioritize, many will choose to invest their efforts in other directions and live the consequences of poorly informed decisions about lighting. Consumers are also skeptical about predictions of the benefits of any new technology, and this holds equally true for energy-efficient lighting. Many consumers are concerned that CFLs lack performance and reliability. In addition, some early models were substandard and bad reports quickly traveled from consumer to consumer.

30. Many manufacturers also promoted CFLs on the basis of their extensive lifespan. Therefore, consumer expected every lamp to meet the lifetime statement while bulbs' lifespan are based on an average lifetime. Following probabilities, some CFL failed early, thereby disappointing some consumers. This situation can be worst in developing countries, since markets are sometimes flooded with low quality CFL, increasing the rate of early failure and consequently, consumer's distrust of the technology. Like much energy efficiency technology, consumers who have had a bad experience tend to avoid CFLs altogether even though many of the early problems have now been reduced significantly.

31. Consumers often look for guarantees or assurances that the products they buy will achieve the promised results, especially when they have paid a high initial cost compared to prices for other, less efficient products. In addition, consumers normally opt to avoid changing habits or actions, especially when conditions such as energy prices are stable. Even given rapid economic changes as has been evident in transition countries in Central and Eastern Europe, there is often a reluctance to move from known practice, even if purchasing energy-efficient lighting makes financial sense.

32. The energy demand for lighting in the residential sector is also affected by occupancy patterns and lifestyle factors. In living rooms, people generally like to be able to dim the lights. Similarly, people often appreciate mood lighting, in which case warm color tints (yellow, orange hues) are often preferred. The CFLs most commonly sold on the commercial market were generally not dimmable and tended to give off a blue/white color. Modern CFLs are now increasingly dimmable and available in a broad range of color temperatures yet, as mentioned above, it may be that consumers have been "turned off" by earlier models.

33. In addition, a significant trend in many OECD countries, consistent with the wider trend towards investment in home decorating, is to install spotlighting systems (to highlight architectural features or artwork). These systems may lead to a greater number of lamps per home and also to a preference for less efficient lighting types (such as low-voltage halogens for spot-lighting and dimmable high-voltage halogens or ILs for mood lighting).

***Barriers related to health risk issues (mercury components)***

34. There is a widespread concern that the mercury content of various CFLs might be transforming an environment-friendly initiative into a risk for health and the environment. The

[10] The UK is the only IEA country to prescribe maximum lighting energy requirements in the residential sector of California also imposes requirements.

mercury content of one CFL can range from 0-50 mg (depending upon when and where the lamp was manufactured) with current technology it is believed that the average mercury content is of about 5 milligrams per bulb. However, reports clearly state that the amount of electricity used by a single IL produces, at the source (coal-fired power plant), much more mercury than the destruction of CFLs does. Figure 5 illustrates the matter.

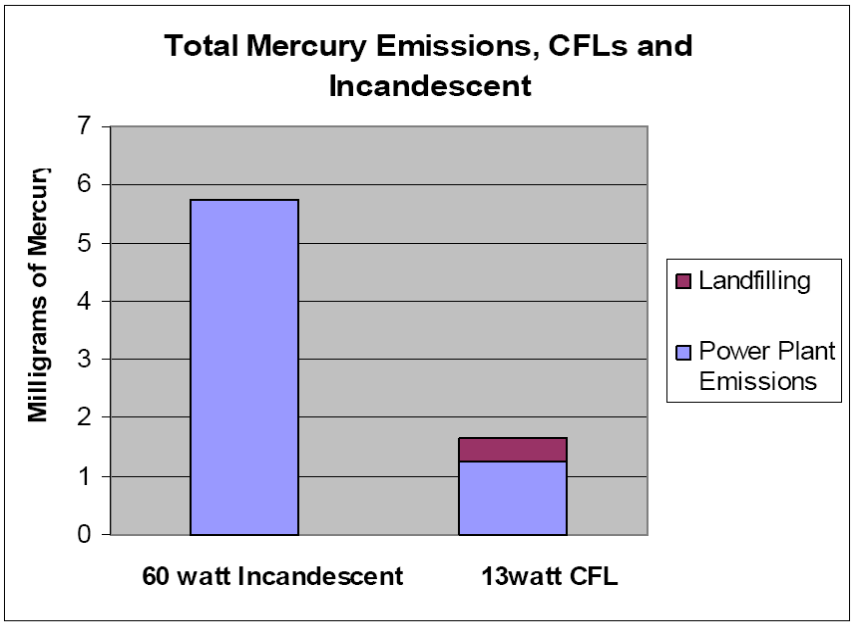



**Figure 5: Total Mercury Emissions, CFLs and Incandescent Lamps**

35. Global mercury demand related to CFL production is estimated at 3-4 % of the current overall global demand and is projected to remain at that level in the coming ten years (with increased production of CFLs with lessening content of mercury). Research is ongoing to achieve further reductions and ultimately, to develop mercury free CFLs.

36. The UNEP Governing Council, in decision 24/3 IV sets priorities for work on mercury, including the reduction of mercury supply, the reduction of mercury use and eventual storage of excess mercury. Given the goal of the UNEP Global Mercury Partnership to reduce, and where feasible eliminate anthropogenic releases of mercury, the focus of the UNEP Chemicals mercury program is on reducing the demand of mercury for all uses, including lighting and lamps.

37. Any significant CFL-promotion effort must take into account the environmental risks pertaining to the disposal of CFLs. The third component of this project will address this issue by supporting governments in the establishment of a national strategy of CFL disposal as well as by supporting the enunciation of national risk communication plans. In the context of Vietnam there are the following barriers.

### *Institutional Barriers*

38. There is no big institutional barrier in energy efficiency and saving in Vietnam. There is in place the OES (MOIT) which is responsible for the development of policies and strategies on energy savings. The only barrier is the smooth cooperation between the OES and the EVN and other relevant stakeholders. Besides, the OES is an office under the Department of Science and Technology (DOST), so collaboration with the Department of Energy (DOE), EVN and others is the key for promoting of EE in lighting.

***Policy Barriers***

39. With the Law on Efficient Use and Saving Energy (EUSE) on hold for approval, Vietnam has a relatively comprehensive policy framework on energy efficiency and saving. The Government has recognized the importance of energy saving in both combating with GHG emissions in one hand, and to reduce energy losses on the other. The main barriers here are: (i) there is no specific policy on energy saving in lighting business, application of energy saving measures is still on voluntary basis, and there are lacks of regulations on prohibition of ILs usage, (ii) a roadmap for the phasing-out of ILs was not developed and should be built up in the near future as regulated by the Draft Law on EUSE, (iii) there are also lacks of specific incentive policies to enhance producers to shift from ILs to ESLs production, and (iv) standards of ESLs and related equipments and testing standards need to be developed and harmonized with international practices.

***Technical Barriers***

40. Local manufacturers still lack capacity in production of high quality ESLs. Rang Dong Company, the biggest producer of ESLs in Vietnam has gradually transformed from ILs into ESLs production, but it still needs support to strengthen technological capacity. International expertise can help the company to improve the quality and reduce production cost, thus to enhance the market development. Capacity of lighting testing laboratories in Vietnam is also one of the key barriers. There are three state laboratories of QUATEST in the three regions (North, Central, and South), but only two in Hanoi and Ho Chi Minh City have better equipments. QUATEST 1 has been supported by the Vietnam EE Public Lighting (VEEPL) project, but still need support in terms of international expertise on the testing of International Electrotechnical Commission (IEC) standards, and profound knowledge on these standards so that they can explain them to the customers.

***Market Barrier***

41. Quality and price are the biggest problems for development of Vietnam CFL market. CFLs are much more expensive than ILs, specifically, a CFL can be sold on the market at around 25,000-40,000 VND depending on the quality while a IL has the price of around 5,000 – 10,000 VND. Besides, there are many CFLs with low quality (mainly illegally imported from China) and they hinder customers from using of these lamps.

**Table 2: Price Comparison between IL and CFL**

| | **IL** | **CFL** | **Price Difference** |
|---|---|---|---|
| Minimum market price | 5,000 VND | 25,000 VND | **400% more expensive** |
| Maximum market price | 10,000 VND | 40,000 VND | **300% more expensive** |

***Information Barrier***

42. Campaigns have been conducted by MOIT and EVN to promote the use of ESLs in Vietnam, but the general population still does not know about the benefits of good quality CFLs. Data with regard to the CFL market and production of CFLs are not officially collected on a periodic basis and volumes of illegal poor quality CFLs are estimates. There is still a lack in term of quality information dissemination, which could be managed by an information center on lighting energy saving products so that relevant information could be disseminated to the whole

population. Knowledge on ESLs technologies and standards is still limited to relevant stakeholders. The business sector does not realize the needs for EUSE.

***Implementation Barrier***

43. Although there are policies and an institutional framework in place, the enforcement and implementation of regulations are not always smooth due to financial, human resource, and awareness constraints. The control of illegal import of CFLs is a very difficult task as Vietnam has a long border with China and it is a big challenge to transform the market.

### *2.4 Institutional, sectoral, and policy context*

**Conventional incandescent lighting and efficient lighting solutions: basic characteristics**

***Incandescent lamps (ILs)***

44. ILs are bulbs containing a wire filament that is heated and emits light. Up to 95% of the energy emitted by ILs is heat, and hence the light efficiency of ILs is inherently low. These bulbs may have different types of finishes to modify the brightness of the filament, internal reflecting substances on the bulb to control the direction of the light, halogen gases, and special tungsten filaments. The latter is used because it has a relatively high melting point and a relatively low rate of evaporation at high temperatures. It is surrounded by a gas (usually argon) to reduce the tungsten evaporation rate and this raises the temperature the filament can operate at and hence the light output. However, the gas also conducts heat away from the element, which lowers the overall efficiency.[11]

45. The first practical incandescent lamp was developed in 1878 and design improvements continued to be made up to 1936 at which time efficacy levels have increased by approximately a factor of 10. No further developments occurred until the halogen lamp, which is also based on the process of incandescence to produce light, was developed in 1958. The most common type of argon-filled IL is known as a general service lamp.

46. The number of times they are turned on does not affect the life span of the bulb, but at an average of just 1,000 hours, their lifetime is significantly shorter than other alternatives. Incandescent lamps create comfortable lighting in terms of color, are easy to dim, operate over a wide range of temperatures and, above all, are inexpensive and readily available in many types of retail outlets.

47. Their chromaticity characteristics give near perfect color rendering but they are only able to produce a warmer light. The most common ILs distribute light diffusely in all directions from a pear shaped bulb. They can be housed inside reflectors to provide narrower or shaped light distribution when required. Incandescent lamps are also commonly available in a large variety of decorative forms such as candle and flame shapes.

48. Their low price, warm color and longstanding familiarity have led ILs to be the most commonly purchased lamps globally. They are heavily used in residential lighting applications in most countries. They however suffer from very poor efficiency. In fact, although the efficiency of ILs has been improved since their first development, they still have the lowest lighting output efficacies of any modern electric lamp type, ranging from 6-18 lumens per watt.12

[11] http://ec.europa.eu/energy/atlas/html/lightdintro.html
[12] http://ec.europa.eu/energy/atlas/html/lightdintro.html

***Compact Fluorescent Lamps (CFLs)***

49. CFLs were first commercialized in early 1980s and are offered in two types: with the ballast integrated into the lamp, or without the ballast integrated. The former are intended as direct substitutes for ILs and are designed to fit into existing incandescent lamp fixtures, while the latter are orientated more at commercial building retrofits and new-build as alternatives to incandescent lighting installations. CFLs usually consist of 2, 4, or 6 small fluorescent tubes that are mounted in a base attached to a ballast for ballast-integrated models, or are plug-in tubes for the non-integrated variety.

50. Ballast-integrated lamps have either a screw-in base or bayonet cap like standard ILs. More recent models are available in a variety of screw-in diameters and fit into a much larger range of sockets than the earlier generations. The light output of integrated CFLs is designed to match the output of equivalent ILs, but since their efficiency is from 4 to 5 times higher, their wattage ratings are proportionately lower. CFL efficiency ranges between 35 and 80 lumens per watt.

51. For a given amount of produced light, CFLs consume from 20% to 25% of the energy used by incandescent light bulbs. About 25% of the energy consumed by CFLs is converted to visible light as compared to only 5% for an incandescent lamp. This relatively high efficiency means that many CFLs are cool enough to touch when they are on and therefore safer. Another important benefit is that they have much longer life cycles as compared to ILs, with rated life spans of 6,000 to 12,000 hours.

52. Currently, CFLs contain quantities of mercury ranging from 0 to 50 milligrams of mercury per bulb. However, overall estimates show a net reduction in mercury releases from the use of CFLs over traditional ILs. This is estimated at 1.1 mg to 4.1 mg release reduction per bulb. Higher mercury prices and mercury content limits set by the EU Restriction of Hazardous Substances (RoHS) Directive have reportedly motivated manufacturers to reduce mercury content in recent years.

***Overview of CFL and IL Markets***

53. Statistics on global lamp sales are hard to come by. IEA (Light's Labour's Lost, 2006) has therefore recently reviewed a large number of sources to produce an estimate of lamp sales by country. As expected, ILs are by far the most commonly sold lamps in the world. They dominate retail lamp sales oriented towards the residential sector in most countries. It is estimated that roughly 13.2 billion units were sold in 2003 representing over 72% of the global lamp market by volume that year. The United States and China are the largest markets for ILs, with sales in excess of 2.5 billion lamps in each country. Sales in the rest of Asia and Former Soviet Union countries are estimated at 3.2 billion units and in Europe at about 1.8 billion.

54. In contrast, CFL sales in 2003 were estimated at 1.1 billion units, representing approximately 6% of the global lighting market by volume. Looking back at sales since their introduction in the early 1980s is, however, indicative of future sales trajectories. Figure 6 shows the estimated global sales figures by region between 1990 and 2004. CFL sales have slowly increased over much of the 1990s and rose sharply starting in 1999. Europe was the largest market for CFLs until 2001, but thereafter China became the largest market. CFL sales in 2003 in China were estimated at 355 million units, representing over 30% of the global market.

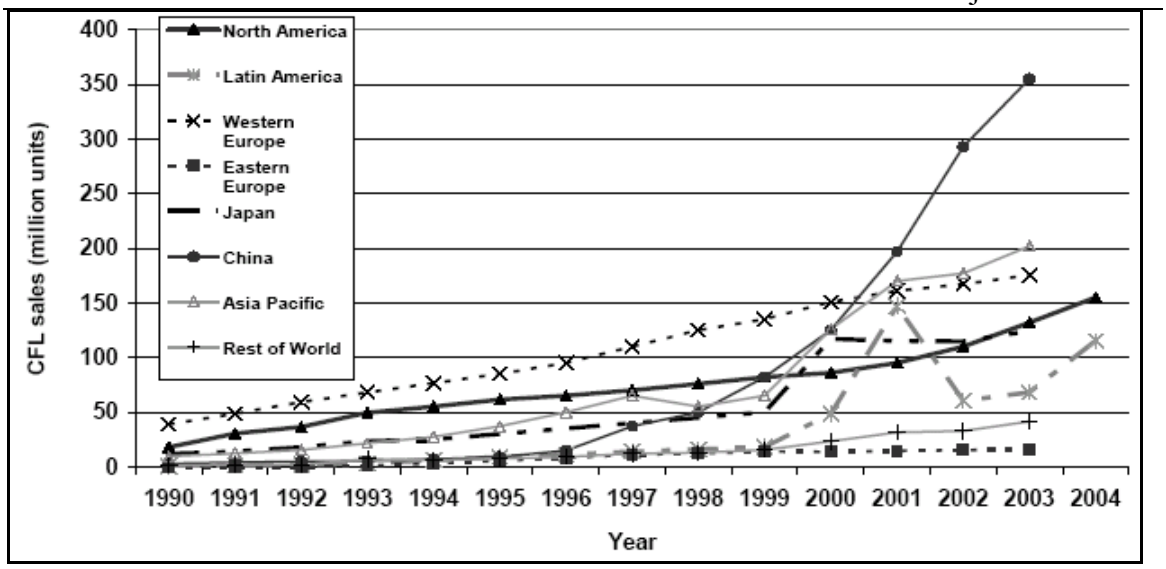



**Figure 6: Estimated global CFL sales by region, 1990-2004 (Source: IEA, 2006[13])**

55. The market share by volume of CFLs varies greatly from country to country. In the United States, CFLs accounted for close to 3% of the sales of medium screw-based lamps in 2004 while in Europe, CFL sales represented 10% of the incandescent lamp sales. In Japan, sales slightly exceed those of conventional ILs. This, however, is mostly a reflection of low incandescent lamp sales since the Japanese household lighting market is dominated by linear fluorescent lamps. This holds true in some other Asian countries such as the Philippines where linear fluorescent lamps also play an important role in household lighting. Many other developing countries also have high CFL penetration rates. In China for example, it is estimated that CFL sales reached close to 14% of the incandescent lamp sales in 2002.

56. As shown in Figure 4, in recent years, the global production of CFLs increased by 25% to 3 billion units, and more than 80% of these lamps were produced in China. The current exact production could well be over 3 billion, according to the observed trends. Production capacity is not a problem but a lack of consumer acceptance might be if governments don't educate consumers about the benefits of CFLs. Switching from energy-inefficient incandescent light bulbs to CFLs not only reduces GHG and pollutant emissions but also reduces the cost of electricity.

[13] Lefebvre, Nicolas *et al.*, *Barriers to Technology Diffusion: The Case of Compact Fluorescent Lamps*, IEA, 2006

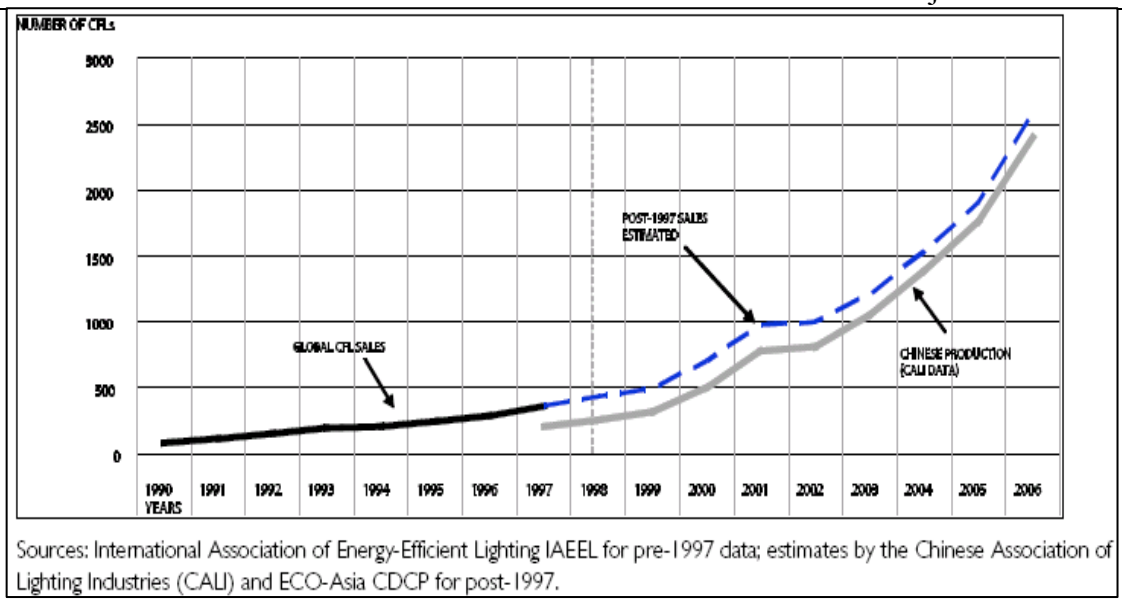



**Figure 7: Estimated Global CFLs Sales by Region and Chinese Production**

57. The market share of CFLs, as presented in Figure 6, demonstrates that CFL growth rates can be quite impressive, but also that relatively few countries have benefited from this technology so far. This means that there are still significant opportunities for promoting efficient lighting worldwide. The replacement of ILs by CFLs therefore seems to offer a win-win situation with benefits from both a climatic perspective and on an economic perspective. To the extent to which the adoption of CFLs reduces system load and/or the consumption of primary fuels exposed to international market risks, it can also be regarded as a means of fostering energy security.

58. Recently, several countries have announced their intention to phase out incandescent lighting and have engaged in legal and technical activities towards this objective. Ireland, Australia, Argentina, and the Philippines are phasing out incandescent bulbs beginning in 2010. The USA[14] introduced new legislation to gradually phase out the least efficient lamps by 2012, while the European Union is considering the same for 2011.
International lighting industry representatives have also announced their support of such a market transformation and have called for coordinated efforts among countries. Some developing countries have also made efforts to promote the adoption of CFLs and to phase-out ILs.

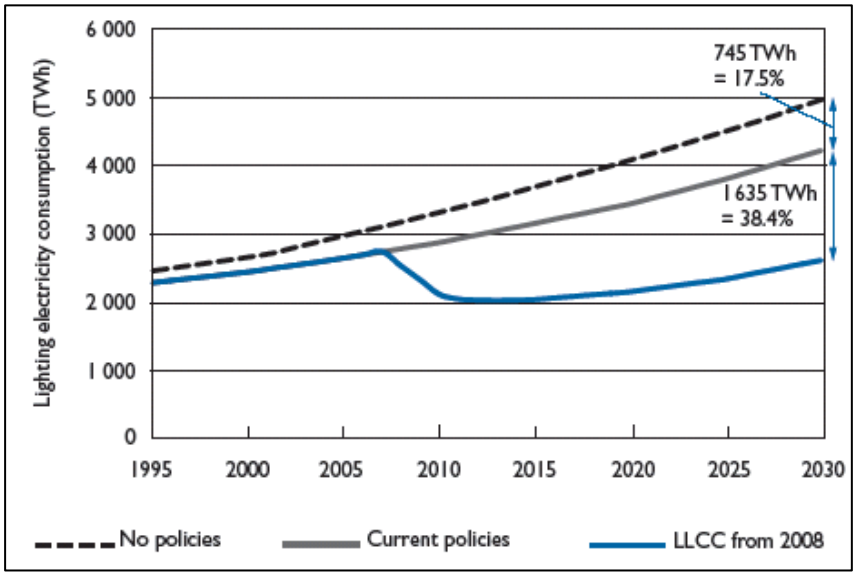
59. The following are some crucial facts about the state of the CFL market. They are taken from various sources, but primarily from 2006 IEA publication "Light's Labour's Lost":

- As the first service offered by electric utilities, lighting ranks among the end-uses dominating global power demand.
- Worldwide, grid-based lighting consumes 19% of total global electricity production, and is associated with 1.9 billion tons of $CO_2$ emissions per year.
- Globally, 70% of total market sales are for ILs.
- With current economic and energy-efficiency trends, it is projected that global demand for artificial light will be 80% higher by 2030 and still unevenly distributed. If this comes

[14] Many large companies, and now finally the federal government in the U.S., have begun installing large amounts of CFLs as short-term energy efficiency initiatives on the way to larger carbon reduction programs

to pass and the rate of improvement of lighting technologies does not increase, global lighting electricity demand will reach 4,250 TWh: almost twice the output of all modern nuclear power plants.

- Without further energy-efficiency policy measures, lighting-related annual $CO_2$ emissions will rise to almost 3 gigatons by 2030.
- The IEA estimates that were end-users to install only efficient lamps, ballasts and controls that will save them money over the life cycle of the lighting service, global lighting electricity demand in 2030 would be just 2,618 TWh.
- This is almost unchanged from 2005 and would actually be lower between 2010 and 2030




(see the LLCC from 2008 scenario in Figure 8).

**Figure 8: Global Lighting Electricity Consumption in 1995–2030 under Different Scenarios**[15]

60. Barriers have nevertheless hampered the broad diffusion of CFLs. In the scope of their energy efficiency policies, many governments are devising measures to overcome key barriers to the broad diffusion of CFLs as substitutes to ILs. Section 2.1.6 below reviews a number of barriers that impede the promotion of energy-efficient lighting.

***Innovation***

61. The lighting market is evolving quite rapidly. For this reason, CFL are even not anymore considered as "innovative", but as a well-established alternative to ILs. The following section aims at exposing some avant-garde lighting products or, at least, new applications to old technologies.

**Light Emitting Diodes (LED)**

62. The most promising innovation in non-domestic lighting is the development of solid state lighting (SSL). This technology is *expected* to achieve efficiencies at least ten times higher than ILs and up to twice as high than fluorescent lamps. LED lamps, aside from non-

[15] These scenarios are explained in Chapter 6 of the IEA publication "Light's Labour's Lost". The Current Policies scenario is the lighting component of the Reference Scenario in the IEA's *2004 World Energy Outlook* (OECD/IEA, 2004)

mercury containing have other advantages such as: long life (50,000 hours), warm light color similar to ILs, low heat generation, and the ability to work with dimming switches in certain lamps. LED lamps are energy-efficient and have the potential to be more efficient than CFLs for some applications. They do not emit ultraviolet or infrared light.

63. A US Department of Energy's (DoE) publication "LED; the Basics" shows that the number of LED products on the market continues to grow. Most popular products include portable desk/task lights, under-cabinet lights, recessed down lights, retail display lights, and outdoor fixtures for street, parking lot, path, and other area lighting. Whereas some products are manifestly highly reliable, some others are not. This is so for the following reasons:

- LED technology evolves very quickly. New generations of LED devices become available approximately every 4 to 6 months.
- Lighting fixture manufacturers have to climb up a learning curve in applying LEDs. Being sensitive to thermal and electrical conditions, LEDs must be carefully integrated into existing systems.
- Important differences in LED technology compared to other light sources have created a gap in the industry standards and test procedures that underpin all product comparisons and ratings. New standards, test procedures are under development and Energy Star criteria for SSL intended for general illumination were published in 2007 (http://www.netl.doe.gov/ssl/energy_star.html).

**Other Technologies**

64. Other efficient lighting technologies which may develop in future, some of which could rival fluorescent lamps in replacing inefficient lamps, are:

- Pin-base CFLs (would require specific fixtures)
- Ceramic metal halide lamps
- Optical fiber technology
- Tungsten photonic lattice lamps
- Halogen infrared lamps
- Organic light-emitting diodes (OLED)
- Phosphorescent organic light-emitting diodes (PHOLED)
- Cold cathode compact fluorescent lamps
- Sulfur plasma lamps.

### *Issues related to mercury disposal*

65. Mercury is a hazardous substance currently included in fluorescent lamps. The average mercury content in a CFL is about 3 milligrams (mg) – roughly the amount it would take to cover the tip of a ball-point pen. By comparison, older thermometers contain 500 mg of mercury – the equivalent of more than 100 CFLs. A common wristwatch battery contains five times more mercury than a CFL. Although there is currently no substance that can replace the efficiency properties of mercury to produce light in fluorescent lamps, manufacturers have reduced the amount of mercury used in lamps. Some manufacturers have voluntarily reduced the mercury content in CFLs by about 80% in the past decade, to as little as 2 mg per bulb. Research is ongoing to achieve further reductions and, ultimately, to develop a mercury-free fluorescent

lamp. Table 2 compares the mercury content in a CFL to other household items. Guidelines or regulations for the handling of mercury ('dosing') in the manufacturing process of CFLs do not exist but reputable manufacturers comply with national environmental regulations with regard to the protection of the environment and their workers in the work place and have their own guidelines and procedures that aim to protect staff who are involved in the production. Further, because of the relatively high cost of mercury manufacturers will make all efforts to minimize the risk of spilling and wasting mercury in the production process.

66. The EU's RoHS Directive 2002/95/EC limits the amount of allowable mercury to a maximum of 5 mg/lamp. Also, under the EU's eco-design directive manufacturers are to indicate mercury content as part of the product information. However, EU procedures for actual testing the amount of mercury in lamps are yet to be agreed. Since a large switch from ILs to CFLs is envisaged for the near future, a common concern is that there will be significant additional mercury in the waste stream at the end of lifetime of these CFLs. It should, however, be noted that also considerable amounts of mercury are released through coal-fired power generation, so the use of CFLs in certain countries with significant coal-fired power generation may actually reduce the release of mercury into the environment, in particular, when appropriate CFL disposal and recycling facilities are put in place such recycling facilities could then also be used for recycling and disposal of ordinary old-fashioned fluorescent lamps and tube lights that also contain mercury.

| **Product** | **Amount of Mercury** | **Number of Equivalent CFLs** |
|---|---|---|
| Compact fluorescent lamp | 5 mg | 1 |
| Watch battery | 25 mg | 5 |
| Dental amalgams | 500 mg | 100 |
| Home thermometer | 500 mg – 2 grams | 100 – 400 |
| Float switches in sump pumps | 2 grams | 400 |
| Tilt thermostat | 3 grams | 600 |
| Electrical tilt switches and relays | 3.5 grams | 700 |

**Table 3: Comparison of the Mercury Content in a CFL to other Household Items**

67. The presence of mercury in CFLs can be harmful to human health and the environment. UNEP Governing Council, in decision 24/3 IV, has set priorities for work on mercury, including the reduction of mercury supply, the reduction of mercury use and eventual storage of excess mercury. Given the goal of the UNEP Global Mercury Partnership to reduce, and where feasible eliminate anthropogenic releases of mercury, the Project will also aim to reduce the demand for mercury for lighting and lamps.

### *2.5 Stakeholder mapping and analysis*

68. There is a broad range of organizations involved in production, dissemination and usage of ESLs in Vietnam. They include Government, NGOs, and private sector companies. Consultations were made with a large number of stakeholders in formulating this project brief through meetings, and below are the descriptions of the roles of all possible stakeholders.

***Government Ministries/Agencies***

**Ministry of Natural Resources and Environment (MONRE)**

69. MONRE is a state management agency, supporting the Government in unified management of natural resources and environment nationwide including seven areas: land, mineral, water resources, environment, hydrometeorology, cartography, and sea and islands. In the field of environment, MONRE is responsible for the development of policies, strategies, standards, and plans on environment protection to submit to the Government for approval. The ministry has also the mandate to provide guidance, organize and monitor the implementation of policies and laws on the environmental protection. The areas of environmental protection include preventing and controlling the environmental pollution and degradation, conserving nature and biodiversity, and improving the environmental quality. The ministry has the mandate to manage Vietnam's Environmental Protection Fund and act as focal point of the GEF in Vietnam.

70. In the field of hydrometeorology, MONRE is the national focal point of climate change adaptation and mitigation. Its mandates include organizing the monitoring and assessment of climate change impacts on natural, human and socio-economic conditions, coordinating with relevant ministries, sectors and localities to suggest the proper recommendations, and submitting them to the appropriate authorities for approval. MONRE is the national focal agency to implement Kyoto Protocol and other international conventions relating to climate change and promotion of Clean Development Mechanism (CDM) projects.

***Role in the project implementation***

71. MONRE will partner with the UNEP and GEF in the implementation of the project. In the implementation process, MONRE will participate in awareness raising and development of policies and standards for CFLs and ESL products. MONRE will take the lead in developing technical guidelines on treatment/recycling of mercury in the ESLs and related products. It will also carry out the national impact studies on awareness and change of behavior at baseline, midterm and project completion. In addition to ISPONRE as executing agency, there are three departments under MONRE that will directly be involved in project implementation, i.e., the Vietnam Environment Administration (VEA), the Department of International Cooperation (DIC), and the Department of Planning (DOP).

**Institute of Strategy and Policy on Natural Resources and Environment (ISPONRE)**

72. ISPONRE belongs to MONRE and was established in 2006 with the following functions: to research socio-economic policies relating to natural resources and environment, to propose and develop strategies and policies in the areas of MONRE's mandate, to conduct science and technology researches, and to provide consultancy services and training courses on natural resource management and environmental protection[16]. ISPONRE is the national focal point of GEF as its director is the national coordinator. The institute also has to implement environmental projects improving the environment in the country. Until now, the institute has been implementing several projects such as Poverty and Environment Project (funded by UNDP and the Department for International Development - DFID), Livestock Waste Management in East Asia (funded by GEF through the World Bank [WB]), and Biodiversity Corridor (funded by the Asian Development Bank [ADB]).

***Role in the project implementation***

73. ISPONRE is executing partner and has the responsibility to manage and monitor implementation of the project. ISPONRE has experience in implementing projects funded by different donors such as GEF, WB, and UNDP. It has just completed the Poverty and Environment Project, and is fully aware of the procedures and mechanism of the National Execution Modality (NEX) applied by UN agencies. ISPONRE is also responsible for liaison

[16] Decision 1326/2008/QD-BTNMT

with the Vietnam GEF operational focal point with regard to monitoring and evaluating the project implementation process.

**Ministry of Industry and Trade (MOIT)**

74. MOIT was established in 2007 from the merging of two former ministries: the Ministry of Industry and the Ministry of Trade. MOIT has the functions and tasks of state management on industry and trade including the following energy-related fields[17]: electricity, new energy, renewable energy, and oil. In these fields the tasks of MOIT is to approve the electricity development master plans of provinces and cities, approve hydropower, new energy and renewable energy master plans, provide guidelines, and implement tasks on atomic electricity, new energy and renewable energy. MOIT is the one that develops national policies, strategy, master plan, and plans on energy to submit to the Prime Minister or National Assembly for adoption.

75. With regard to energy efficiency, MOIT is responsible for defining government policies on energy efficiency, as well as proposing a legislative framework for implementing energy efficiency regulations. MOIT includes DOE and DOST. DOE is responsible for the development of policies, and strategies on energy while DOST is responsible for the science, technology and environment aspects of MOIT.

***Role in the project implementation***

76. MOIT will take the lead in the development of ESL enhancing policy and roadmap/plan for phasing out the ILs. It will as well collaborate with the Ministry of Finance (MOF) to develop the financial incentive policies for manufacturers to transform production ILs to ESLs. It will partly participate in the information dissemination program, awareness raising, and study/research on the market of the ILs and ESLs in Vietnam. Under MOIT, OES, DOE, and DOST should be the three main stakeholders to participate in the development of energy saving, and transformation of ILs into ESLs. The Institute of Energy will also participate in the study of CFLs and ILs in the Vietnam market.

**Ministry of Science and Technology (MOST)**

77. MOST is a governmental agency which performs the function of state management of science and technology, covering scientific and technological activities, development of scientific and technological potential, intellectual property, standardization, measurement, and quality control, atomic energy, radiation and nuclear safety, and state management of public services in the domains under its management in accordance with the law[18].

78. Specifically, on the standard and quality management, MOST is mandated to: (i) manage the system of Vietnam's standards and technical regulations, (ii) evaluate and publicize national standards, (iii) to guide the elaboration and evaluation of national technical regulations, (iv) organize the elaboration of national standards and technical regulations in the domains under its management, and (v) to guide the application of international, regional and foreign standards in Vietnam. MOST is also responsible for: (i) guiding and managing the assessment of conformity with standards and technical regulations, and (ii) accrediting testing laboratories, calibration laboratories, conformity certification organizations and evaluation organizations. With such mandates, MOST is the government agency to develop EE standards for EE products.

[17] Decree 189/2007/ND-CP dated 27/12/2007
[18] Decree 28/2008/ND-CP dated 14/3/2008

***Role in the project implementation***

79. MOST will participate in capacity building with regard to QA/QC of ESLs, and according to this, relevant standards will be improved in line with regional and international standards. MOST will also participate in the development of a quality control system and the upgrade of a national laboratory testing capacity. Under MOST, the Vietnam Standards and Quality Institute (VSQI) and QUATEST 1 & 3, under the Directorate for Standards, Metrology and Quality (STAMEQ), are the agencies that will be partners and beneficiaries of the Project. The VSQI will directly participate in the standards development process while QUATEST 1 & 3 will be the laboratories for testing lighting products.

**Directorate for Standard, Measurement, and Quality (STAMEQ)**

80. STAMEQ is a subordinate organization of the MOST with function to help MOST implement state management on standards, measurement and quality. STAMEQ is the agency that develops national standards on energy efficiency and EE products. STAMEQ has also under its management the three national testing laboratories in the field of energy efficiency, i.e., Quatest 1, Quatest 2, and Quatest 3, which are located in Hanoi, Da Nang, and Ho Chi Minh City, respectively.

**Ministry of Finance (MOF)**

81. MOF will participate in the development of financial incentive policies to promote the transformation from ILs to ESLs production. Implementing partners under MOF are the Customs Administration , which will be engaged with the Green Customs program, and the Department of Tax Policy, which is responsible for the development of incentive fiscal tools.

**Ministry of Education and Training (MOET)**

82. MOET will participate in awareness raising activities mainly through the education system.

***Enterprises***

**Electricity of Vietnam (EVN)**

83. EVN is a state-owned enterprise[19] and has a multi-sectoral business operation with main business activity is production, trade of electricity, public communication and electrical mechanics. EVN has 11 member-companies of which 3 regional and 8 provincial companies. The production capacity of EVN in 2008 was 15,000 megawatt (MW) and in 2009 despite the delays in the start-up of several power plant projects, EVN managed to add 3,000 MW of new power generation capacity, taking the total to 18,000 MW. EVN will participate in the development and implementation of the national social marketing campaign and cooperate with MOIT and VLA in conducting the lighting market study, raising the awareness of the general population, and conducting pilot projects in the cities/provinces.

**Local Lighting Product Manufacturers**

84. Rang Dong and Dien Quang companies are the local manufacturers that will participate in technology transfer activities of the project technical support program. The two companies will be

[19] Decision 48/2006/QD-TTg

supported to transform production of ILs into production of ESLs. Business transformations plans and training courses on improvement of ESLs quality are the main outputs of this activity.

**Rang Dong Company**

85. Rang Dong is the biggest lighting-source producer in Vietnam. It used to be state-owned but has recently been privatized and it is now a joint-stock company. Its production capacity is 50 millions of ILs and 80 millions of fluorescent lamps per year. Realizing the importance of ESLs, however, the company has reduced production of ILs in 2008 to 30 million pieces and will reduce its production further to 20 million in 2010. The company also produces high-pressure lamps with capacity 350,000-400,000 pieces a year. The company has a distribution network of 6,000 retailer shops nationwide and a testing laboratory conformed with ISO 17025 standard. The company needs support to transform ILs production into ESLs production, fluorescent T10 to T8 or T5 and changing from electromagnetic ballast into electronic ballast. Production of LED to replace FLs is also a strategy in the future.

**Dien Quang Company**

86. Dien Quang is the second largest lighting manufacturing company, located in Ho Chi Minh City. It also used to be state-owned but was privatized in 2005. Annually, the company produces 24 millions fluorescent lamps, 8.4 millions compact lamps, electronic ballast and 8.4 million ILs. The company has recently invested in a production line of compact lamp and is now investigating possibilities of producing LED lamps. The company has recognized the importance and the tendency of shifting to CFLs production and has aligned his vision that way. It also participated actively in awareness raising campaign promoting usage of CFLs.

***Other stakeholders***

**Vietnam Lighting Association (VLA)**

87. There are more than 15 companies in the lighting business participating in this association. Some of them are big like Rang Dong, Phillips, Osram, Dien Quang and Hanoi Public Lighting Company (Hapulico). The association was developed to build up a network, sharing information, conducting study and survey on the lighting market.

**National Television (VTV2)**

88. VTV2 program, together with EVN, will participate mainly in the ESLs lighting information dissemination and awareness raising program.

**Non-Government Organizations (NGOs) and other related organizations**

89. NGOs will be involved in the public awareness campaign and information dissemination activities of the project. Organizations (such as universities and research institutes) will participate in providing comments and consultation during the project implementation via workshops and consultation conferences.

90. At a global level the Project is also expected to interact with the following stakeholders and parties.

- UNEP (UNEP/DTIE, UNEP Global Mercury Partnership, Secretariat of the Basel Convention, "Global Market Transformation for Efficient Lighting" project)
- UNDP
- WB
- IEA
- National lighting associations operating in the various geographic zones
- The Renewable Energy & Energy Efficiency Partnership's (REEEP)
- The International Partnership for Energy Efficiency Cooperation
- The Alliance to Save Energy
- The Collaborative Labelling Appliance Standards Programme (CLASP)
- International and regional harmonization institutes and organisations such as IEC and the Pan-American Standards Commission (COPANT)
- Bilateral donors involved in lighting and their specific projects such as USAID for Asia and GTZ for India.

91. All these stakeholders and parties will be involved in further project implementation by using appropriate mechanisms and channels. While direct consultations, specific workshops and associated public awareness raising and training are envisaged to be the main channels for the involvement of institutional stakeholders, the broader consumer surveys and public media are expected to be more applicable for reflecting the views of individual consumers.

92. A number of relevant international and regional entities, which have been involved in supporting lighting activities in different countries, have been listed by the project team. Close co-operation with these entities will be sought both in terms of exchanging the experiences and lessons learnt as well as at the level of joint activities and possible cost sharing.

### *2.6 Baseline analysis and gaps*

93. The main characteristics of the present situation are (i) low level of political commitment and weak coordination of international efforts to phase-out inefficient lighting, and (ii) less efficient technical backstopping and weak exchange of information and learning between different countries for improving product quality of ESLs. The development of the ESL market is therefore not reaching its full potential in reducing GHG emissions and producing other economic and domestic benefits. In the absence of the suggested strategic initiative to stimulate the ESL market and to remove the related barriers simultaneously in several countries, the global ESL market development will not reach the level that it should on the basis of the technical maturity and cost-efficiency of the ESL technologies.

### *2.7 Linkages with other GEF and non-GEF interventions*

94. The Project is in line with, and in support of, the renewed GEF vision: strategy, innovation, equity, accessibility, and focus. This program proposed here also relies on a strong public-private partnership. This initiative is consistent with the GEF Climate Change Strategy and the Strategic Program of Promoting Energy Efficiency in Buildings, as lighting is major, omnipresent electricity-consuming equipment in all buildings. The Project will be properly coordinated with the GEF-financed and UNEP-executed "Global Market Transformation for Efficient Lighting" project (the global lighting project). In particular, the global lighting project will facilitate the establishment of methodologies for the development of labeling procedures and quality certification; the identification of appropriate policy options for phasing out ILs and introducing latest technology ESLs; and the development of financing mechanisms, appropriate standards, and detailed environmental safeguards under the project. Vietnam will also be able to

learn from the experiences and actions taken in other countries that were at a similar stage of market transformation for ESL products as Vietnam is at present.

95. The Project takes a programmatic approach, and will involve major stakeholders, including policy makers, the industry and consumers. The GEF experience as a network and partnership instrument to cope with global climate change issues is likely to be expanded from the envisaged market transformation, focused on a global phase-out of incandescent lighting, both in production and use. The GEF initiative will contribute to the G8+5 initiative on energy efficiency, and could become one of its most visible and pragmatic component. Under the leadership of the GEF, phasing-out incandescent lighting could also be embraced by the Conference of the Parties (COP)/Meeting of the Parties (MOPs) of the United Nations Convention on Climate Change (UNFCCC). Within UNFCCC, the CDM Executive Board could facilitate specific transformation of some national lighting markets, using the recently approved CDM framework.

96. UNDP and GEF are also supporting the ongoing Vietnam Energy Efficiency in Public Lighting Program (VEELP), which aims at improving the lighting levels and quality of public lighting whilst also reducing public lighting demand growth through improvements in light sources, controls and fixtures including policy development, technical support, and financing and demonstration programs, mainly in larger public sector entities and applications. However, since the focus of the VEELP project on public sector and cities there is no significant duplication between VEELP and the proposed UNEP/GEF project as the types of lamps required under each project are very different as are the target populations, i.e., local governments and individuals/households, respectively.

97. The following represents a range of international initiatives aimed at transformation of lighting markets. The means available to transform lighting market are diverse and can be suitable to any context given proper market studies.

***Standards and labels***

**CFL Harmonization**

98. Governments worldwide have called for increased international co-operation on policy to encourage more environmentally sustainable, EE products. As the marketplace for goods and services becomes increasingly global, so is the need to ensure co-operation in the development of policy roadmaps, labels and standards. The most fundamental activity pertaining to harmonization is the International Compact Fluorescent Lamp (CFL) Harmonization Initiative launched at RightLight6 in Shanghai (May 2005). It is aimed at increasing the availability of higher quality, EE compact fluorescent lamps around the world through cooperation on testing and standard setting. More precisely, the Initiative revised the IEC test procedure, conducted round robin testing on five continents using the reviewed test, initiated a dialogue on setting performance tiers and drafted a framework for compliance[20].

99. Regionally, the GEF is supporting the "Barrier Removal to the Cost Effective Development and Implementation of Energy Efficiency Standards and Labeling Project" (BRSEL) in Asia with a budget of US$ 8 Million. This project focuses on regional Energy Efficiency Standards and Labeling program cooperation and harmonization with provision for general information, tools and training to all interested developing countries in the region. CFLs and electronic ballast are among the targeted products.

[20] More information is available at the following address: http://www.apec-esis.org/www/cfl/

100. In Asia, there have been considerable steps taken towards a greater harmonization of CFL products. The Asia CFL Quality Charter is among the most significant initiatives of the kind and any global CFL harmonization initiative should try to build on this experience and work in synergy with it. The Charter aims at avoiding potentially disastrous policy failures: in fact, while governments are committed to the phasing-out of incandescent light bulbs, they generally fail to recognize that the available alternatives (CFLs) sometimes are of very low quality and could ruin consumer confidence in CFLs. With over 41 standards and labels worldwide, each with different requirements, avoiding the mentioned policy failures requires harmonization of these standards, labels and minimum performance requirements.

**Eco-design of Energy Using Products (EuPs)**

101. The Framework Directive for the Eco-design of EuPs provides a framework for establishing minimum eco-design requirements for energy using products. It is intended to help deliver European Union (EU) objectives to reduce greenhouse gas emissions, to reduce the adverse environmental impacts of products, and to ensure free-trade in energy-using products. A series of products are being evaluated through Preparatory Studies. These studies are intended to provide the Commission and the product Consultation Forum with the evidence available to allow them to assess whether a product should be considered for an implementing measure. Current studies are related to work on domestic lighting, office lighting and street lighting products. Future preparatory studies are expected to include industrial lighting. Residential lighting will be included, and it is likely that there will be an implementing measure for residential lighting. This could include the mandatory phase out of low efficacy lamps.

**Efficient Lighting Initiative (ELI)**

102. Advances in lighting technology have created a variety of new products which promise significant economic and environmental benefits from large increases in energy efficiency compared to conventional lighting products. In many developing countries, these new, efficient lighting products still face significant barriers to wide-spread acceptance. During the period 2000 through 2003, the International Finance Corporation (IFC) established a multi-country Efficient Lighting Initiative (ELI) using US$15 million of GEF funds to support private sector activities and promote market expansion for EE lighting in a selected set of GEF-eligible countries, namely, Argentina, Czech Republic, Hungary, Latvia, Peru, Philippines, and South Africa.

103. ELI was built upon lessons learned in the IFC/GEF Poland Efficient Lighting Project (PELP) and other efficient lighting projects to significantly accelerate the penetration of EE lighting technologies. A key program objective was to mobilize additional private sector resources. The original ELI program has five components: (i) efficient product financial incentives; (ii) public education programs; (iii) transaction support; (iv) market aggregation; and (v) electric utility programs.

104. In 2005, the China Standard Certification Center (CSC) was commissioned by the IFC, with funding to develop and expand the ELI certification and branding system globally. The new, expanded ELI Program is an extension of assistance from a team of international experts from the original ELI seven countries, and will continue to work in cooperation with government agencies, international organizations, manufacturers, testing laboratories, lighting associations, large retailers and other agencies, etc. to accelerate the widespread adoption of energy-efficient lighting products and thereby reduce greenhouse gas emissions.

105. The ELI Quality Certification Institute is seeking strategic partnerships worldwide, and is working to establish ELI as a global service network. In 2008, ELI has focused on the developing countries of Asia/Asia Pacific, Latin America, and Africa and also seeks opportunities to

harmonize its test methods and performance specifications with other voluntary labeling programs internationally.

**Energy Star**

106. Energy Star is a United States government's Environmental Protection Agency (EPA) program to promote EE consumer products. It began as a voluntary labeling program designed to identify and promote EE products, and computer products were the first to be labeled, though it has since expanded to major appliances, office equipment, lighting, home electronics, and more. The label can also be found on some new homes and commercial and industrial buildings.

107. The international Energy Star symbol is a simple way for consumers to identify products that are among the most energy-efficient on the market. Only manufacturers and retailers whose products meet the Energy Star criteria can label their products with this symbol. Choosing an Energy Star-labeled product over a conventional model could save hundreds of dollars in energy costs.

108. Energy Star has been instrumental in the more widespread use of LED traffic lights and the wider adoption of CFLs. The energy saved through the adoption of Energy Star qualified residential and commercial lighting products, reported in their 2006 Annual Report, was 13 billion kWh. Energy Star has now been adopted by several countries around the world, including the EU, Canada, Australia and New Zealand[21]. Lighting, however, is not covered by this label in the EU.

**Energy Saving Trust's Specification**

109. Under the UK Energy Saving Trust's (EST) Energy Saving Recommended (ESR)[22] scheme only products that meet strict criteria on energy efficiency and independently tested by an independent accredited testing body can carry the logo. Along with their energy consumption, the criteria for light bulbs cover how long they should last, start-up time, quality of light, packaging information and safety. The criteria are reviewed on a regular basis and the standards are constantly being raised to make sure that energy-saving bulbs keep on improving in terms of efficiency and performance. The specifications for ESR accreditation for CFLs are high and similar to the Energy Star level. A recent review of this label increased the expected lifespan of light bulbs significantly.

**Eco-labeling**

110. Eco labeling schemes are growing in popularity. Since there are a huge variety of these, they are presented in the table below with basic information. These "eco label" schemes incorporate environmental performance and impact criteria for lighting products.

**Best Practice Initiatives**

111. Standards and labels are a powerful tool to enhance overall energy efficiency of devices and products. In fact, securing a certification for products (in the case of labels) has increasingly been regarded as a commercial strategy by both manufacturers and retailers. However, labels and standards can require frequent updates as the market evolves. For instance, Energy Star ratings are periodically reviewed as to limit the number of devices and products in the upper end of the efficiency spectrum.

112. Some best practice initiatives palliate to that need in being a *dynamic* recognition system for the most performing products. This is the case of the Top Ten initiative in Europe. As can be

[21] http://oee.nrcan.gc.ca/energystar/english/consumers/index.cfm /; http://www.energystar.gov.au/; http://www.eeca.govt.nz/

[22] http://www.energysavingtrust.org.uk/energy_saving_products/about_energy_saving_recommended_products

deduced from the name of the initiative, the Top Ten classification lists the top ten EE devices and products in each category. The classification is thus inherently competitive as new products can automatically be included in the Top Ten ranking, pushing out the lower-end EE devices. This scheme provides incentives to any manufacturer to carry on continuous improvement of its products.

***Global Phase Out of Low EE Lamps***

113. As mentioned above, the Eco-design of EuPs of the EU includes a phasing out scheme. As of October 2008, the European Commission suggests a staged approach from 2009 to 2013, now supported by the lighting industry.

- **Stage 1 (October 2009):** phase-out of ILs of 100W, 75W and 60W. Less energy-efficient products remain for clear lamps non-clear lamps and halogen-specific fixtures.
- **Stage 2 (October 2011):** phase-out of all remaining ILs of 40W and 25W. Less energy-efficient products remain for clear lamps, only class A (EE) non-clear lamps remain and less energy-efficient bulbs for halogen-specific purposes remain.
- **Stage 3 (October 2013):** depending on the energy efficiency ambition level of the initiative (five options considered), the level of the energy efficiency requirements will be brought to a maximum under the planned option. At the end of this stage, for instance, CFL might be the only bulbs allowed in their category while some other lighting products with very specific usage might be tolerated in less energy-efficient versions.

**OECD countries**

114. Since early 2007 almost all Organization for Economic Co-operation and Development (OECD) governments have begun developing policies aimed at phasing-out low efficacy lighting. The intention is to encourage the usage of higher efficiency lamps and most notably CFLs. The result is a strong probability that the majority of ILs will be prohibited from sale within the OECD countries in the 2008 to 2016 timeframe. Globally, OECD economies account for approximately 50% of global incandescent lamp sales of between 12 and 13 billion lamps per annum. Regulatory, fiscal and voluntary measures to phase-out ILs are in place or under development in Australia, Canada, the EU (including separate national initiatives in Belgium, Ireland, the Netherlands, Portugal, and the UK), Switzerland and the United States.

**Latin America**

115. Cuba and Venezuela have implemented regulatory measures to phase-out ILs within their borders. Brazil is already using as many CFLs as ILs and has benefited from substantial sustained electricity savings as a result.

**Asia**

116. Indonesia, Vietnam, India, South Africa, Thailand and the Philippines have set up promotional programs for CFL, in substitution of ILs. China currently consumes roughly 2 billion ILs and is also the dominant producer of CFLs for the global market, with over 80% of all CFLs manufactured there, including most of those sourced to OECD markets through the major lamp manufacturers. The Chinese government and lighting industry is currently evaluating the pros and cons of an accelerated phase-out of ILs in China as well as of the probable cumulative impact of the international regulations on the global lamp market and in particular the demand for CFLs.

117. The unprecedented rapidity of these international policy developments is of such a scale that it could pose a risk for the security of supply of CFLs in the international market. Depending

on the timing and ambition of policy settings and the lamp production investment decisions taken in response to these, there is a real risk of shortages of lamps of appropriate quality, which is liable to seriously undermine public confidence in energy efficiency and greenhouse gas abatement efforts in general. In response to this concern, IEA has launched a study into the global supply of CFLs under various phase-out scenarios. Funded initially by Canada, the UK, and the large lamp manufacturers, the study should report its findings in the following months. ITFSP will be taking a keen interest in the study and its outcome. For an overview of global phase out initiatives, see CLASP's article: "A Global Movement toward Phasing out Energy Inefficient Light Bulbs"[23] .

**Box 2: Examples of market transformation initiatives**

**A) The Philippines Efficient Lighting Market Transformation Project**: The project addresses the barriers to widespread utilization of EE lighting systems (EELs) in the Philippines. It will cover EE versions of linear fluorescent lamps (standard vs. the slim tubes), CFLs, high intensity discharge (HID) lamps, ballasts (low loss electromagnetic and electronic), and luminaries. The Project will accelerate integration of EEL programs to the planned activities of the Department of Energy, enhance private sector's involvement and appreciation of the benefits of EEL and ensure that environmental impacts associated with the use of EELs are mitigated. The project will achieve its objectives by: updating of policies, standards/guidelines; institutional capacity building; consumer education and information dissemination; developing and implementing financing mechanisms; and, mitigating environmental impacts of the project
.
http://cdmdna.emb.gov.ph/cdm/public/cdm-ph-initiatives.php?main=cdmph&sub=initiatives#B

**B) Australian Phase-out of inefficient incandescent light bulbs:** The first stage of the phase-out plan will be the introduction of an import restriction on inefficient incandescent light bulbs used for general lighting purposes from November this year, as was announced on 5 June 2008. The savings to the environment and the economy which the initiative will generate are considerable. Across the country, the move to more efficient lighting, such as CFLs, is expected to save more than four terawatt hours of electricity, up to four million tons of greenhouse gas emissions (equivalent to one million cars off the road) and more than US$400 million per year (saving more than US$50 per year per household).

http://www.environment.gov.au/settlements/energyefficiency/lighting.html

***Developing new markets for efficient lighting products***

**Lighting Africa**

118. This program is a World Bank Group initiative aimed at providing up to 250 million people in Sub-Saharan Africa with access to non-fossil fuel based, low cost, safe, and reliable lighting products with associated basic energy services by the year 2030. The program basically

[23] http://www.clasponline.org/clasp.online.whatnew.php?no=517

consists in a competition for the design and delivery of adapted lighting products targeting low income consumers. It is thus aimed at the sustainable development of the energy-efficient lighting products addressing the needs of poorer populations, with limited or no access to an electricity grid.

**EE light bulbs program in India**

119. The Indo-German Energy Program carried out by GTZ and the Indian Bureau of Energy Efficiency (BEE), and funded by the German Federal Ministry for Economic Cooperation and Development (BMZ), is disseminating up to 400 million energy-efficient light bulbs to private households all over the country over five years. This should reduce the electricity demand by a total of about 10,000 MW. However, modern CFLs are ten times more expensive than conventional bulbs. To make the energy-efficient CFLs affordable for all Indian households, GTZ is assisting the BEE in registering the project under the CDM of the UNFCCC.

120. By applying to a special CDM category – a "Program of Activities" (PoA) – it becomes possible to 'bundle' the emissions from about 100 small-scale CFL projects under one organizational umbrella. The PoA is particularly relevant for development projects because it allows the bundling of reductions from many small actions. The BEE and GTZ hope to realize a potential $CO_2$ reduction equivalent of 10 million tons annually, which will generate 10 million certified emissions reductions (CER). Revenues from the CERs will help cover the investment costs of €1.4 million per million CFL bulbs. GTZ is currently drafting the PoA and designing a rigorous monitoring plan for this complex CDM project; the next step will be to obtain clearance from the CDM board.

- **New GEF market transformation and phasing-out initiatives:** In a decision rendered in July 2008, the GEF has approved two projects related to market transformation and phasing-out of incandescent light bulbs. These two initiatives target the Chinese and Russian markets.

- **China:** Phasing-out Incandescent Lamps and Energy Saving Lamps Promotion (PILESLAMP), in collaboration with UNDP. GEF project grant: $14 million.

- **Russian Federation:** Transforming the Market for Efficient Lighting, in collaboration with UNDP. GEF project grant: $7.02 million.

***Relationship with other Projects (GEF and non GEF)***

121. The Project is structured to maintain links with other ongoing and future projects in the domain via the permanent global platform that will be established. National lighting programs as well as international donor-financed programs (such as the World Bank Efficient Lighting Initiative) will be key points of reference in order to build up their experience and avoid the unnecessary duplication of effort. Special attention will be given to the UNDP implemented China lighting project starting implementation simultaneously due to the weight of China as supplier and consumer in the global lighting market.

**Box 3: World Bank Efficient Lighting**

Over the past few years, the World Bank has stepped up its efforts to provide support, to developing countries, with designing and implementing EE lighting-based demand-side management (DSM) programs. The implementation approach builds upon the experience and best practices of

IFC and the Bank led work in late 1990s, largely with GEF support, in developing large scale energy-efficient lighting programs in Thailand, Mexico, Poland, Philippines etc. that led to the establishment of the Efficient Lighting Initiative-ELI. (www.efficientlighting.net). The primary objective and impact of the CFL-based DSM programs has been to address power shortages through peak load reduction, though such programs also have other developmental benefits. Their application can helps mitigate the impacts of tariff increases to end users, as higher tariffs are offset by energy and bill savings. These programs can allow electric utilities to improve the reliability of supply in a more cost effective manner than supply-side improvements alone, since the cost of energy saved through CFLs is estimated to be only 1/20th of cost of adding new generation capacity (such as diesel based power supply). They can also be used to reduce utility losses where for social reasons tariffs may be unable to sufficiently recover supply costs. In addition, deployment of CFLs in place of conventional ICs, results in reduction of air pollutants and global greenhouse gases (GHGs) associated with grid energy generation. The latter provides the opportunity to mainstream Clean Development Mechanism (CDM) into CFL projects and obtain carbon credits.4 In addition to CDM, some CFL programs have benefited from GEF program support even in recent years (e.g., Russia, China programs endorsed by GEF in 2008).

(Source: ESMAP Energy-Efficient Lighting Operational Toolkit - Terms of Reference, Sep. 2008)

***Past and On-going Energy Conservation and Efficiency Usage (EC&EU) Programs in Vietnam***

122. The main activities for EC&EU in the industrial sector are human resource development, energy audit and introduction of high-efficiency equipment. So far, programs on establishment of legal system and human resource development are mainly implemented, but those on development of energy management models and financial support have not been implemented yet because these programs are still in the initial stage. Improvement of lighting efficiency is a very important approach to cut down peak demand for electricity in the evening. Two campaigns for dissemination of CFLs and tubular fluorescent light (TFL) in household and other sectors have been implemented. Recently, a program which focuses on dissemination of high-efficiency home electric appliances in the household sector has been implemented with support from Japan. International aid agencies contribute in the fields of establishment of legal system, human resource development, dissemination of high-efficiency equipment, and energy audit. WB and GEF are taking the lead in promoting EE&C as a countermeasure to rapid increase in energy demand and $CO_2$ emissions in Vietnam. Figure 9 below presents the general picture of EC&EU programs undertaken in Vietnam.

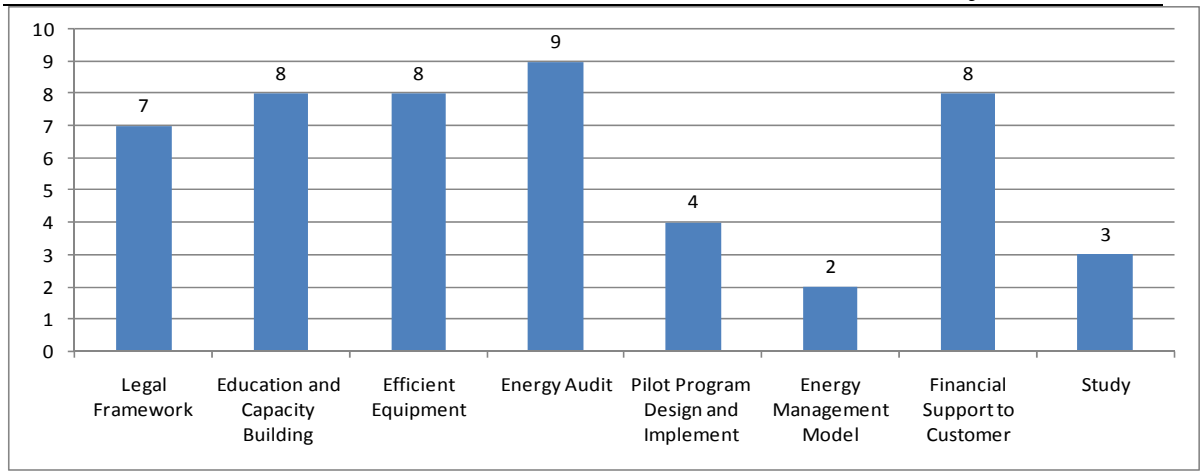



**Figure 9: Number of EC&EU Programs by Content**

123. The National Strategic Program on EC&EU also plays a successful role in achieving targets of EC&EU for sustainable development based on development plans by local governments, particularly in Hanoi and Ho Chi Minh City. Aid agencies of Japan are strengthening the support to the field of EE&C in Vietnam. Regarding programs such as the establishment of legal system and human resource development, it is not easy to evaluate quantitatively the effects on energy savings, reduction of peak demand, reduction in $CO_2$ emissions, etc. Some programs, however, seem directly to contribute to these reductions.

### *3.1. Project rationale, policy conformity and expected global environmental benefits*

124. Vietnam is a densely populated developing country located in the Southeast Asian region. Its rapid economic growth has contributed to progress in improving its overall human development index, particularly in education, health, and increased standard of living. Actually, according to the UNDP human development index study in 2007/2008, the HDI for Vietnam is 0.725, which gives the country a rank of 105 out of 177 countries.

125. The United Nations Development Assistance Framework (UNDAF)[24] for Vietnam noted that since the adoption of the policy of Doi Moi (renovation) in 1986, GoV's long-term economic objective has been to industrialize and modernize so to move from an economy dominated by agriculture toward newly industrialized economy. Vietnam experienced strong economic growth during the early and mid-nineties, but growth slowed significantly at the end of the last decade. However, more recently, GDP growth has again begun to increase to 6.8%, in 2001, and 7.04% in 2002, straining the national infrastructure in general and energy supply in particular.

126. The Project is an example of national efforts to promote EE lighting by phasing out the use of ILs. CFLs are considered as an important technology for saving energy and addressing climate change by mitigating emissions of greenhouse gases. The project intervention area will cover the whole country.


**Figure 10: Map of Vietnam**

(Source: http://www.lonelyplanet.com/maps/asia/vietnam/)

127. The Project is important for the region as many Asian countries are actively promoting CFLs through market transformation. In June 2008, the world's largest lighting companies signed an agreement to eliminate substandard poor quality ESLs from the Asian market. Under this agreement, which is named the Manila Compact, lighting suppliers have committed to develop common performance levels to rate the quality of CFLs sold in Asia, introduce a product marking system, and establish an on-line regional database that identifies CFLs that meet quality standards. There is now a wealth of experience with the promotion of CFLs in Asia, and there is

[24] http://www.undg.org/archive_docs/1166-Vietnam_UNDAF_-_Vietnam_1998-2000.pdf

much that can be learned through the increased sharing of experiences and best practices for the success of the phasing-out of ILs in Vietnam.

***Electricity Tariff***

128. Vietnam has a uniform retail electricity tariff, which applies across the country (in the case of rural areas where their power grids are managed by local communes, electricity tariff sold to the local commune is the same as a uniform tariff, but electricity tariff provided by local communes for end-users is higher since local communes add their costs on the uniform tariff). This uniform tariff is basically adopting a pay-as-you-go system, with rates varying by voltage levels and consumer types, and offering time-of-day rates for major customers. Among various customer categories, the residential use of the first 100 kWh (550 VND/kWh, (=3.4 US cents/kWh), VAT excluded) is cross-subsidized by higher tariff for the industry and commerce.

129. In 2005, the average unit rate of electricity sales was VND 789/kWh (=4.9 US cents/kWh). Foreseeing the need for enormous capital for power infrastructure development in the coming years, it is inevitable to raise the tariff in order to secure financing of EVN and attract private capital of domestic and foreign developers. Power Sector Development Strategy has stated, "Continue carrying out electricity tariff reform according to the roadmap which was approved by increasing tariff towards long run marginal cost of electricity generation and transmission and reforming tariff schedules". In addition, cross-subsidy from industrial and commercial uses to residential use will decrease in the future. Since March 1, 2009, the electricity tariff has been revised upward.

***Rural Electrification***

130. Vietnam has adopted a unique approach to improve the access to electricity in rural and remote areas. In fact, seven regional power companies in charge of power transmission and distribution (less than 110kV) have provided for these areas a medium voltage connection to commune centers, and local communes have taken responsibilities for installing and operating the low voltage networks. This approach has enabled Vietnam to increase the household electrification rate from 51% in 1995 to over 94% in 2008.

***Policy Context***

131. Vietnam has developed legal framework on conservation and energy saving. This frame work includes environmental policies from one side, and energy policies from the other side. Environmental policies are dealing with pollution and greenhouse gas emissions, and they are to promote usage of renewable and clean energy. Energy policies are to enhance savings and efficient uses of energy.

132. In summary, energy-efficient lighting products are economic, commercially viable and available technologies, which due to the different market barriers, however, have not reached the market penetration rate that it could reach on simply economic grounds. Policy makers in many countries have long understood these difficulties and have been implementing measures directly aimed at the surpassing of these barriers since the 1970s. Moreover, these measures have resulted in impressive returns. In cumulative terms the policies implemented since 1990 saved almost 8% (2 960 TWh) of cumulative lighting electricity consumption to 2005 and 1,670 Mt of $CO_2$ emissions; they are also forecasted to save another 14,500 TWh and 8,500 Mt of $CO_2$ (17% of the total) from 2006 to 2030 without being strengthened. In addition they have been remarkably cost-effective in avoiding net costs of US$253 billion by 2005 and are on course to save US$1.5 trillion by 2030.

133. Governments have a key role to play in accelerating the adoption of energy-efficient lighting.They can set standards to prohibit the sale of the least efficient lighting technologies where high-efficiency, good-quality and cost-effective alternatives exist.They can institute regulations applying to the energy performance and quality of lighting systems installed in major applications: commercial buildings, new residential construction, outdoor lighting, industrial lighting and vehicle lighting. They can help develop innovative financing and fiscal schemes to overcome first-cost barriers and provide information and training to lighting specifiers, designers and installers. They can educate the public at large about the benefits of efficient lighting.They can ensure that the energy costs and performance of lighting are visible in the market by labelling the energy performance of equipment and certifying the performance of entire light-using systems such as buildings and outdoor lighting. They can encourage better building design with more effective use of daylight through education, training and incentives.They can lead by example through pioneering efficient-lighting technologies and practices in their own buildings and by setting appropriately ambitious targets. And they can establish programmes and provide support to bring more sustainable, affordable and high-quality lighting to the world's light-poor.

134. All these measures will bring results but need careful design and targeting. They also need to be ambitious, broadly based and effectively implemented to realise their potential. Many governments have found that comprehensive and broad-ranging programmes with a clearly defined mandate and adequate resources enable the most effective response. While some leading countries have undertaken lighting energy efficiency measures, the global potential is untapped. Furthermore, as some of the more broad-based programmes are novelties, there are only scarce reports of their effectiveness. Given the strong synergy between lighting industries, private sector actors and public agencies towards a more EE lighting future (as illustrated by recent commitments by the EU and Australia, among others), there is arguably no counter-indication to further promotion and implementation of lighting policies and measures.

135. ILs have been used since the 19$^{th}$ century and still have an energy-to-light conversion efficiency of 5%, which is five times lower than that of equivalent good-quality CFLs. A replacement of inefficient ILs by CFLs would alone cut world lighting electricity demand by 18%, without any depreciation of lighting quality. In the service sector, the use of high-efficiency ballasts, slimmer fluorescent tubes with efficient phosphors and highquality luminaires produces savings that are just as impressive.

136. For street and industrial lighting there are great savings to be gathered from discontinuing the use of inefficient mercury vapour lamps and low-efficiency ballasts in favour of higher-efficiency alternatives. The waste of light can also be readily reduced by the use of time-scheduled switching, occupancy sensors and daylight-responsive dimming technologies, all of which are mature and fully proven techniques with high savings returns.

137. GEF's global lighting project is expected to take significant actions on global level to transform the market of efficient lighting with three inter-related objectives: (i) to promote high performance, EE lighting technologies; (ii) to phase out inefficient, incandescent lights; and (iii) to substitute traditional fuel-based lighting with modern, efficient alternatives, including the promotion of EE mercury free alternatives. The project consists of three elements, including (i) a global program (this proposal); (ii) country and regional projects; and (iii) public-private partnerships. It will draw upon past GEF-funded projects in the domain and will be coordinated with other global, regional and national initiatives related to the promotion and market transformation towards efficient lighting.

138. The Project will serve as a platform to build synergy among global stakeholders, share knowledge and information, create policy and regulatory frameworks, address technical and

quality issues, assist public-private partnerships and support country programs. Even in countries with established energy efficiency goals and policies, national taxation and industrial policies and regulatory practices often pose barriers for accelerated penetration of EE lighting.

139. Governments and other stakeholders have expressed concern about mercury use in CFLs, hence the issue of finding policies to address this issue would be high on priority. Consideration shall be given to setting up lamp recycling infrastructure and final disposal past CFL life.

140. Utility-based energy efficiency lighting programmes may require an adequate regulatory framework to recover the costs of these lamps through normal utility collection mechanism, with the ability to cut services in case of non-payment. The Project will also seek to transfer new or established methodologies for monitoring and verification of the electricity and cost savings associated with EE lighting retrofits. Such methodologies exist at international level and are key in promoting viable commercial financing arrangements for private energy service companies (ESCOs).

### *3.2. Project Goal and Objective*

141. The goal of the Project is to speed up the transformation of the market for environmentally sustainable efficient lighting technologies in the emerging markets of developing countries. The program aims to accelerate the phase-out of incandescent bulbs by removing the market barriers to energy-efficient lighting, promote development of mercury free technologies and thereby reducing global greenhouse gas emissions as well as mercury releases. The objective is to create locally or regionally an institutional/legal/financial/technical environment that is in favor of energy-efficient lighting through the promotion of high-performance and environmentally sustainable new technologies such as mercury free CFLs and the phase-out of inefficient, ILs. The project will (i) work in close partnership with highly qualified experts specialized in energy efficiency and lighting, (ii) provide a global "open space" for exchange and communication in between all the stakeholders and (iii) provide support to the implementation of adapted country programs, expanding in this way the market transformation mechanisms in a large majority of developing countries.

142. The GEF implementing agency for the Project is the United Nations Environment Program (UNEP). In a complementary way, UNEP and other GEF agencies will develop specific efficient lighting projects at regional and national level under the guidance of the present global approach, in close partnership with the private lighting industry from OECD, emerging and developing countries, building upon the existing related activities supported not only by the GEF but also by other financing agencies. The Project will therefore serve as an "umbrella" under which further national projects in various Southeast Asian countries will be undertaken.

143. By building on experiences and lessons learned from various international initiatives and an initial market assessment of the targeted countries that have expressed interest in participating in the project, the concrete objective of the Project is to support to Vietnam in the development of a local EE lighting industry and business.

144. The Project will seek to achieve this concrete objective by:

- **supporting** the establishment of an enabling national policy framework that would allow the sustainable development of a energy-efficient lighting market, including regulations, financial and/or fiscal incentives and/or voluntary or mandatory quality control, certification and labeling schemes;

- **enhancing** the awareness of decision-makers and market actors on the benefit of EE lighting products for meeting the energy climate change challenges and on the benefits of mercury free alternatives ;
- **increasing** consumer access to information through technical support provided to GEF or non-GEF EE lighting projects
- **building** the capacity of the EE lighting supply chain, including training and certification of local manufacturers and traders; and
- **facilitating** global information exchange and networking to learn about the experiences, results, lessons learned and best practices in other countries or initiatives.

145. The Project, which has been approved by GoV, is considered as a GEF alternative, seeks to transform the existing lighting industry in Vietnam towards high-quality CFL products that will in turn lead to the reduction of electricity demand and the associated greenhouse gas (GHG) emissions from electricity production. It will also pave the way for the promotion and near term introduction of Light Emitting Diode (LED) technology in the various sectors of the economy.
The Project will phase out incandescent bulbs, thereby reducing greenhouse gas emissions from the lighting sector by accelerating commercialization and sustainable market transformation of EE lighting technologies in Vietnam.

146. To meet the above-mentioned overall goal, the Project is structured around four components, which include: (i) Local Lighting Industry Capacity Enhancement Program, (ii) Improved QA/QC Framework, (iii) ESL Market Transformation and Consumer Education and Awareness, and (iv) National Policy and Institutional Support Program towards Phasing-out of Incandescent Lamps and Promotion of ESLs.

### *3.3 Project Components and Expected Results*

**Project components**

147. The Project consists of activities, which aim at facilitating the widespread adoption of energy-saving lighting products, improving the Vietnamese energy-efficient lighting products market, and working towards the phasing-out of ILs. The Project has four specific, components with activities that are designed to meet the objective of the Project.

Component 1: Local Lighting Industry Capacity Enhancement Program

148. This component is designed to put the national market in the right direction for integration with the maturing global market. The outputs under this component include:

Output 1.1: Market research on the current status of the ESL and IL markets in Vietnam:

- A detailed market study will be undertaken at the commencement of the Project to collect information on lamps from the general population, local manufacturers, custom administrators, and consumer preferences. The study will provide the project with a baseline on Vietnam lamps data, including ILs and ESLs. This activity is envisaged to be managed by the Institute of Energy (IE), which has managed similar studies in the past and has good contacts with manufacturers. The Vietnam Light Association (VLA) and MOIT will be the key stakeholders for providing production and market information. Furthermore, custom administrator will provide information on lamp importation and possibly an estimate of illegal imports.

Output 1.2: Technical aids on ESLs and conversion of IL production lines to quality ESLs:

- International and local experts will be made available to help the IL manufacturers to assess how they could convert their IL production line to ESL. Based on his

assessment, the expert will then provide four workshops, two in Hanoi and two in Ho Chi Minh to cover the major industrial regions of the country.

Output 1.3: Training courses on quality ESL production:

- International and local experts will be made available to ESL manufacturers to analyze their products quality and assess how they could raise it within a marketable price. Based on their assessment, the experts will then provide training courses to local manufacturers under two workshops, one in Hanoi and one in Ho Chi Minh city. Local manufacturers were consulted and agreed to such training during the PPG. Each workshop is expected to be attended by a minimum of 30 participants and the manufacturers will make the facilities required for the workshops available as well as provide other support in-kind such as food and drinks.

Output 1.4: Business transformation plans agreed for 2 to 4 ESL products for two main manufacturers:

- From the trained manufacturers participating in output 1.2, the two main manufacturers (Rang Dong and Dien Quang) will be asked to develop business transformation plans for the development of two to four new ESL products. International and local experts will be provided by the project to support them in this activity.

Output 1.5: Technical support for selected local manufacturers towards quality ESL production at marketable cost:

- International and local experts will provide on field support to the two main local manufacturers; Dien Quang and Rang Dong. This activity will be based on the assessment made for the training course on quality ESL production (output 1.3). The total period of project implementation is four years and it is estimated that experts will need to spend a total of eight weeks spread over the first three years with each manufacturer when they will work with the concerned production department to raise their ESL quality to an international standard level. The technical assistance provided will also:
  - Focus on CFL production lines and the two manufacturers' testing laboratories.
  - Support the manufacturers in other aspects such as training of staff, research/study on replacement of ILs used in agriculture with CFLs, LED development, waste treatment issues regarding the disposal of CFLs, etc.

<u>Component 2: Improved QA/QC Framework</u>

149. This component has been designed to address the ESL quality issues and introduce a more comprehensive national QA/QC system based on international best practice. This will help support consumers in distinguishing low-quality from high-quality lamps and therefore protect the reputation of ESLs. The outputs under this component include:

Output 2.1: Energy, environmental & quality standards for ESLs are strengthened and harmonized in line with regional or international best practices:

- Standard experts from the country and from VSQI will work on harmonizing the existing CFL standard with international standard. Collaboration will be put forth with the GEF global lighting program which is also working on international standard on efficient lighting. Local manufacturers will also be involved in the process.

Output 2.2: A national quality inspection system for ESLs is established:

- A national quality inspection system will be put in place under the management of MOST. Training will be provided to selected manager at MOST which will be responsible of inspecting the quality of ESLs manufactured locally and of imported ESLs.

Output 2.3: Capacity of two testing laboratories is strengthened:

- International and local experts will be dispatched to Quality Assurance and Testing Centre Number 1 (QUATEST 1) and Quality Assurance and Testing Centre Number 3 (QUATEST 3) to assess their capacity on ESL testing and their needs (including additional equipment) to reach international level. Activities including two workshops (of three days each) and four weeks of field training; guidelines will be developed based on the assessment of the two laboratories. The testing centres will finance any additionally required equipment.

Output 2.4: "Green Customs Initiative" program to reduce import/export of ILs & low quality CFLs implemented:

- The Green Customs Initiative is a partnership of international organizations cooperating to prevent the illegal trade in environmentally-sensitive commodities. As such, the program will provide a workshop in Hanoi to custom administrator with the objective of reducing import/export of ILs and low quality CFLs.

Output 2.5: Capacity of civic authorities to handle and safely dispose mercury in ESLs and to engage in recycling strengthened

- CFLs which will replace ILs contain mercury. At the end of the life of CFL if not properly disposed or recycled, it would lead to release of mercury into the environment. A regulatory framework for management of hazardous wastes exists; however, regulations for the recycling and disposal of hazardous lamps don't exist. As such the program will organize a workshop and provide guidance to policy makers with regard to framing regulations and guidelines on recycling and safe disposal of the CFLs.

Component 3: ESL Market Development and Consumer Education and Awareness

150. This component will help address the barriers related to the marketing and promotion of ESLs and the phasing out of IL production and sales. It will focus on increasing public awareness in the country which is home to over 86 million inhabitants. The outputs under this component include:

Output 3.1: A national social marketing campaign for rural and residential users designed and implemented:

- Local marketing experts will work on developing a national marketing campaign to raise awareness of population on ESL, their qualities and advantages. Possible partners for this activity include EVN, MOIT, government state television and local manufacturers.

Output 3.2: Documented results of the market study on the ESL promotional campaign and the roadmap/master-plan for ESL promotion:

- International and local experts on marketing campaign evaluation will develop a market study to evaluate the impact of the marketing campaign on the population. Based on the evaluation result, a roadmap/master plan for ESL promotion will be developed and will present the best way to promote ESL over the following years.

Output 3.3: Demonstration projects in rural areas implemented:

- Demonstration project will be implemented in rural areas to promote and raise the population awareness with regard to the benefits of ESLs. Demonstration sites will be selected by applying national criteria to make sure they are representative of the whole country. Projects could include, but are not limited to, replacement of ILs in school with ESL. Possible partners include EVN, IE, and the Vietnam Women's Union.

Output 3.4: ESL procurement plan for public sector developed:

- National experts with support from MOIT and MOF will develop a draft regulation on ESL procurement for the public sector. MOF and MOIT will be in charge of submitting the regulation for implementation in the following years.

Component 4: National policy and institutional support program towards phasing-out of ILs and pro-motion of ESLs

151. This component will support the industrial transformation and market development with a coherent ESL policy in line with GoV policies. The activities that planned to be implemented under this component include:

Output 4.1: Agreed and adopted national roadmap and a master-plan for the phase-out of ILs and promotion of good quality ESLs:

- At the commencement of the project, each stakeholder is required to participate in meetings to agree on a roadmap/master-plan for promoting ESLs in the country. The roadmap will identify the activities which will occur in the following years, including this project's activities, and will identify their role. The Project will support the Office of Energy Efficiency and MOIT, in developing a draft roadmap to phase out ILs, which will be submitted to the Prime Minister for adoption.

Output 4.2: Established national policy for phasing out ILs:

- National policy expert will assist VSQI and MOIT to provide recommendations on national policies that can be implemented by GoV to phase out ILs in the country.
- National experts will support MOIT in developing guidelines documents for implementation of the Law on Efficient use and energy saving (for adoption by the National Assembly in 2010).

Output 4.3: Proposed policy measures and incentives for ESL market development and enhancement through local partners:

- National expert on policy and regulation will develop a proposal for a national incentive on ESL recycling and a proposal on providing other potential financial incentives to accelerate the penetration of ESL in the market. Possible partners include EVN, MOIT, and the Vietnam Environment Protection Fund.

**Expected Results**

152. The Project represents new opportunities for sustainable development in Vietnam. These include environmental, economic, and technology transfer opportunities.

***Environmental Opportunities***

153. CFLs become hazardous waste when they are used or broken. In CFL manufacturing, mercury can be in vapour, liquid or solid forms. Mercury is a necessary component for the operation of most energy-efficient lighting. Without the mercury, the lamp would not produce visible light. The danger of mercury poisoning has been observed for hundreds of years. Research studies, over the last few decades, have shown that even low-level exposure to mercury can have toxic effects. Although Vietnam has strong legal framework for solid waste and hazardous waste management, there are not any regulations regarding the disposal and recycling of solid and hazardous wastes in the lighting industry in general and of used CFLs in particular. Used CFLs are mentioned in relevant regulations for solid waste and hazardous waste management and classified as hazardous waste (specified in *Decision 23/2006/QĐ-BTNMT* on the issuance of hazardous waste list). However, these regulations are not effectively enforced yet.

154. The main reasons include the lack of resources and institutional capability to implement Vietnam's policy framework at the operational level, major gaps in enforcement, and insufficient supervision of waste management practices (limited human resources, unclear mandates, overlapping roles of various government agencies, and limited interagency coordination). In addition, persons involved in waste handling and disposal do not realize that used CFLs and ordinary fluorescent lamps contain mercury and thus are hazardous waste that they do not manage in compliance with existing regulations. Moreover, there is a lack of facilities and responsibilities to treat and dispose of solid waste, especially for many types of hazardous waste including used CFLs. Given the lack of combined treatment facilities and limited incentives for safe disposal, many industries, including the light industry in general and CFL manufacturers in particular, experience a variety of unsafe methods of waste treatment and disposal.

155. The phasing-out of ILs in Vietnam program creates an opportunity to issue relevant regulations to force manufacturers to take responsibility for recycling and treating used CFLs, and users to take responsibility for separating hazardous waste from the mainstream. This will definitely help to better handle, in Vietnam, the significant threat to public health and the environment posed by hazardous waste. In addition the proposed program towards phasing out ILs through market transformation for energy-efficient lighting products in Vietnam will allow the country to reduce the overall country electricity consumption hence reducing the corresponding GHG emissions due to fossil fuel electricity generation. As a matter of fact, the ability of nationwide electricity consumption increased rapidly to 66 billion kWh in 2008, and it is estimated to reach 96 billion kWh in 2010, in which the industry and residential sectors account for 47 and 51% of the total electricity consumption according the prediction of the APEC Energy Demand and Supply Outlook (2006)[25]. Moreover, efforts of the electricity sector in bringing the grid to rural and remote areas will continue to make the situation more serious.

***Economic Opportunities***

156. The project for phasing out ILs through market transformation for energy-efficient lighting products in Vietnam offers economic opportunities. Apart from improving lighting service, there are other benefits (education and health) to the use of efficient light bulbs for the end-user. The economic opportunities created are:

- The use of ESL products in households will contribute to the reduction of electricity consumption. This delays the building of new power plants. From the electricity utility perspectives, there is a capital cost savings opportunity.

[25] http://www.ieej.or.jp/aperc/2006pdf/Outlook2006//OR_Viet_Nam.pdf

- Based on various sources, the IEC highlights the fact that investments in energy-efficient lighting offer a rate of return of 30 to 50% per year based on energy savings alone. It is further claimed by some sources that the value of associated worker-productivity benefits can be 10 to 100 times greater than the energy benefits[26].
- CFLs dissemination supports macroeconomic development through new jobs creation. The proposed program towards phasing out ILs through market transformation for energy-efficient lighting products in Vietnam will lead to the economic growth of efficient lighting products industries in the country. The table below shows production and sales for the three largest manufacturers (Philips, Rang Dong and Dien Quang). It does not represent the whole market as some lamps are imported by domestic distribution companies and small manufacturers.

**Table 4: Production and Consumption of Lighting Products in Vietnam**

| Type of Product | Unit | Production & Sales | | | |
|---|---|---|---|---|---|
| | | 2006 | 2007 | 2008 | 2009 |
| **Incandescent Lamp** | | | | | |
| Production | Bulbs | 44,870,310 | 44,348,510 | 43,998,080 | 45,840,000 |
| Domestic | Bulbs | 7,713,200 | 13,443,800 | 12,173,200 | 12,834,000 |
| Export | Bulbs | 37,157,110 | 30,904,710 | 31,824,880 | 33,006,000 |
| **Fluorescent Lamp** | | | | | |
| Production | Bulbs | 37,160,820 | 34,272,960 | 30,755,160 | 33,002,000 |
| Domestic | Bulbs | 14,724,920 | 15,150,920 | 12,397,600 | 17,573,000 |
| Export | Bulbs | 22,435,900 | 19,122,040 | 18,357,560 | 16,429,000 |
| **Compact Fluorescent Lamp** | | | | | |
| Production | Bulbs | 22,699,100 | 21,180,408 | 21,657,900 | 26,392,000 |
| Domestic | Bulbs | 2,996,150 | 8,102,000 | 5,341,120 | 6,992,000 |
| Export | Bulbs | 18,702,950 | 13,078,408 | 16,316,780 | 19,400,000 |

(Source: MOIT)

157. The table shows a decrease in lamp importations because local manufacturers have increased their light bulbs production due to customer preference for local products. Such growth of the local lighting industry in Vietnam will surely lead to the creation of new jobs.

[26] See IEA (2006); *Light's Labour's Lost*, page 43.

***Technology Transfer Opportunities***

158. The Project facilitates energy-efficient lighting products and related accessories technology transfer opportunities in the residential and commercial sectors. In fact, according to the International Energy Agency a characteristic of the residential lighting market is that lighting controls and sensors are much less widely used than in the commercial sector (where the penetration of these technologies is still relatively low compare to other countries). For exterior lighting, motion sensors have become reasonably commonplace, but for interior lighting, very few motion or infrared detectors, light-sensitive dimmers, time-lapse switches or other control devices are used. In part, this can be explained by the lower number of running hours of a typical household lamp when compared with commercial applications. However, with the performance of such controls continuing to improve and their costs falling, there may be significant opportunities to transfer this technology into the end-users sector in Vietnam.

### *3.4 Risk analysis and risk management measures*

| RISK LOG | | | | | | |
|---|---|---|---|---|---|---|
| **Risk Description** | | **Category** | **Impact Severity** | **Likelihood** | **Risk Management Strategy & Safeguards** | **By When/ Whom?** |
| 1 | The project may face a low level of participation from the private sector | Organization | Low | Low | The Project will mitigate the risk by ensuring the involvement of the private sector from the project design stage, dissemination of the latest information through right channels, and identification of their needs and demand through continuous dialogue. The following agencies have been contacted and co-financing commitments have been obtained :<br>• Vietnam Energy Efficiency and Conservation /MOIT<br>• ISPONRE<br>• Rang Dong Light Source and Vacuum Flask Joint Stock Company- One of the largest Manufacturer of ESLs in Vietnam<br>• Dien Quang : One of the largest Manufacturer of ESLs in Vietnam<br>• Quatest3<br>Quatest 1<br>• Vietnam Standard and Quality Institute<br>• Institute of Energy<br>• Vietnam Lighting Association (VLA)<br>• Vietnam Environment Administration (VEA) | 2010-2013 by Project Management Office (PMO) |

| RISK LOG | | | | | | |
|---|---|---|---|---|---|---|
| **Risk Description** | | **Category** | **Impact Severity** | **Likelihood** | **Risk Management Strategy & Safeguards** | **By When/ Whom?** |
| 2 | Lighting products manufacturers may not be able to deliver high quality ESL | Technical | Medium | Low | The assessments made by the development team of the Project show that many local entrepreneurs have sufficient technical capacities to participate in the promotion of energy saving lights. The Project will undertake capacity building activities for lighting producers to enable them to quickly adapt to the new market demand and requirements and supply the market with high quality energy saving lighting products. A list of two largest lighting producers is :<br>• Rang Dong Light Source and Vacuum Flask Joint Stock Company- One of the largest Manufacturer of ESLs in Vietnam<br>• Dien Quang : One of the largest Manufacturer of ESLs in Vietnam | 2010-2013 by PMO |
| 3 | Disbursements of funds by the Government agencies for demonstration projects not meeting the scheduled dates | Political | Medium | Low | Co-financing required for three demonstration projects in rural areas is estimated at not more than $150,000, which given the total confirmed co-financing amount of $22.127 million is relatively small and therefore a low risk of non-availability when required. | 2010-2013 by MONRE |
| 4 | Weak government support, which leads to low level and ineffective enforcement of policies and regulations | Political | Medium | Medium | Incorporation of the necessary interventions for the formulation of the policies on ESL, including the accompanying implementing rules and regulations, as well as improving the institutional arrangements for the enforcement of lighting product standards and lighting energy codes. | 2010-2013 by MONRE |

| RISK LOG | | | | | | |
|---|---|---|---|---|---|---|
| | **Risk Description** | **Category** | **Impact Severity** | **Likelihood** | **Risk Management Strategy & Safeguards** | **By When/ Whom?** |
| 5 | The project may face opposition from social and political organizations. | Political | Medium | Medium | It will be ensured that political parties and civil society organizations are kept updated, on a regular basis, regarding the project progress and the benefits for the nation. | 2010-2013 by MONRE |
| 6 | The project implementation may be delayed of parallel activities that are baselines for specific incremental activities of the project. | Political | Medium | Medium | Firm commitments by responsible agencies have been confirmed. These are as follows (in $):<br>VNEE/MOIT 1,000,000<br>ISPONRE 500,000<br>Rang Dong 9,917,000 (incl. 1.79 million cash)<br>Dien Quang 3,500,000 (incl. 150,000 cash)<br>Quatest 3 5,000,000<br>Quatest 1 610,000 (incl. 30,000 cash)<br>VSQI 600,000<br>Institute of Energy 300,000<br>VLA 150,000<br>VEA 550,000 | 2010-2013 by MONRE |
| 7 | The project may be implemented without taking into account the human and environmental safeguards measures. | Potential negative environmental and social risks | Medium | Low | An environmental impact assessment (EIA) has been conducted. It includes environmental safeguards with regard to solid and hazardous waste management; in particular, the safe disposal and recycling of CFLs. The EIA recommends interventions that could promote better environmental practices in the lighting industry in Vietnam. The project will address this risk by making sure that these recommendations are strictly applied in the case of the phasing-out of ILs in Vietnam. | 2010-2013 by PMO |

### *3.5 Consistency with National Priorities or Plans*

159. Energy conservation and environmental protection are fundamental policies of the Vietnamese Government, which has also signed the UNFCCC and the Kyoto Protocol. To facilitate the implementation of Energy Efficiency programs and energy conservation, the policy has been marked by:

- **The Law on Environmental Protection enacted in 2005 (LEP 2005)**, Article 84, point 3 on Management of GHG's and ozone layer-depleting gases: the State encourages production, business and service establishments in the development of clean energy, renewable energy and environment-friendly products in order to minimize GHG emissions;

- **National Strategy for Environmental Protection until 2010 and Vision toward 2020 (NSEP):** The strategy emphasizes the use of clean energy is one of the measures to reduce emission and pollution. One of the viewpoints is promoting the adoption of clean technology and cleaner production lines and the use of environmentally friendly and less pollution raw materials and fuels. The objectives of the strategy include increase the rate of clean energy use to 5% in 2010 of the total annual energy consumption. Encouraging the consumption of energy in an economical manner and the use of clean energy are the main guidelines.

- **The National Target Program on Energy Efficiency and Conservation (EE&C) has identified the following priorities**:
  (i) enhance State management on energy efficiency and conservation and organize the management system of energy conservation;
  (ii) promote education, propaganda, community mobilization, awareness raising in energy efficiency and conservation;
  (iii) promote high productivity and energy-saving facilities and gradually eliminate low productivity facilities; and
  (iv) promote energy efficiency and conservation in industrial enterprises, buildings, and transportation.

- **Decree 102/2003/NĐ-CP on Energy Use and Saving Energy (EUSE):** The Decree was approved on September 3rd, 2003 by the government with the purpose to promote saving and rational use of energy in order to curb the increasing energy use of national economy and to protect environment, rationally exploit energy resources, implement sustainable socio-economic development. This Decree regulates the EUSE in industrial production, in buildings, and for energy-consuming equipment and means and in daily life of people.

160. The promotion and implementation of the utilization of ESLs in Vietnam through the transformation of the local lighting products market and the phasing-out of ILs is consistent with national priorities/plans. The Project will also be instrumental in developing a legal basis for GoV measures to reduce the use of ILs. The Project will reduce stress on the national utility, Electricity Company of Vietnam (EVN), which currently faces power supply shortages due to increased demand for electricity. The Project fits the objectives of GEF's Operational Programme #5 (Removal of Barriers to Energy Efficiency and Energy Conservation) and GEF's climate change strategic program on Promoting Energy Efficiency in Residential and Commercial Buildings (SP-1). UNEP will ensure that the activities under the Project will be properly coordinated with the "Global Market Transformation for Efficient Lighting" project. The interaction between the

Center of Excellence to be established under the global lighting project and the Project will constitute an innovative approach to promote the adoption of EE lighting in Vietnam.

***Environmental Policies***

**a) LEP 2005**

161. LEP 2005 enhances development of clean energy, renewable energy and environment-friendly products; according to it clean energy and renewable energy are exploited from wind, solar, geothermal sources, water, biomass and other renewable sources. Organizations and individuals investing in the development and use of clean energy, renewable energy, and production of environment-friendly products shall be granted by the State preferences in tax, funding support and land for building production establishments. The Government shall formulate and implement clean and renewable energy development strategies to achieve the following objectives:

(i) Strengthen national research and application capacity of clean and renewable energy extraction and use technologies;

(ii) Extend international cooperation and mobilization of resources involving in the extraction and use of clean and renewable energies;

(iii) Gradually increase in the ratio of clean and renewable energy to the total national energy production; and implementation of objectives of the national energy security, saving of natural resources and reduction in the green house gases emissions; and

(iv) Integrate the programme on clean and renewable energy development with the programme on poverty reduction and rural, mountainous, coastal and island development.

161. GoV encourages production and consumption of less polluting and easily decomposable products and goods; use of water for production of clean energy, production, import and use of machinery, equipment and means of transport driven by clean and renewable energy.

**b) NSEP**

163. The strategy emphasizes use of clean energy is one of the measures to reduce emission and pollution. One of the viewpoints is promoting the adoption of clean technology and cleaner production lines and the use of environmentally friendly and less pollution raw materials and fuels. Objectives of the strategy include increase the rate of clean energy use to 5% in 2010 of the total annual energy consumption. Encouraging the consumption of energy in an economical manner and the use of clean energy are the main guidelines.

**c) Climate Change Responding Policies**

164. Vietnam has been forecasted as one of the 5 most seriously affected by the climate change countries in the world, especially by the sea level rise. If the sea level rise 01 meter, which is forecasted to happen by 2100, 37.8% land of the Mekong River Delta will be under sea water, around 20 million of people will be affected. The country now has been facing with increasing natural disasters like typhoons, floods, drought, etc. Recognizing these threats, GoV has ratified and issued several policies to adapt and mitigate climate change as listed below:

- Ratified the UN convention on climate change (UNFCCC) in 1992-1994

- Ratified Kyoto protocol (KP) 2002
- Issued the Direction 35/2005/CT-TTg in 2005 on Kyoto protocol implementation
- Issued the Decision 47/2007/QĐ-TTg to approve implementation plan of KP
- Issued the Decision 172/2007/QĐ-TTg to approve the National Strategy on Reduction and Prevention of Natural Disasters until 2020
- Issued the Decision 158/2008/QD-TTg of Government on National Target Program on Response to Climate Change (NTPRCC)
- Issued the Scenarios on Climate Change in Vietnam.

165. The most important program is the NTPRCC. Under the program ministries, sectors, provinces, and cities have been made responsible for the development and implementation of action plans to address climate change including: assessment of climate change impacts and identification of corresponding measures; and integration of climate change concerns into strategies, programs, and plans. For MOIT, one of the key measures requested by the NTPRCC is "saving and efficient use of energy, research and apply technologies to reduce emission and saving energy (focus on renewable energy)". So, phasing out the ILs and transformation of the lighting market to using of ESLs is completely in line with the environmental policies of the country.

***Electricity Policy***

**a) Law on Electricity (2004)**

166. The Law on Electricity was adopted in 2004 and provides regulations on business operation activities relating to electricity such as: planning and development of electricity, saving electricity, electricity market, licensing, rights and obligations of producers and clients, protection and safety, electricity to rural, mountainous and island area and state management on electricity. Regarding to the EE use and saving, the law has expressed that applying scientific and technological progress in electricity activities and using electricity aim at saving, improving energy efficiency, protecting ecological environment is one of the key in the electricity development policies (Article 4).

167. The law encourages saving of electricity in generation, transformation, distribution and use. In the latter, GoV encourages domestic production or import, applying preferential tax for products on the list of electricity-saving products and imported equipment, materials and technology lines to produce electricity-saving products. The projects which apply results of scientific and technological development research, investment projects of electricity saving products production or investment project for the purpose of energy saving are loaned preferentially from the Development Assistance Fund and Scientific and Technological Development Assistance Fund. The law also regulates that ministries, local authorities have to develop programs, projects on enhancement the efficient use and saving energy (Article 13).

**b) National Strategy for Development of Electricity Sector during 2004-2010 and Vision toward to 2020 [27]**

168. The strategy provides the main orientation for development of electricity in the period 2004-2010, which includes development of hydro, nuclear, and thermal electricity. The objective of the strategy is to ensure that the quality of electricity supply is increased; its consumer price becomes more competitive, in particular, by focusing on potential electricity saving by reducing T&D losses and electricity consumption by end-users; and research and development activities with regard to new and renewable energy are promoted to meet demand for electricity, in particular, on islands and in remote areas.

**c) National Strategy for Energy Development until 2020 and vision toward 2050[28]**

169. The strategy has several focal points, which include (i) rapid and sustainable development of energy in line with the national socio-economic development strategy; (ii) in parallel with the diversification of energy sources and the application of energy saving technologies, which are considered a key activities during the process of national industrialization and modernization, rational and balanced development of the subsectors for power, oil and gas, coal, and new and renewable energies; and (iii) development of clean energies while prioritizing the development of new and renewable energies.

170. Objectives have been set up with overall goal: exploiting and using domestic energy resources in a rational and efficient manner; diversifying forms of investment and business in the energy domain, and develop an energy market conducive to fair competition; boosting the development of new and renewable energies, bio-energy and nuclear power to meet the requirements of socio-economic development; and developing the energy sector in a quick, efficient and sustainable manner in association with environmental protection.

171. The policy on encouraging the economical and efficient use of energy must identify specific conservation requirements on sectors which consume a large volume of energy; to encourage the application of energy-saving equipment and technologies. Implementation solutions include investment, financial mechanisms, human resource development, organizational mechanisms, etc.

**d) Decree 102/2003/NĐ-CP on EUSE**

172. The Decree was approved on September 3rd, 2003 by the government with the purpose to promote saving and efficiency energy use to meet the need of increasing energy use of national economy and to protect environment, rationally exploit energy resources, and implement sustainable socio-economic development. This Decree regulates the EUSE in industrial production, in buildings, and for energy-consuming equipment and means and in daily-life of people.

[27] Decision 176/2004/QĐ-TTg

[28] Decision 1855/QĐ-TTg)

173. One of technological solutions for saving and efficiency energy use regulated in the Decree is development of renewable energy use instead of non-renewable energy sources as coal, oil and gas products. Article 9 requested offices, state management offices, in their annual maintenance plans to replace old, obsolete, consuming high quantity of electricity equipments with energy saving equipments in lighting, ventilation, air conditioning, etc. Article 10 regulates that manufacturers shall have to provide customers with necessary information on the efficiency and energy consumption levels of the equipment and means.

174. With regard to labeling of EE products, the decree requested manufacturers to describe the consumed quantity of electricity on the packaging of the products. They have to declare this figure and to be responsible for conformity with this indicator. The manufacturers can apply for labeling of their products for conformity with energy efficiency standards. In daily life, individuals shall have the responsibility to use lighting (among other) equipments with good electricity consumption to replace the old, obsolete, to reduce the energy consumption.

175. The decree also provides incentive policies, according to it, enterprises with investment projects on the manufacture of energy-saving products, the import of new technologies or intensive investment with a view to saving energy shall be considered for medium- or long-term loans from the Development Assistance Fund, the Scientific and Technological Development Assistance Fund (Article 15). Measures to boost scientific and technological development to achieve the targets of EUSE include (i) developing the technologies of EUSE, which suit various industries and play important role in the national economy; (ii) supporting the research, development and application of common-use techniques regarding energy saving, which are confirmed as having practical efficiency; and (iii) introducing and applying technologies, widely disseminate information related to technologies with the EUSE (Article 16).

176. Article 18 of the Decree assigns the Ministry of Industry (now MOIT) to develop and submit to the Prime Minister the National Target Program on EUSE with the following contents: (i) research and develop projects on EUSE that promote the environmental protection and mitigate environmental impacts arising from energy production and use; (ii) draw up plans on EUSE and; (iii) conduct education and training activities and information dissemination and community awareness campaigns in the areas of developing and promoting the EUSE as well as environmental protection. According to this Decree, MOIT is mandated to: (i) develop and submit to Prime Minister the National Target Program of EUSE and manage implementation; (ii) develop policies on EUSE; (iii) develop and implement annual plans for saving energy; (iv) develop the list of products that have to be phased out on annual basis; and (v) regulate the labeling of the ES products and others.

177. MOST is responsible for issuing national standards on energy consumption limits for equipment and national regulations on testing equipment for products to comply with the standards. The Ministry of Construction (MOC) is responsible for providing guidelines on implementation of measures of EUSE of lighting equipment for households, buildings owners, and project developers. The Ministry of Finance (MOF) is responsible for providing guidelines of implementation of incentive measures in EUSE.

178. The draft law makes MOST responsible for developing energy efficiency standards for facilities and equipment. It also responsible for developing a roadmap for energy labeling of equipment and phasing out equipment with high energy consumption levels. With regard to incentive measures, the draft law regulates tax exemption and reduction of the operating cost for EUSE, including equipment, facilities, materials, and technologies imported for the purpose of energy saving, energy-saving products, shall enjoy tax preferences. Specifically, production of energy saving and renewable energy products are exempted from or enjoy reduced income tax, value added tax, environmental tax, environmental protection fees. Imported machines, equipment, facilities, and other equipment for energy saving purposes, production of energy saving equipment, and renewable energy production are exempted from import tax. Enterprises that would like to invest in the manufacturing of energy saving products, import new technology or make intensive investments for the purpose of energy savings may obtain loans preferentially from development banks or national funds such as the Scientific and Technological Development Assistance Fund or the Energy Saving Fund.

179. The draft law requires GoV to develop and implement the National Target Program on EUSE corresponding to 5, 10 year development plans. The main tasks of the shall be: completing institutional framework, developing standards; developing forms of education, raising awareness of the community; researching and developing projects which apply technology to enhance energy efficiency in production, construction, transportation.
In conclusion the draft law provides quite a comprehensive policy on EUSE, when adopted and enacted, it will really promote the EUSE in Viet Nam.

### *3.6 Incremental Cost Reasoning*

180. The economic benefits as well as the environmental benefits of phasing out inefficient lighting are well recognized world-wide, and several OECD countries have already announced their intention and a timeframe for phase-out of ILs. However, in Vietnam a coordinated effort to transform the present lighting market to one for ESLs is still absent. The Project will fill this void. The Project will build upon ongoing efforts and experiences gained with regard to supporting lighting programs in various countries and will coordinate the project activities and findings under the Project with those of the global lighting project so as to learn from experiences and best practices in countries that are or were at a similar stage of transformation of the lighting market into an EE one as Vietnam is at present and be in a position to develop the optimum policy and regulatory framework for such as transition.

181. Under a business-as-usual (BAU) scenario, Vietnam would continue to make a half-hearted and unfocused approach to the transformation of its lighting market into an EE one. The Project represents an integrated and comprehensive approach to such market transformation and is an alternative to the BAU situation in Vietnam described above that requires the support of the GEF. By adopting such an approach, the GEF alternative will have direct impacts on energy conservation and EE business promotion and will direct consumer choices towards more climate-friendly lighting products and appliances. Furthermore, it will reduce the emissions of GHG and harmful substances into the atmosphere, the use of conventional fuels for power generation, and the requirement and corresponding investments for new power generation. A detailed incremental cost analysis is in Appendix 3.

### *3.7 Sustainability*

182. The Project is addressing the sustainability aspects by taking into account in its design and implementation the international experiences, best practices and results achieved so far, many of which are relatively well documented and reflected also in the situation analysis section. It is obvious that in order to facilitate sustainable market transformation, there is a need for both demand and supply side measures, which together can increase the global market demand for EE lighting technologies, while simultaneously ensuring the supply of reliable, customer friendly technology, thereby building the long term confidence and customer satisfaction.

183. As highlighted by experiences from some countries with more mature markets, where there is still relatively little actual experience with EE lighting technologies and little support data upon which Governments can make their decisions, the program sustainability will be enhanced through phase-out policy, product quality improvement, and consumer awareness campaign. In fact, in the long term, sustainability will depend on a broad base of cost effective, trouble free customer experience with the technology. Such experience can be supported by internationally recognized and understood product standards, certification and labeling. Furthermore consumer awareness campaigns are expected to be considered as the core national level activities supported by the project that will reinforce the project sustainability.

184. The Project will also support the implementation of a monitoring to measure the impact of the gradual process of the diffusion of EE lighting products and the phase-out of ILs. The monitoring network will be equipped with methodologies/survey instruments for market assessment and evaluation of potential impacts of the EE lighting programs worldwide. The technical capacity of the of institutions involved in monitoring induced impacts of EE lighting market transformation in general, and the phase-out of ILs in particular, will be strengthened to enable better long-term planning for further adaptation of policy and interventions.

### *3.8 Replication*

185. The replication of lessons learned is an integral component of the project design as the expected energy savings from the use of EE products - and the corresponding GHG emissions reduction. Project outcomes will provide substantive lessons regarding EE lighting market transformation in various economic conditions and technology environment.
The activities that will be carried out under the Project are meant to create an enabling framework that would facilitate the widespread utilization of EE lighting products and gradual phase-out of incandescent bulbs. With such enabling environment, the development of national and regional initiatives based on EE lighting products are expected to be carried out, offering the opportunity to achieve the overarching goals of the Project. In particular, the various national EE lighting programs that will be supported are meant to showcase feasible design and application of EE lighting systems, enforcement of policies, and implementation of EE lighting quality improvement and certification and financing of EE lighting project.

186. The Project's replication strategy is based on the following features of the project design:

(i) technical assistance activities will aim to lay the necessary foundation of a supportive legal and regulatory framework, institutional structures and national capacities to initiate, develop and manage sustainable promotion of EE lighting markets at the national levels;

(ii) technical assistance will be provided to the manufacturers to upgrade their production line to manufacture high quality ESLs, which will not only serve the national cause but also the region as a whole;

(iii) the Project includes global networking as well as management and dissemination of international experiences, success stories, and best practices through UNEP, other UN agencies, and other network partnerships;

(iv) the Project aims at the adoption of internationally recognized product standards, (including decreased mercury content); and testing and quality control schemes;

(v) the Project includes close monitoring and evaluation of the project implementation and results, thereby providing lesson learned for future action; and

(vi) the Project includes public awareness raising efforts and effective dissemination of the project results.

187. The effective replication of project activities will require a combination of policy related changes as well as effective dissemination of the project results and lessons learned, thereby providing applicable examples for the replication of best practice. Sometimes results on the practical side are needed, before the necessary changes at the policy level can be effectively promoted and implemented. The project will facilitate continuing contacts and co-operation between the different stakeholder groups at the national and international level by organizing seminars, workshops and other public events, thereby bringing the project proponents, the policy makers and the potential investors / other donors together. UNEP/DTIE, in co-operation with the project partners, is envisaged to continue to manage and disseminate the information, experiences and lessons learnt also after the closure of the project as well as to extend the replication of similar activities beyond the countries that are directly supported by the earlier proposed GEF umbrella project.

### *3.9 Public Awareness, Communications and Mainstreaming Strategy*

188. This initiative mostly consists in the development and implementation of information, communication and dissemination tools; these tools are targeted at decision-makers, regulatory bodies (new standards, enforcement, and compliance), professionals and end-users. A large part of the activities to be developed in Component 3 aim at disseminating the results of technical analyses, studies and strategies, through the promotion of best practice cases, capacity building actions and networking. The fourth component is designed to in developing national policies and implementing tools respecting the local conditions.

### *3.10 Environmental and social safeguards*

189. The Project will have a significant positive social impact with regard to improving the living standards of the concerned population through the use of more EE lighting, reduction of mercury pollution, economic development, and creation of jobs. The contribution of the Project to socio-economic development, including gender and poverty alleviation, is considerable. A CFL can last between four and ten times longer than the average incandescent light bulb, which can lead to major savings in household energy costs in terms of lighting equipment purchase cost. In addition, EE lighting products are more expensive to buy at the counter whereas traditional incandescent light bulbs consume far more electricity and they do not last long by comparison. As a result, using EE lighting products helps households and other users in the commercial and

public offices sector to save money. In fact, when viewed over the product life cycle, the more EE lighting products can be slightly less expensive in terms of its pure capital acquisition and labour costs than the less EE lighting products because: (i) it often lasts longer and hence has longer replacement cycles, and (ii) it often has lower maintenance costs. According to the Asian Development Bank (ADB) the switch to CFLs would result in household lighting costs falling by as much as 80%[29]. This is a substantial saving for an impoverished household. Moreover, based on various sources, the IEC highlights the fact that investments in EE lighting offer a rate of return of 30 to 50% per year based on energy savings alone. It is further claimed by some sources that the value of associated worker-productivity benefits can be 10 to 100 times greater than the energy benefits[30].

190. The phasing-out of ILs and the widespread use of energy-saving lighting products also support macroeconomic development through new jobs creation. In order to secure the supply of the local market in EE lighting products, there has to be development of EE lighting products plants. From the environmental point of view, the proposed project supported by the GEF will lower environmental impacts of lighting equipments in Vietnam and on a global level. According to $CO_2$ reduction estimation, the proposed project will help reduce a cumulative estimate of 2.3 million tons of carbon dioxide over the project lifetime. The environmental benefits that would be delivered from the project can be broadly divided into two categories namely, those related to the conservation of energy resources and those related to other chemicals like mercury etc.

191. The environmental benefits that would be delivered from the project can be broadly divided into two categories namely, those related to the conservation of energy resources and those related to other chemicals like mercury etc. One of the main benefits from switching over from ILs to CFLs and from poor quality to good quality CFLs is that there would be substantial amount of savings in electrical energy consumption which would lead to reduction of the GHG gases in the environment. As can be seen from the Table 1 below, assuming that by the end of the project 60 million ILs have been replaced with good quality CFLs and 25 million poor quality CFLS has been replaced with good quality CFLs, with an average lifetime for the good quality CFLs of 6,000 hours, GHG emissions will have been reduced by 2.302 million ton. This includes reduction in emission due to electricity saved from change of poor quality CFLs with the good quality CFLs produced after the interventions from the project. However, assuming the new good quality CFLs have a lifetime of a minimum of three years it is estimated that the CFLs installed under the Project will generate additional GHG emission reductions of a minimum of 2.966 million ton of $CO_2$ equivalent. As a result, the intervention of the GEF would lead to a direct emissions reduction impact of a minimum of 5.268 million ton of $CO_2$ equivalent.

192. In addition to the reduction in the GHG emissions, there are several non-tangible benefits, which would accrue. Although it may be difficult to quantify their contribution to emission reduction but their positive impact on environment cannot be discarded. The other main benefits are:

[29] http://www.adb.org/Media/Articles/2008/12390-philippines-energies-efficiencies/default.asp
[30] See IEA (2006); *Light's Labour's Lost, page 43.*

- The good quality CFLs have a power factor of 0.85 and above where as the poor quality CFLs have a power factor of 0.55. This increase in power factor would also result in an enhanced current carrying capacity of the low voltage transmission and distribution system. This would lead to reduction of the line losses or the distribution losses in the system thus conserving energy.

- The good quality CFLs would reduce the problems of harmonics (electrical disturbances induced) and thereby further enhancing the quality of the current flowing in the distribution system and lesser impact on other electrical and electronic appliances in use.

- Due to savings of electricity, the country would have to build fewer power plants with total capacity of 754 MW in case of thermal power generation or 1,698 MW in case of hydropower.

**Table 5: GHG Emission Reduction Estimate**

| | Parameter | Total | Remarks/Source of Data |
|---|---|---|---|
| REPLACE-MENT OF 60 watts ILs WITH GOOD QUA-LITY 15 watts CFLs | Reduction in watts from replacement of one ILs with good quality CFLs | 45 watt | • Based on reports by EVN, in general, a consumer uses 60 watt ILs.<br>• This is also substantiated in a USAID report on "Phasing in Quality- Harmonization of CFLs to help Asia address climate change", March 2009<br>• Typical use of 60 watt ILs for consumer has been taken as a basis in CDM register project, namely Bachat Lamp Yogna (BLY) on CFLs in India<br>• 1 IL consumes 60 watt and for the same luminance 1 CFL consumes 15 watt |
| | Total electricity savings per year from 20 million installed CFLs | 1,149.750 million kWh | • It will take one year to set up local production lines for good quality CFLs<br>There are 60 million ILs in Vietnam and they will be replaced by batches of 20 million good quality CFLs each during years two, three, and four<br>• From 2nd year onwards, in 3 years all 60 million ILs will be replaced<br>• According to the approved CDM methodology AMS-2J. Average working of one lighting fixture is 3.5 hours each day for 365 days a year |
| | Electricity savings at the end of the project | 5,173.875 million kWh | • There are 60 million ILs in Vietnam and they will be replaced by batches of 20 million good quality CFLs each during years two, three, and four<br>• From 2nd year onwards, in 3 years all 60 million ILs will be replaced<br>• Replacement of ILs and installation of CFLs will begin from the beginning of 2nd year of the project and the CO2 savings that would accrue at the end of that year have been prorated at half of the 20 million CFLs |

| | | | |
|---|---|---|---|
| | | | installed during the year |
| | Total $CO_2$ equivalent emissions reduction at the end of the project | 2,224,766.25 ton | • 0.43 kg $CO_2$/kWh Project Brief, Vietnam Promoting Energy Conservation in Small and Medium Enterprises (PECSME), www.gefweb.org. This is the most conservative estimate coming from GEF projects |
| REPLACEMENT OF POOR QUALITY CFLs WITH GOOD QUALITY CFLs | Reduction in watts from replacement of poor quality CFLs with good quality CFLs | 3.75 watt | • Based on report on" Phasing in Quality – Harmonization of CFLs to help Asia address climate change" report by USAID, Asia one poor quality CFL consumes 18.75 watt and for the same luminance one good quality CFL consumes 15 watts |
| | Total electricity savings per year from 8.33 million installed CFLs | 39.922 million kWh | • It will take one year to set up local production lines for good quality CFLs<br>• Each year 23.5 million poor quality, illegally imported CFLs and 1.5 million poor quality, locally produced CFLs enter the market<br>• Assuming 33% reduction in illegal imports each year from the second year of project implementation onwards 8.33 million of poor quality<br>• CFLs are to be replaced each year during years two, three, and four<br>• Replacement of poor quality CFLs and installation of good quality CFLs will begin from the beginning of 2nd year of the project and the $CO_2$ savings that would accrue at the end of that year have been prorated at half of the 8.33 million CFLs installed during the year<br>• From 2nd year onwards, in 3 years all 25 million poor quality CFLs will be replaced<br>• According to the approved CDM methodology AMS-2J. Average working of one lighting fixture is 3.5 hours each day for 365 days a year |
| | Electricity savings at the end of the project | 179.648 million kWh | • Each year 23.5 million poor quality, illegally imported CFLs and 1.5 million poor quality, locally produced CFLs enter the market<br>• Replacement of poor quality CFLs and installation of good quality CFLs will begin from the beginning of 2nd year of the project and the $CO_2$ savings that would accrue at the end of that year have been prorated at half of the 8.33 million CFLs installed during the year<br>• In 3 years 25 million poor quality CFLs will be replaced |
| | Total $CO_2$ equivalent emissions | 77,249 ton | • 0.43 kg $CO_2$/kWh Project Brief, Vietnam Promoting Energy Conservation in Small and Medium Enterprises (PECSME), www.gefweb.org |

| | | | |
|---|---|---|---|
| | reduction at the end of the project | | |
| | Total electricity savings | 5,353.523 million kWh | |
| | Total $CO_2$ equivalent emissions reduction by the end of the project | 2.302 million ton | |
| | Additional emission reduction over the lifetime of the CFLs. | 2.966 million ton | |
| | Total $CO_2$ equivalent emissions reduction (Minimum) | 5.268 million ton | • Three years after project completion |
| | Avoided additional required power generation capacity at peak load (thermal power plant case) | 754 MW | • Assumed plant load factor: 90% and T&D losses: 9.35% (see www.jica.go.jp/english/operations/.../oda.../e_project27_full.pdf )<br>• Assuming that the energy savings would be at peak load |
| | Avoided additional required power generation capacity at peak load (hydropower plant case) | 1,698 MW | • Assumed plant load factor: 40% and T&D losses: 9.35%<br>• Assuming that the energy savings would be at peak load |

193. The environmental impact assessment conducted during the PPG phase of the project has highlighted a very important issue regarding use of mercury in the CFLs as opposed to nil in the ILs. Although there is no mercury emission during the lifetime usage of CFLs, but the mercury in the CFLs becomes a problem once the CFLs are discarded. It also means that there has to be good recycling and disposal system to effectively avoid emission of mercury in the environment. Such a system doesn't exist yet and the Project will provide guidance to policy makers with regard to framing regulations and guidelines on recycling and safe disposal of the CFLs

194. A recent survey in India on the amount of mercury in a CFL reveals that the mercury in poor quality CFLs is in the range of 4 mg to as high as 40 mg per CFL. However the mercury in

the CFLs can be brought down to be in the range of 3 mg to 5 mg per CFL. Therefore as targeted under the Project the improvement in the quality of CFLs would also result in less mercury use per CFL.

195. The improvement in the quality of CFLs would also result in increase in the operational life of a CFL. The life of poor quality CFL is typically less than 3,000 hours whereas that of medium quality is 6,000 to 8,000 hours and that of highest quality is more than 8,000 hours. Increase in the operational life of a CFL would also result in less number of CFLs being discarded and sent for disposal. For a typical case of a poor quality CFL being replaced by a good quality CFL, the amount of mercury to be disposed off in the landfill would be reduced by 50% over a four year period cycle approximately. Nevertheless, CFLs can be recycled, where possible, to maximize mercury savings and minimize mercury contamination

196. Power generation using coal also leads to mercury emissions in the environment. Studies have shown that 0.016 mg mercury is emitted in the environment per unit (kWh) of electricity produced[31]. Assuming that the reduction in the electricity consumption would lead to reduced production of electricity from only the coal based thermal power stations in Vietnam, since the thermal power stations are the most inefficient and least cost effective, therefore 5,353.523 million kWh of electricity saved during the project cycle would result in reduction in mercury emission into the environment by 85.65 kg.

197. Successful implementation of the Project, which is about the phase-out of ILs, will effectively contribute to the improvement of energy utilization, efficiency of lighting systems, reduction in the emissions of greenhouse gases and other pollutants such as mercury, dust sulphur, and nitrogen oxides, and reduction of household energy costs. However, if they are not properly recycled or disposed of, CFLs may release mercury into the environment. Also, if a CFL is broken, mercury vapours will be released. Therefore, to promote better environmental practices in the lighting industry in Vietnam, some possible interventions would include:

- Regulations and enforcement enhancement

198. Strengthen resources and institutional capability to implement Vietnam's legal framework on solid and hazardous waste management, especially for enforcement and supervision of waste management practices. In addition, Vietnam should consider relevant regulations to require CFL manufacturers to share the costs and responsibility for recycling the mercury contained in bulbs, and require users to separate broken or used CFLs from other organic domestic waste or to transport them to a hazardous waste collection center for recycling.

- User's awareness and responsibility raising

199. There is a need to strengthen the user's awareness of the danger of used or broken CFLs and their role and responsibility in transporting CFLs to hazardous waste collection center for recycling.

[31] Office of Solid Waste and U.S. Environmental Protection Agency, Final Report on "Mercury Emissions from the Disposal of Fluorescent Lamps", February 2008

- Strengthening the disposal and recycling of used or broken CFLs

200. Proper disposal and recycling of CFLs are important because of their mercury content. If the bulbs break during use or are not properly collected and recycled at end of life, the mercury can enter the environment. Therefore, there is a need for the safe disposal of used or broken CFLs. There are three disposal methods for CFLs: recycling, incineration, and land filling. The best method for disposal is the systematic collection and recycling of CFLs that ensures that various materials, including mercury, are recovered and recycled or disposed of in an environmentally sound way.

201. All the components of CFLs can be recycled, including metal end caps, glass tubing, mercury, and phosphor powder. The metal portions can be sold as scrap metal, the glass can be manufactured into other glass products, and the mercury can be recycled into new fluorescent light bulbs and/or other mercury-added devices. Therefore, the recycling of the CFL's components would also reduce the need for production of raw materials.

202. Therefore, to promote recycling of CFLs, retail collection programs need to be developed. Also government agencies, utilities, manufacturers, and other organizations should take the responsibility for promoting CFL recycling whereby the manufacturers would have prime responsibility to ensure that at the end of a lifetime of a CFL the environment will not be worse off in comparison with the time when the CFL was placed in the market.

- Strengthening of CFL disposal in landfills

203. Such CFLs must be kept in designated areas, which should be regularly tested for any mercury leaching into the underlying soil, and if an unacceptable level is reached, further remediation action must be undertaken immediately.

### *3.11 Critical Success Factors*

204. Successful implementation of the Project very much depends upon taking into account key issues in the project design and implementation. The key issues that should receive proper attention in order to positively influence the project deliverables include:

- Necessary staff and skills to implement such project in Vietnam.
- Inclusion of adequate provisions to sustain the Project.
- A supportive policy environment, including proactive commitment by GoV and major energy sector players.
- Visible successes at the early stage of the project implementation in order to gain a strong government and public support for continuing such activities.
- Establishment of financing programs, such as revolving funds for residential users and parallel financing programs for commercial/industrial customers, during the design and implementation of such project in Vietnam.
- Well-designed public awareness campaigns are critical to Demand-side Management (DSM) program successes.
- Managerial and financial autonomy must be guaranteed for DSM units.

205. The Project will have significant positive impacts in terms of macroeconomic, social, and environmental impacts. All workers in the plants will be adequately trained in the manufacture of CFLs and they will continue to work in accordance with Labour Law provisions. There will neither be any displacement and/or resettlement of persons nor and voluntary or involuntary land acquisition under the Project and thus the inclusion of specific social safeguards is not required.

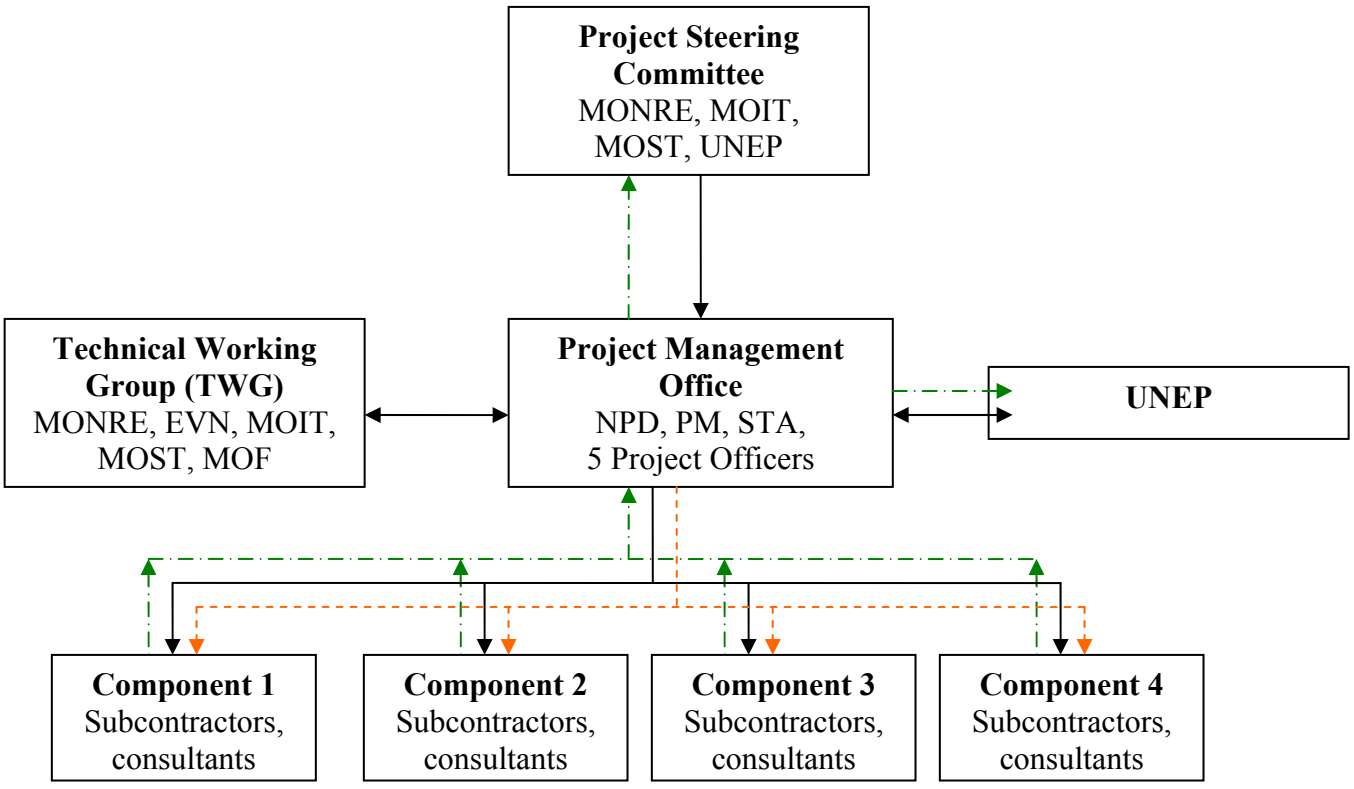
**Section 4: Institutional Framework and Implementation Arrangements**

***Project Management and Supervision***

206. ISOPONRE under MONRE is to carry out the Project; however, since under other GEF-financed projects ISOPONRE has shown to require further strengthening to successfully execute projects, it will be supported by UNEP/DTIE as the official executing agency for the Project. For this purpose UNEP/DTIE will cooperate with ISOPONRE and UNEP/DTIE in cooperation with ISOPONRE will be accountable to GoV and UNEP/GEF for ensuring (i) achieving the project objectives; (ii) the substantive quality of the project; (iii) the effective use of both international and national resources allocated to it; (iv) the timely availability of financing to support project implementation; (v) the proper coordination among all project stakeholders; in particular national parties; and (vi)timely submission of all project reports, including work plans and financial reports.

207. The project management arrangement is expected to consist of following:

- The Project Steering Committee (PSC)
- The National Project Director (NPD)
- The Project Management Office (PMO)
- The Technical Working Group (TWG)



: project management line
: reporting line
: financial flow

**Figure 10: Proposed Project Implementation Arrangement**

***Steering Committee***

208. The Project Steering Committee (PSC) will consist of high level representatives from MONRE, MOST, MOIT, and UNEP. It will be chaired by the Vice-Minister of MONRE. The primary roles of the PSC are: (i) to provide overall guidance to the implementation of the project, (ii) to ensure good coordination among participating agencies, sectors and international organizations. The PSC meets at least once a year, to discuss the progress of the project and provide future guidance.

***National Project Director***

209. The Director General of ISPONRE is expected to be the National Project Director (NPD). The NPD's overall role is to ensure the successful execution and implementation of the project toward achieving project results. The NPD represents MONRE and is accountable to the Government and UNEP for the substantive quality of the Project and for the proper use of project resources. The NPD is responsible for mobilizing all national and international project inputs in a timely manner, supporting project management and implementation, organizing project activities in accordance with the project work plan, and reporting to MONRE and UNEP the progress and the financial status of the Project.

***Project Management Office (PMO)***

210. ISPONRE will create a PMO that will be responsible for the overall operational and financial management and reporting of the GEF funds in accordance with the rules and regulations for nationally executed projects (see figure 4). The PMO will manage day-to-day operations of the Project, and will be based at the premises of ISPONRE. The structure of the PMO is presented in figure 5.

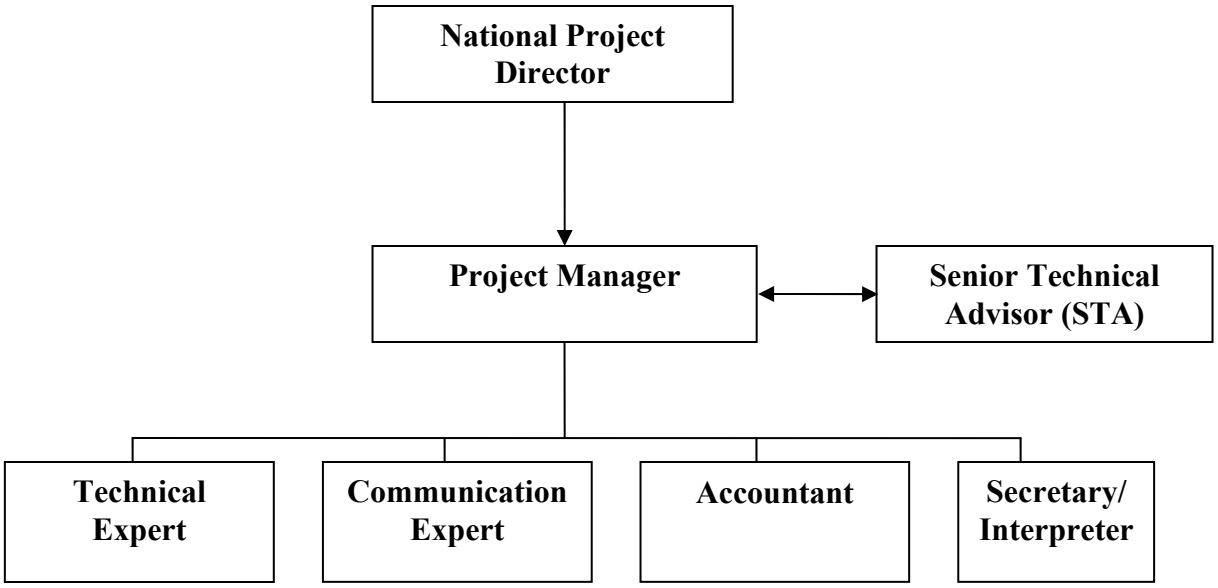



**Figure 11: Project Management Office (PMO)**

211. The PMO will comprise seven members, including: (i) the NPD who works part-time for the project as in-kind contribution of the Government; (ii) project manager; (iii) senior technical advisor; (iv) technical expert; (v) communication expert; (vi) accountant and; (vii) secretary/interpreter. The international senior technical advisor (STA) will not be a permanent staff but will be recruited from time to time to assure the quality of the outputs. In addition, a number of subcontractors and international experts will support the PMO as and when needed to undertake the project activities.

212. The PMO will prepare quarterly progress reports to review achievement in the previous quarter, prepare financial report and develop work plan and budget for next quarter. All such documents would be endorsed by the UNEP Task Manager. The PMO will also hold quarterly meetings with the UNEP/DTIE (part-time) coordinator[32] during visits to Vietnam to discuss the quarterly progress report, a quarterly work plan, a quarterly budget and any other relevant issues. It will also produce annual progress reports, which must be submitted to the SC at least two weeks before the annual meeting. At the end of the project, the PMO will produce the terminal report, which is to be submitted to the SC at least two weeks before the final meeting.

***Technical Working Group***

213. A Technical Working Group (TWG) will be established to provide overall comments of key program activities including fund commitments and co-financing arrangements. The TWG will consist of ISPONRE, senior representatives from the relevant departments of MONRE, MPI, MOST, MOIT, MOF as well as ESL production companies, lighting R&D institutions, and lighting industry associations. The TWG will meet regularly during the project implementation.

[32] The UNEP/DTIE part-time coordinator will be based in UNEP's Regional Office for Asia and the Pacific in Bangkok, Thailand.

Considering the typical gestation period for obtaining GEF funding commitment, actual project development, evaluation and approval, it is anticipated that the project will kick-off by July 2010. It will operate for a period of 4 years until 31 July 2014. A detailed project implementation plan will be formulated after preparation and discussion with the UNEP international consultant.

214. Implementation of any project activity goes through following steps:

(i) Preparation of the work plan, development of Terms of Reference (TOR);
(ii) Recruitment of consultants;
(iii) Verification of the outputs quality;
(iv) Documentation, printing of the output; and
(v) Dissemination

**Section 5: Stakeholder participation**

215. The following stakeholders will be involved in further project implementation by using appropriate mechanisms and channels. While direct consultations, specific workshops, and associated public awareness raising and training are envisaged to be the main channels for the involvement of institutional stakeholders, the broader consumer surveys and public media are expected to be more applicable for reflecting the views of individual consumers.

216. The Project seeks to build on the competencies of all stakeholders by creating a discussion platform to bring all views to the table and draw up the final orientation and guidance towards achieving project outcomes. At the implementation level, each involved stakeholder will play a central role based on its areas of expertise to ensure the delivery of outcomes and outputs. The level of participation of key national stakeholders is outlined hereafter.

| **Stakeholders** | **Roles** |
|---|---|
| MONRE | MONRE is the lead state agency that is responsible for the management of natural resources and the environment in Vietnam. As such, it will coordinate the necessary government support and insight. It will also preside over the Project Steering Committee (PSC). MONRE will also liaise with the Global Market Transformation for Efficient Lighting project. |
| ISPONRE | ISOPONRE is the executing partner for UNEP/DTIE under the Project. It will be responsible for management and monitoring the implementation of the Project for which it will create a PMO at its premises. It will be responsible for organizing stakeholder participation, as required. |
| MOIT | MOIT will take the lead in for the development of the ESL enhancing policy and roadmap/plan for phasing out ILs. It will also collaborate with MOF to develop the financial incentive policies to manufacturers to change their production to ESLs from ILs. It will partly participate in the information dissemination program, awareness raising, and study/research on CFLs and ILs in the Vietnamese market. It will also participate in the PSC meetings. |
| MOST | MOST will participate in capacity building with regard to QA/QC of ESLs, and help strengthen relevant standards in line with regional and international standards. MOST will also participate in the development of a quality control system and the upgrade of a national laboratory testing capacity. Under MOST, VSQI and QUATEST 1 and 3 will be partners and beneficiaries of the Project. VSQI will directly participate in the standards development process while QUATEST 1 and 3 will be the laboratories for testing lighting products. MOST will also participate in PSC meetings. |
| STAMEQ | STAMEQ is part of MOST and is responsible for the development of EE standards for energy use and products. It also supervises the national testing laboratories and as such |

| | |
|---|---|
| | will be involved in the Project through QUATEST 1 and 3. |
| MOF | MOF will participate in the development of financial incentive policies to promote the transformation from the production of ILs to ESLs. Implementing partners under MOF include the Customs Administration, which will be involved in the Green Customs program and the Department of Tax Policy, which will be responsible for the development of incentive fiscal tools. |
| MOET | MOET will participate in awareness raising activities mainly through the education system. |
| EVN | EVN will participate in the development and implementation of the national social marketing campaign and cooperate with MOIT and VLA in conducting the lighting market study, raising the awareness of the general population, and conducting pilot projects in the cities/provinces. |
| Rang Dong Company | Under the Project the company will receive support to change its production lines from manufacturing ILs to manufacturing good quality ESLs. It will also contribute to awareness raising about the benefits of ESLs. |
| Dien Quang Company | Under the Project the company will receive support to change its production lines from manufacturing ILs to manufacturing good quality ESLs. It will also contribute to awareness raising about the benefits of ESLs. |
| VLA | VLA will participate in the exchange of information and studies on the lighting market in Vietnam and contribute to awareness raising about the benefits of ESLs. |
| VTV2 and NGOs | VTV2 and NGOs will participate in the dissemination of information and awareness raising campaigns about the benefits of ESLs. |

217. Other major stakeholders identified for the successful implementation of the proposed project include: (i) professional associations like the Association of Architects, the Association of Professional Engineers and the Regional Chamber of Agriculture, (ii) Non-Governmental Organizations (NGOs) particularly those working on environmental protection and natural resources conservation and (iii) the civil society associations for dissemination of information materials on the best operation and maintenance practices for electricity consuming household equipment.

## Section 6: Monitoring and Evaluation Plan

### Progress and Financial Reports

218. The Project will follow UNEP standard reporting and evaluation processes and procedures. Reporting is an integral part of the UNEP project manager's responsibility, including obtaining the necessary inputs from any subcontracted partners. A unified half-yearly "Progress & Financial Report" will be submitted to the relevant Programme Framework Coordinating Division in an electronic format with a copy to UNEP/QAS by:

- July 31 for the period between January 1 and June 30 or parts thereof for any given year.
- January 31 for the period between July 1 and December 31 or parts thereof for any given year.
- The last Progress & Financial Report (Final Report) must be submitted within 60 days of project closure.

### Monitoring

- ***Project Inception Phase***

219. A Project Inception Workshop (IW) will be conducted and led by an international consultant hired by the UNEP/DTIE. The workshop will gather national institutions involved in project implementation, key stakeholders, co-financing partners, the UNEP/DTIE representatives and representatives from the UNEP/GEF regional coordinating unit as well as UNEP and GEF headquarters representatives. The IW will enable the project team and key stakeholders to fully understand the ownership of the project goals and objectives as well as finalize the preparation of the project's first Annual Work Plan based on the project logframe matrix. Some of the key activities that will be undertaken during the IW include: (i) a review of the logframe indicators, means of verification, assumptions, and (ii) finalization of the Annual Work Plan (AWP) with precise and measurable performance indicators and in a manner that is consistent with the expected outcomes of the project.

220. The IW will also provide the project stakeholders with the opportunity to detail and understand their roles and mainly that of the project team and the support services and complementary responsibilities of the UNEP/DTIE vis-à-vis the project team. Moreover, the IW will provide a detailed overview the UNEP and GEF reporting and monitoring and evaluation (M&E) requirements, with particular emphasis on the Annual Project Implementation Reviews (PIRs) and related documentation, the Annual Project Report (APR), Tripartite Project Review (TPR) meetings, as well as midterm and final evaluations. The terms of reference for project staff and decision-making structures will be discussed again as needed in order to clarify, for all, each party's responsibilities during the project implementation phase.

- ***Inception Report***

221. A project Inception Report (IR) will be prepared immediately following the IW. It will include a detailed first year Annual Work Plan divided in quarterly timeframes detailing the activities and progress indicators that will guide implementation during the first year of the

project. This work plan will include the dates of specific field visits, support missions by the GEF focal point in Vietnam or UNEP/DTIE or consultants, as well as timeframes for meetings of the project decision-making structures. The report will also include the detailed project budget for the first full year of implementation, prepared on the basis of the AWP, and any monitoring and evaluation requirements to effectively measure project performance during the targeted twelve-month timeframe.

222. The IR will include a more detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners. In addition, a section will be included on progress to date on project establishment and start-up activities and an update of any changed external conditions that may affect project implementation. When finalized, the report will be circulated to project counterparts who will be given a period of one calendar month in which to respond with comments or queries. Prior to the circulation of the IR, the GEF focal point in Vietnam, and UNEP/DTIE will review the document.

- ***Monitoring Activities***

223. The PMO will formulate, in consultation with the project implementation partners and stakeholder representatives, a detailed schedule of project review meetings and requirements that should be incorporated in the project IR. The project team will be supported by the UNEP/DTIE in addressing any difficulties that might occur in the monitoring process.

224. The M&E plan will be fine-tuned at the IW by the project team, the UNEP and GEF representatives and key stakeholders. Specific targets for the first year implementation progress indicators together with their means of verification will be developed at this workshop. These will be used to assess whether project implementation is proceeding at the intended pace and in the right direction and will form part of the AWP. The local project implementing agencies will also take part in the IW in which a common vision of overall project goals will be established. Targets and indicators for subsequent years will be defined annually as part of the internal evaluation and planning processes undertaken by the project team.

***a) Periodic Monitoring and Implementation Progress***

225. This will be undertaken by the UNEP/DTIE and the GEF focal point through periodic meetings with the project stakeholders. The periodicity of the meetings will be decided at the IW on a consensus basis. This will allow the different parties involved in project implementation to ensure that the implementation of the project is smooth by addressing, in a timely fashion, difficulties that might need to be dealt with in the course of the implementation phase. The GEF focal point in Vietnam, some members of the PSC and the UNEP/DTIE will pay periodic field visits to pilot project sites based on an agreed upon schedule with project stakeholders during the IW. A field visit report must be produced by the GEF focal point and circulated no less than two weeks after the visit to the Project Management Unit, the PSC members and the UNEP/DGEF.

***b) Annual Monitoring***

226. This will occur through the TPR. The project will be subject to a TPR, which is the highest policy level meeting of all the parties involved in project implementation, at least once in a year. The first such meeting will be held within twelve months after the inception of the Project. The PMO will prepare an APR and submit it to the UNEP/DGEF at least two weeks prior to the TPR for review and comments. The APR will serve as a basis for the discussions during the meetings. The project proponent will present the APR at the TPR, highlighting policy issues and recommendations for the decisions of the participants. The project proponent will also inform the participants of any agreement reached by stakeholders during the APR preparation on how to resolve operational issues. Separate reviews of each project outcome may also be conducted if necessary.

***c) Terminal Tripartite Review (TTR)***

227. This meeting will be held in the last month of project operations. The project team will be responsible for drafting the Terminal Project Report (TPR) and submitting it to the UNEP/DGEF, at least two weeks before the TTR meeting is held, for their review and comments. The TTR discussions during the meeting will be based on the TPR. The Terminal Tripartite Review will consider the implementation of the project as a whole, paying particular attention to whether the project has achieved its stated objectives and contributed to the broader environmental objective. It will be the basis for the decision on whether any actions are still necessary, particularly in relation to the sustainability of project results and act as a vehicle through which lessons learned can be captured to feed into other projects under implementation of formulation.

**Project Monitoring Reporting**

***a) Annual Project Report (APR)***

228. The format of the APR is flexible, but should at least include the following points: (i) an analysis of project performance over the reporting period, including the outputs produced and, where possible, information on the status of the outcomes, (ii) the constraints experienced in the progress towards results and the reasons for these, (iii) the major constraints to achieving the results, (iv) Annual Work Plan (AWP), and (v) lessons learned and clear recommendations for future orientation in addressing the key problems in the lack of progress.

***b) Project Implementation Review (PIR)***

229. The GEF monitoring procedures and policies require a PIR, which is an annual monitoring process. The scope and content (template) of the PIR will be defined by the GEF and will be provided by UNEP/DGEF to PMO. It has become an essential management and monitoring tool for project managers and offers the main vehicle for extracting lessons from ongoing projects. Once the project has been under implementation for a year, a PIR must be completed by the project team leader together with the UNEP/DTIE representative and the GEF focal point. The PIR can be produced any time during the year and, ideally, prior to the TPR. The

PIR should then be discussed at the TPR so that the result would be a PIR that has been agreed upon by the Project Management Team, the GEF and the UNEP/DTIE.

***c) Other Reports***

230. Other reports that will be prepared and submitted include:

- ***Periodic Progress Reports***

231. Short reports outlining main updates in project progress will be provided periodically by the Project Management Unit to the GEF focal point and the UNEP/DTIE.

- ***Periodic Thematic Reports***

232. The project team may prepare, upon request by the UNEP/DGEF, Specific Thematic Reports (STRs). The STRs will focus on specific issues or areas of activity covered by the project. The request for a thematic report will be provided to the project team in written form by UNEP and the GEF and will clearly state the issue or activities that need to be reported on. These reports can be used as a form of lessons learned exercise, specific oversight in key areas or as troubleshooting exercises to evaluate and overcome obstacles and difficulties encountered. It is recommended that UNEP/DGEF minimize its request for thematic reports. In case such reports are necessary, the project team should be given a reasonable timeframe for the production of the report by the project team.

- ***Terminal Project Report***

233. During the last three months of project implementation, the project team will prepare the Terminal Project Report. This comprehensive report will summarize all the activities, achievements and outputs of the project, including lessons learned, objectives met or not achieved and structures and systems implemented. It will be the definitive statement of the project activities during its lifetime. It will also lay out recommendations for any further steps that may need to be taken to ensure the sustainability and replication of the project activities.

**Evaluation**

234. The Project will be subject to a minimum of two independent evaluations in line with UNEP and GEF M&E policies and procedures. The evaluations include the following.

***a) Midterm Evaluation***

235. An independent midterm evaluation will be carried out in the middle of the project lifetime. The midterm evaluation will determine the progress being made towards the

achievement of outcomes and will identify course correction if needed. It will assess the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. The findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project term. The organization, terms of reference and timing of the midterm evaluation will be decided after consultation between the project parties.

***b) Final Evaluation***

236. An independent final evaluation will be undertaken three months prior to the TTR meeting and will focus on the same issues as the midterm evaluation. It will apply the norms and standards of the UNEP/DGEF as far as evaluation is concerned. The evaluation will first assess the achievement of outputs and outcomes and provide ratings for targeted objectives and outcomes. Secondly, it will assess the likelihood of the sustainability of the outcomes at project termination and provide a rating for this. Thirdly, it will assess the minimum M&E requirements. Lastly, the final evaluation will also look at the impacts including the contribution to capacity development, the achievement of global environmental goals and the lessons learned as in the midterm evaluation. The final evaluation should also provide recommendations for follow-up activities. The template of the terms of reference for this evaluation will be prepared by the UNEP/DGEF based on their evaluation procedures and will clearly indicate the information that must be included in the evaluation report. The monitoring and evaluation (M&E) plan is summarized in the following table 6.

**Table 6: Monitoring and Evaluation (M&E) Plan**

| M&E Activity | Description | Responsible Parties | Timeframe |
|---|---|---|---|
| Progress and Financial Reports | • Part of UNEP procedures for project monitoring.<br>• Detailed progress reports and financial reports with justification of any change. | • UNEP project coordinator<br>• Support : PMO and ISOPONRE | • Two reports for any given year (July 31 and January 31)<br>• Last Progress & Financial Reports (Final Reports) within 60 days of project closure |
| Inception Report | • Report prepared immediately following the IW.<br>• Includes a detailed AWP for the first year, as well as an overview of AWPs for subsequent years, divided in quarterly timeframes detailing the activities and progress indicators.<br>• Includes the dates of specific field visits, support missions by the GEF focal point in Algeria or the UNEP/DTIE or consultants, as well as timeframes for meetings of the project | • Execution: PMO, ISOPONRE, UNEP DTIE | • Immediately following project start-up |

| | | | |
|---|---|---|---|
| | decision-making structures.<br>• Details project budget, a more detailed narrative of institutional responsibilities, coordinating actions and feedback mechanisms and any monitoring and evaluation requirements. | | |
| Progress Reports | • Short progress reports describing project activities implementation status.<br>• Thematic periodic reports could also be prepared to focus on specific issues or areas of activity covered by the project. | • Execution: PMO<br>• Support: UNEP/ DTIE, ISOPONRE | • Quarterly<br>• As necessary for the thematic reports |
| Annual Project Reports (APR) | • Analyzes project performance over the reporting period.<br>• Describes constraints experienced in the progress towards results and the reasons<br>• Describes the AWP and the detailed budget for activities implemented.<br>• Draws lessons and makes clear recommendations for future orientation in addressing the key problems in the lack of progress. | • Execution: PMO, ISOPONRE<br>• Support: UNEP/ DTIE and government counterparts | • Yearly |
| Project Implementation Review (PIR) | • Annual monitoring process mandated by the GEF. This is an essential management and monitoring tool for project managers.<br>• Prepared in collaboration with UNEP Coordination and government counterparts within a year of project start.<br>• The PIR is discussed during the Tripartite Project Review meeting and approved by the government, GEF, and UNEP/DTIE. | • Execution: UNEP/ DTIE<br>• Support: PMO and ISOPONRE<br>• Approval: PSC and Tripartite Project Review meeting | • Yearly |
| Tripartite Project Review (TPR) | • Highest policy-level meeting of the parties directly involved in project implementation.<br>• The project team will prepare and submit an Annual Project Report (APR) to UNEP/DGEF at least two weeks prior to the TPR for review and comments. | • Execution: UNEP/ DTIE<br>• Input: Government counterparts<br>• Support: PMO and ISOPONRE | • At least once every year upon receipt of the APR |
| Terminal Tripartite Review (TTR) | • The project team will draft and submit a Terminal Project Report (TPR) to the UNEP/DGEF, at least two weeks before the TTR meeting for their review and comments.<br>• The TTR will consider the implementation of the project as a whole with a focus on the achievement of its stated objectives and contribution to the broader environmental objective.<br>• Decides whether any action is needed to achieve the sustainability of project results. | • Execution UNEP/DTIE<br>• Input: Government counterparts<br>• Support: PMO and ISOPONRE<br>• Approval: PSC and Terminal Tripartite Review meeting | • Last month of project closure |

| | | | |
|---|---|---|---|
| | • Draws lessons to be captured into other projects. | | |
| Project Terminal Report | • Comprehensive report summarizing all activities, achievements, lessons learned, objectives met or not achieved structures and systems implemented, etc.<br>• Lays out recommendations for any further steps that may need to be taken to ensure the sustainability and replication of project activities. | • Execution: UNEP/ DTIE<br>• Contribution: Government<br>• Support: PMO and ISOPONRE | • Last three months of project implementation |
| Midterm Independent Evaluation | • Determines progress being made towards the achievement of outcomes and identifies course corrections if needed.<br>• Focuses on the effectiveness, efficiency and timeliness of project implementation; highlights issues requiring decisions and actions; and presents initial lessons learned about project design, implementation and management. | • Execution: independent consultants<br>• Input: PMO, ISOPONRE, UNEP/DTIE, | • At the midpoint of project implementation |
| Final External Evaluation | • Focuses on the same issues as the midterm evaluation.<br>• Looks at the impacts and sustainability of the results, including the contribution to capacity development and the achievement of global environmental goals. | • Execution: independent consultants<br>• Input: PMO, ISOPONRE, UNEP/DTIE | • Three months prior to the terminal TPR meeting |

## Section 7: Project Financing and Budget

### *7.1 Overall Project Budget*

237. The total cost of the Project is US$ 25.152 million of which US$ 2.94 million is being requested from the GEF with the remainder of US$ 22.212 million being provided as in-kind and cash contribution by government organizations and the private sector. The overall project budget is shown in table 7 below while the detailed GEF budget is shown in Appendix 1 in accordance with the UNEP budget line format.

**Table 7: Overall Project Budget by Component**

| Project Components | GEF Financing (a) | | Co-Financing (b) | | Total (US$) (c=a+ b) |
|---|---|---|---|---|---|
| | (Million US$) | % | (Million US$) | % | |
| 1. Local lighting industry capacity enhancement program | 0.600 | 5 | 12.417 | 95 | 13.017 |
| 2. Improved QA/QC framework | 0.600 | 8 | 6.500 | 92 | 7.100 |
| 3. ESL market transformation and consumer education and awareness | 0.915 | 34 | 1.745 | 56 | 2.660 |
| 4. National policy and institutional support pro-gram towards phasing-out of ILs and promotion of ESLs | 0.350 | 26 | 1.000 | 74 | 1.350 |
| 5. Project Performance & National Impact M&E System | 0.175 | 25 | 0.150 | 75 | 0.325 |
| 6. Project management | 0.300 | 43 | 0.400 | 57 | 0.700 |
| Total Project Costs | 2.940 | 12 | 22.212 | 88 | 25.152 |

### *7.2 Project Co-financing*

238. The co-financing sources as well as the contributions are summarized in table 7 below. See appendix 2 for detailed information about the co-financing in accordance with the UNEP budget line format.

**Table 8: Summary of Co-financing**

| Name of Co-financier (source) | Classification | Type | Project (US$) | % |
|---|---|---|---|---|
| Vietnam Energy Efficiency and Conservation /MOIT | Beneficiary | In-kind | 1,000,000 | 4.5 |
| ISPONRE | Executing agency | In-kind | 585,000 | 2.6 |
| Institute of Energy | Beneficiary | In-kind | 300,000 | 1.3 |
| VEA | Beneficiary | In-kind | 550,000 | 2.5 |
| Vietnam Standard Quality Institute | Beneficiary | In-kind | 600,000 | 2.7 |
| QUATEST 1 (testing laboratory) | Beneficiary | Cash<br>In-kind | 30,000<br>580,000 | 0.1<br>2.6 |
| QUATEST 3 (testing laboratory) | Beneficiary | In-kind | 5,000,000 | 22.5 |
| Vietnam Lighting Association | Beneficiary | In-kind | 150,000 | 0.7 |
| Rang Dong (lighting manufacturer) | Private sector | Cash<br>In-kind | 1,790,000<br>8,127,000 | 8.1<br>36.6 |
| Dien Quang (lighting manufacturer) | Private sector | Cash<br>In-kind | 150,000<br>3,350,000 | 0.7<br>15.1 |
| Total Co-financing | | | 22,212,000 | 100.0 |

### *7.3 Project Cost-effectiveness*

239. The successful implementation of the Project will result in GHG emissions reduction resulting from the transformation to a market for EE lighting products of a minimum of 5.268 million ton after three years of project completion as a result of the replacement of ILs with CFLs and other ESLs. This translates into an approximate unit abatement cost of US$ 0.58/ton of $CO_2$ equivalent. The cost effectiveness of the GEF contribution to the proposed project is acceptable as it demonstrates that the GEF cost of the Project are competitive when compared to a $CO_2$ abatement cost of at least US$ 5/ton of $CO_2$ for other GHG emissions reduction mechanisms.

240. The expected global environmental benefits are much larger than the estimate presented in this document as the market in Vietnam for good quality ESLs will continue to expand and more advanced ESL technologies will be introduced and used. Besides, the technical tools and the regulatory framework as well as the financial incentives to be developed under the proposed project are also expected to be relevant for the introduction of other clean energy technologies in Vietnam and the development of a market for such technologies. The main national and local benefits include:

- Providing an alternative to the population producing direct costs savings compared to the traditional ILs (EE lighting products are most efficient and last up to 10 times longer than ILs).
- Economic cost savings at the national level and reduced dependency and expenditures on imported fossil fuels.
- The promotion on non-mercury technologies will likewise contribute to cost savings in terms of the eventual disposal costs of mercury-containing CFLs.
- Reduced pressure (and peak load reduction) on the power system, which in many countries is already suffering from a demand that is exceeding the capacity. The avoided capacity in the order of about 754 MW for thermal power plants.
- Reduced local pollution produced by conventional energy sources (replacing a single incandescent bulb with a CFL will keep a half-ton of $CO_2$ out of the atmosphere over the life of the bulb. Saving electricity reduces $CO_2$ emissions, sulfur oxide and high-level nuclear waste).
- Enhanced employment opportunities and development of the country's SME sector in the lighting industry, particularly in Asia.
- Enhanced product quality.
- Can be used for scaling up energy efficiency, on a replicable basis.
- Providing financial benefits to the consumers (although initially more expensive, the consumers save money in the long run because energy-efficient lighting products use 1/3 of the electricity consumed by incandescent bulbs and last up to 10 times longer than incandescent. A single 15 watt CFL instead of a 60 watt incandescent bulb will save about 57.48 kWh in one year.).

# APPENDIXES

## Appendix 1: Reconciliation between GEF Activity Based Budget and UNEP Budget line (GEF funds only US$)

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Project title:* | | | ***"Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam"*** | | | | | | | | | | | |
| *Project number:* | | | | | | | | | | | | | | |
| *Project executing partner:* | | | *UNEP-DTIE/ROAP in collaboration with ISPONRE, Ministry of Natural Resources and Environment (MONRE)* | | | | | | | | | | | |
| *Project implementation period:* | | | *Expenditure by project component/activity (provide description)* | | | | | | | **Insert actual year* | | | | |
| *From :* | | | *Add additional components/activities as required* | | | | | | | *Add additional years as required* | | | | |
| *To:* | | | *Component 1: Local Lighting Industry Capacity Enhancement Program* | *Component 2: Improved QA/QC Framework* | *Component 3: Market Transformation and Consumer Education and Awareness* | *Component 4: National Policy and Institutional Support Program towards Phasing-out of 60 million IIs and Promotion of ESLs* | *Component 5: Project Performance and National Impact M& E System* | *Project Management* | *Total* | *Expenditure by calendar year* | | | | |
| ***UNEP Budget Line*** | | | | | | | | | | *Year 1** | *Year 2** | *Year 3** | *Year 4** | *Total* |
| ***10*** | ***PERSONNEL COMPONENT*** | | | | | | | | | | | | | |
| | *1100* | *Project personnel* | | | | | | | | | | | | |
| | *1101* | *Local Project Managers* | *-* | *-* | *-* | *-* | *-* | *60,000* | *60,000* | *15,000* | *15,000* | *15,000* | *15,000* | *60,000* |
| | *1102* | *UNEP Project Coordinator* | *-* | *-* | *-* | *-* | *-* | *120,000* | *120,000* | *30,000* | *30,000* | *30,000* | *30,000* | *120,000* |
| | *1103* | *Senior Technical Advisor* | *12,000* | *12,000* | *12,000* | *12,000* | *-* | *-* | *48,000* | *12,000* | *12,000* | *12,000* | *12,000* | *48,000* |
| | *1104* | *Technical Expert* | *12,000* | *12,000* | *12,000* | *12,000* | *-* | *-* | *48,000* | *12,000* | *12,000* | *12,000* | *12,000* | *48,000* |
| | *1105* | *Communication Expert* | *12,000* | *12,000* | *12,000* | *12,000* | *-* | *-* | *48,000* | *12,000* | *12,000* | *12,000* | *12,000* | *48,000* |
| | *1106* | *Secretariat/Translator* | *10,000* | *10,000* | *10,000* | *10,000* | *-* | *-* | *40,000* | *10,000* | *10,000* | *10,000* | *10,000* | *40,000* |
| | *1107* | *Accountant* | *10,000* | *10,000* | *10,000* | *10,000* | *-* | *-* | *40,000* | *10,000* | *10,000* | *10,000* | *10,000* | *40,000* |
| | ***1199*** | ***Sub-total*** | ***56,000*** | ***56,000*** | ***56,000*** | ***56,000*** | ***-*** | *180,000* | ***404,000*** | ***101,000*** | ***101,000*** | ***101,000*** | ***101,000*** | ***404,000*** |
| | *1200* | *Consultants* | | | | | | | | | | | | |
| | *1201* | *International expert on ESL production* | *348,000* | *-* | *-* | *-* | *-* | *-* | *348,000* | *160,000* | *140,000* | *48,000* | *-* | *348,000* |
| | *1202* | *International testing and standards expert* | *-* | *120,000* | *-* | *-* | *-* | *-* | *120,000* | *40,000* | *40,000* | *40,000* | *-* | *120,000* |
| | *1203* | *International environmental expert* | *-* | *96,000* | *-* | *-* | *-* | *-* | *96,000* | *8,000* | *36,000* | *36,000* | *16,000* | *96,000* |
| | *1204* | *International marketing campaign expert* | *-* | *-* | *320,000* | *-* | *-* | *-* | *320,000* | *40,000* | *60,000* | *120,000* | *100,000* | *320,000* |
| | *1205* | *International policy expert* | *-* | *-* | *-* | *80,000* | *-* | *-* | *80,000* | *-* | *-* | *40,000* | *40,000* | *80,000* |
| | *1206* | *Local market research expert* | *60,000* | *-* | *-* | *-* | *-* | *-* | *60,000* | *30,000* | *-* | *-* | *30,000* | *60,000* |
| | *1207* | *Local business plan expert* | *80,000* | *-* | *-* | *-* | *-* | *-* | *80,000* | *40,000* | *40,000* | *-* | *-* | *80,000* |
| | *1208* | *Local quality inspection expert* | *-* | *67,000* | *-* | *-* | *-* | *-* | *67,000* | *25,000* | *25,000* | *17,000* | *-* | *67,000* |
| | *1209* | *Local environmental expert* | *-* | *63,000* | *-* | *-* | *-* | *-* | *63,000* | *10,000* | *18,000* | *20,000* | *15,000* | *63,000* |
| | *1210* | *Local marketing expert* | *-* | *50,000* | *80,000* | *-* | *-* | *-* | *130,000* | *-* | *50,000* | *50,000* | *30,000* | *130,000* |
| | *1211* | *Local standards setting expert* | *-* | *32,000* | *-* | *-* | *-* | *-* | *32,000* | *16,000* | *16,000* | *-* | *-* | *32,000* |
| | *1212* | *Local policy expert* | *-* | *15,000* | *58,000* | *133,000* | *-* | *-* | *206,000* | *50,000* | *56,000* | *60,000* | *40,000* | *206,000* |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1213 | Consultants travel | 3,000 | 3,000 | 3,000 | 3,000 | - | - | 12,000 | 3,000 | 3,000 | 3,000 | 3,000 | 12,000 |
| | **1299** | **Sub-total** | **491,000** | **446,000** | **461,000** | **216,000** | **-** | **-** | **1,614,000** | **422,000** | **484,000** | **434,000** | **274,000** | **1,614,000** |
| | 1300 | Administrative Support | | | | | | | | | | | | |
| | 1301 | Assistant | - | - | - | - | - | 32,000 | 32,000 | 8,000 | 8,000 | 8,000 | 8,000 | 32,000 |
| | **1399** | **Sub-total** | **-** | **-** | **-** | **-** | **-** | **32,000** | **32,000** | **8,000** | **8,000** | **8,000** | **8,000** | **32,000** |
| | 1600 | Travel on official business | | | | | | | | | | | | |
| | 1601 | Project staff travel | 3,000 | 3,000 | 3,000 | 3,000 | - | 68,000 | 80,000 | 15,000 | 25,000 | 20,000 | 20,000 | 80,000 |
| | **1699** | **Sub-total** | **3,000** | **3,000** | **3,000** | **3,000** | **-** | **68,000** | **80,000** | **15,000** | **25,000** | **20,000** | **20,000** | **80,000** |
| **1999** | **Component total** | | **550,000** | **505,000** | **520,000** | **275,000** | **-** | **280,000** | **2,130,000** | **546,000** | **618,000** | **563,000** | **403,000** | **2,130,000** |
| | | | | | | | | | | | | | | |
| **20** | **SUB-CONTRACT COMPONENT** | | | | | | | | | | | | | |
| | 2100 | Sub-contracts (MOUs/LOAs for cooperating agencies) | | | | | | | | | | | | |
| | 2102 | National consumer awareness and marketing campaign, including pilot projects | - | - | 315,000 | - | - | - | 315,000 | - | - | 215,000 | 100,000 | 315,000 |
| | **2199** | **Sub-total** | **-** | **-** | **315,000** | **-** | **-** | **-** | **315,000** | **-** | **-** | **215,000** | **100,000** | **315,000** |
| **2999** | **Component total** | | **-** | **-** | **315,000** | **-** | **-** | **-** | **315,000** | **-** | **-** | **215,000** | **100,000** | **315,000** |
| | | | | | | | | | | | | | | |
| **30** | **TRAINING COMPONENT** | | | | | | | | | | | | | |
| | 3300 | Meetings/Workshops | | | | | | | | | | | | |
| | 3301 | Workshops (Component 3) | - | - | 80,000 | - | - | - | 80,000 | - | 20,000 | 30,000 | 30,000 | 80,000 |
| | 3302 | Workshops (Component2) | - | 75,000 | - | - | - | - | 75,000 | 35,000 | 40,000 | - | - | 75,000 |
| | 3303 | Meetings (Component 2) | - | - | - | 25,000 | - | - | 25,000 | - | - | - | 25,000 | 25,000 |
| | 3304 | Workshop (Component 5) | - | - | - | - | 15,000 | - | 15,000 | - | - | - | 15,000 | 15,000[33] |
| | **3399** | **Sub-total** | **-** | **75,000** | **80,000** | **25,000** | **15,000** | **-** | **195,000** | **35,000** | **60,000** | **30,000** | **70,000** | **195,000** |
| **3999** | **Component total** | | **-** | **75,000** | **80,000** | **25,000** | **15,000** | **-** | **195,000** | **35,000** | **60,000** | **30,000** | **70,000** | **195,000** |
| | | | | | | | | | | | | | | |
| **40** | **EQUIPMENT AND PREMISES COMPONENT** | | | | | | | | | | | | | |
| | 4100 | Expendable equipment | | | | | | | | | | | | |
| | 4101 | Office supplies | - | - | - | - | - | 3,000 | 3,000 | 1,000 | 1,000 | 1,000 | - | 3,000 |
| | **4199** | **Sub-total** | **-** | **-** | **-** | **-** | **-** | **3,000** | **3,000** | **1,000** | **1,000** | **1,000** | **-** | **3,000** |
| | 4200 | Non-expendable equipment | | | | | | | | | | | | |
| | 4201 | Office equipment | - | - | - | - | - | 7,000 | 7,000 | 2,000 | 2,000 | 2,000 | 1,000 | 7,000 |
| | **4299** | **Sub-total** | **-** | **-** | **-** | **-** | **-** | **7,000** | **7,000** | **2,000** | **2,000** | **2,000** | **1,000** | **7,000** |
| **4999** | **Component total** | | **-** | **-** | **-** | **-** | **-** | **10,000** | **10,000** | **3,000** | **3,000** | **3,000** | **1,000** | **10,000** |



[33] Workshop is held to Strengthen National M&E System as part of the M&E activities.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **50** | **MISCELLANEOUS COMPONENT** | | | | | | | | | | | | | |
| | 5200 | *Reporting costs* | | | | | | | | | | | | |
| | 5201 | *Technical publications* | *50,000* | *20,000* | *-* | *56,000* | *-* | *-* | *126,000* | *25,000* | *40,000* | *40,000* | *21,000* | *126,000* |
| | **5299** | ***Sub-total*** | ***50,000*** | ***20,000*** | ***-*** | ***56,000*** | ***-*** | ***-*** | ***126,000*** | ***25,000*** | ***40,000*** | ***40,000*** | ***21,000*** | ***126,000*** |
| | 5300 | *Sundry* | | | | | | | | | | | | |
| | 5301 | *Communications* | *-* | *-* | *-* | *-* | *-* | *4,000* | *4,000* | *1,000* | *1,000* | *1,000* | *1,000* | *4,000* |
| | **5399** | ***Sub-total*** | *-* | *-* | *-* | *-* | *-* | ***4,000*** | ***4,000*** | ***1,000*** | ***1,000*** | ***1,000*** | ***1,000*** | ***4,000*** |
| | 5500 | *Evaluation* | | | | | | | | | | | | |
| | 5501 | *Monitoring & Evaluation* | *-* | *-* | *-* | *-* | *160,000* | *-* | *160,000* | *-* | *80,000* | *-* | *80,000* | *160,000* |
| | **5599** | ***Sub-total*** | ***-*** | ***-*** | ***-*** | ***-*** | ***160,000*** | ***-*** | ***160,000*** | ***-*** | ***80,000*** | ***-*** | ***80,000*** | ***160,000*** |
| **5999** | **Component total** | | ***50,000*** | ***20,000*** | ***-*** | ***56,000*** | ***160,000*** | ***4,000*** | ***290,000*** | ***26,000*** | ***121,000*** | ***41.000*** | ***102,000*** | ***290,000*** |
| | | | | | | | | | | | | | | |
| **99** | **GRAND TOTAL** | | ***600,000*** | ***600,000*** | ***915,000*** | ***356,000*** | ***175,000*** | ***294,000*** | ***2,940,000*** | ***610,000*** | ***802,000*** | ***852,000*** | ***676,000*** | ***2,940,000*** |

## Appendix 2: Reconciliation between GEF Budget and Co finance Budget (Total GEF & Co Finance US$)

| | |
|---|---|
| Project title: | **"Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam"** |
| Project number: | |
| Project executing partner: | UNEP-DTIE/ROAP in collaboration with ISPONRE, Ministry of Natural Resources and Environment (MONRE) |
| Project implementation period: | |
| From: | |
| To: | |

| | | | | Co-finance 1: Government/Institutes | | Co-finance 2: Lighting manufacturers | | Co-finance 3: Testing laboratories | | Co-finance 4: Lighting associations | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **UNEP Budget Line** | | | GEF Cash | Cash | In-kind | Cash | In-kind | Cash | In-kind | Cash | In-kind | Cash | In-kind |
| **10** | **PERSONNEL COMPONENT** | | | | | | | | | | | | |
| | 1100 | Project personnel | | | | | | | | | | | |
| | 1101 | Local Project Managers | 60,000 | - | 50,000 | - | 90,000 | - | 50,000 | - | 3,000 | - | 193,000 |
| | 1102 | UNEP Project Coordinator | 120,000 | - | 50,000 | - | 130,000 | - | 20,000 | - | 2,000 | - | 202,000 |
| | 1103 | Senior Technical Advisor | 48,000 | - | 100,000 | - | 450,000 | - | 70,000 | - | 2,000 | - | 622,000 |
| | 1104 | Technical Expert | 48,000 | - | 100,000 | - | 90,000 | - | 35,000 | - | 10,000 | - | 235,000 |
| | 1105 | Communication Expert | 48,000 | - | 100,000 | - | 120,000 | - | 80,000 | - | 3,000 | - | 303,000 |
| | 1106 | Secretariat/Translator | 40,000 | - | 50,000 | - | 50,000 | - | 66,000 | - | 3,000 | - | 169,000 |
| | 1107 | Accountant | 40,000 | - | 50,000 | - | 90,000 | - | 79,000 | - | 2,000 | - | 221,000 |
| | **1199** | **Sub-total** | **404,000** | - | **500,000** | - | **1,020,000** | - | **400,000** | - | **25,000** | **-** | **1,945,000** |
| | 1200 | Consultants | | | | | | | | | | | |
| | 1201 | International expert on ESL production | 348,000 | - | 400,000 | - | 200,000 | - | 230,000 | - | 5,000 | - | 835,000 |
| | 1202 | International testing and standards expert | 120,000 | - | 100,500 | - | 200,000 | - | 380,000 | - | 5,000 | - | 685,500 |
| | 1203 | International environmental expert | 96,000 | - | 45,000 | - | 120,000 | - | 320,000 | - | 2,000 | - | 487,000 |
| | 1204 | International marketing campaign expert | 320,000 | - | 200,000 | - | 150,000 | - | 300,000 | - | 1,000 | - | 651,000 |
| | 1205 | International policy expert | 80,000 | - | 40,000 | - | 75,000 | - | 540,000 | - | 2,000 | - | 657,000 |
| | 1206 | Local market research expert | 60,000 | - | 35,000 | 50,000 | 100,000 | - | 320,000 | - | 3,000 | 50,000 | 458,000 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1207 | Local business plan expert | 80,000 | - | 40,000 | 50,000 | 150,000 | - | 320,000 | - | 3,000 | 50,000 | 513,000 |
| | 1208 | Local quality inspection expert | 67,000 | - | 30,000 | - | 100,000 | - | 370,000 | - | 3,000 | - | 503,000 |
| | 1209 | Local environmental expert | 63,000 | - | 26,000 | - | 180,000 | - | 240,000 | - | 1,000 | - | 447,000 |
| | 1210 | Local marketing expert | 130,000 | - | 80,000 | 50,000 | 105,000 | - | 400,000 | - | 2,000 | 50,000 | 587,000 |
| | 1211 | Local standards setting expert | 32,000 | - | 20,000 | - | 180,000 | - | 350,000 | - | 1,000 | - | 551,000 |
| | 1212 | Local policy expert | 206,000 | - | 200,000 | - | 60,000 | - | 100,000 | - | 1,000 | - | 361,000 |
| | 1213 | Consultants travel | 12,000 | - | 6,000 | - | 30,000 | - | 30,000 | - | 1,000 | - | 67,000 |
| | **1299** | **Sub-total** | **1,614,000** | - | **1,222,500** | **150,000** | **1,650,000** | **-** | **3,900,000** | **-** | **30,000** | **150,000** | **6,802,500** |
| | 1300 | Administrative Support | | | | | | | | | | | |
| | 1301 | Assistant | 32,000 | - | 150,000 | - | 150,000 | - | 150,000 | - | - | - | 450,000 |
| | **1399** | **Sub-total** | **32,000** | - | **150,000** | **-** | **150,000** | - | **150,000** | **-** | **-** | **-** | **450,000** |
| | 1600 | Travel on official business | | | | | | | | | | | |
| | 1601 | Project staff travel | 90,000 | - | 10,000 | - | 40,000 | - | 20,000 | - | 5,000 | - | 75,000 |
| | **1699** | **Sub-total** | **90,000** | - | **10,000** | - | **40,000** | - | **20,000** | **-** | **5,000** | **-** | **75,000** |
| **1999** | **Component total** | | **2,140,000** | - | **1,882,500** | **150,000** | **2,860,000** | - | **4,470,000** | **-** | **60,000** | **150,000** | **9,272,500** |
| | | | | | | | | | | | | | |
| **20** | **SUB-CONTRACT COMPONENT** | | | | | | | | | | | | |
| | 2100 | Sub-contracts (MOUs/LOAs for cooperating agencies) | | | | | | | | | | | |
| | 2101 | Upgrading of production lines for CFL production and new testing equipment | | | | | 8,210,000 | | 1,500,000 | | | | 8,360,000 |
| | 2102 | National consumer awareness and marketing campaign, including pilot projects. | 315,000 | - | 105,000 | 1,790,000 | - | - | | - | - | 1,790,000 | 105,000 |
| | **2199** | **Sub-total** | **315,000** | **-** | **105,000** | **1,790,000** | **8,210,000** | **-** | **1,500,000** | **-** | **-** | **1,790,000** | **9,815,000** |
| **2999** | **Component total** | | **315,000** | **-** | **105,000** | **1,790,000** | **8,210,000** | **-** | **1,500,000** | **-** | **-** | **1,790,000** | **9.815,000** |
| | | | | | | | | | | | | | |
| **30** | **TRAINING COMPONENT** | | | | | | | | | | | | |
| | 3300 | Meetings/Workshops | | | | | | | | | | | |
| | 3301 | Workshops (Component 3) | 80,000 | - | 75,000 | - | 80,000 | - | 50,000 | - | 12,000 | - | 217,000 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3302 | Workshops (Component2) | 75,000 | - | 45,000 | - | 50,000 | | 30,000 | - | 15,000 | - | 140,000 |
| | 3303 | Meetings (Component 2) | 25,000 | - | 75,000 | - | 40,000 | - | 25,000 | - | 6,000 | - | 146,000 |
| | 3304 | Workshop (Component 5)[34] | 15,000 | - | 20,000 | - | 15,000 | - | 5,000 | - | 5,000 | - | 45,000 |
| | **3399** | **Sub-total** | **195,000** | **-** | **215,000** | - | **185,000** | **-** | **110,000** | **-** | **38,000** | **-** | **548,000** |
| **3999** | **Component total** | | **195,000** | **-** | **215,000** | - | **185,000** | **-** | **110,000** | **-** | **38,000** | **-** | **548,000** |
| | | | | | | | | | | | | | |
| **40** | **EQUIPMENT AND PREMISES COMPONENT** | | | | | | | | | | | | |
| | 4100 | Expendable equipment | | | | | | | | | | | |
| | 4101 | Office supplies | 3,000 | - | 24,000 | - | 22,000 | - | 27,000 | - | 3,500 | - | 76,500 |
| | **4199** | **Sub-total** | **3,000** | **-** | **24,000** | **-** | **22,000** | - | **27,000** | **-** | **3,500** | **-** | **76,500** |
| | 4200 | Non-expendable equipment | | | | | | - | | | | | |
| | 4201 | Office equipment | 7,000 | - | 90,000 | - | 57,000 | - | 20,000 | - | - | - | 167,000 |
| | **4299** | **Sub-total** | **7,000** | **-** | **90,000** | **-** | **57,000** | - | **20,000** | **-** | **-** | **-** | **167,000** |
| **4999** | **Component total** | | **10,000** | **-** | **114,000** | **-** | **79,000** | - | **47,000** | **-** | **3,500** | **-** | **243,500** |
| | | | | | | | | | | | | | |
| **50** | **MISCELLANEOUS COMPONENT** | | | | | | | | | | | | |
| | 5200 | Reporting costs | | | | | | | | | | | |
| | 5201 | Technical publications | 115,000 | - | 50,500 | - | 95,000 | - | 10,000 | - | 20,000 | - | 175,500 |
| | 5202 | Testing Fees | | | | | | 30,000 | | | | 30,000 | |
| | **5299** | **Sub-total** | **115,000** | **-** | **50,500** | - | **95,000** | **30,000** | **10,000** | **-** | **20,000** | **30,000** | **175,500** |
| | 5300 | Sundry | | | | | | | | | | | |
| | 5301 | Communications | 5,000 | - | 38,000 | - | 23,000 | - | 18,000 | - | 3,500 | - | 82,500 |
| | **5399** | **Sub-total** | **5,000** | - | **38,000** | - | **23,000** | - | **18,000** | **-** | **3,500** | **-** | **82,500** |
| | 5500 | Evaluation | | | | | | | | | | | |
| | 5501 | Monitoring & Evaluation | 160,000 | - | 30,000 | - | 25,000 | - | 25,000 | - | 25,000 | - | 105,000 |
| | **5599** | **Sub-total** | **160,000** | **-** | **30,000** | **-** | **25,000** | | **25,000** | **-** | **25,000** | **-** | **105,000** |



[34] To strengthen national M&E system.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **5999** | **Component total** | **280,000** | **-** | **118,500** | **-** | **143,000** | **30,000** | **83,000** | **-** | **48,500** | **30,000** | **363,000** |
| | | | | | | | | | | | | |
| **99** | **GRAND TOTAL** | **2,940,000** | **-** | **2,435,000** | **1,940,000** | **11,477,000** | **30,000** | **6,180,000** | **-** | **150,000** | **1,970,000** | **20,242,000** |

## Appendix 3: Incremental Cost Analysis

| Strategy | Baseline | Alternative | Increment |
|---|---|---|---|
| **Project Objective:**<br>The overall aim is to phase out incandescent lamps (ILs) production and use through the transformation of the lighting products market as well as the promotion of high quality energy saving lamps (ESLs) in Vietnam thus reducing greenhouse gas (GHG) emissions. | In the absence of the project the present practice of using energy inefficient ILs and poor quality ESLs for lighting will continue with corresponding GHG emissions and inefficient use of energy. | Comprehensive approach to the transformation of the market for lighting products in Vietnam to an EE one resulting in less GHG emissions and more efficient use of energy. | **GEF Increment:** Scientific and technical analysis and technical assistance. Total GEF costs US$ 2,940,000 (and US$22.212 million in co-financing for investments, scientific and technical analysis, and technical assistance).[35]<br><br>**Estimated global benefits:** Cumulative $CO_2$ emission reductions of 2.302 million ton at the end of the project and 5.268 million ton, three years thereafter. |
| **Outcome 1**: Successful business transformation of manufacturers of ILs and improved quality of locally produced ESLs at marketable prices. | Continuation of domestic manufacturing of inefficient ILs and ESLs and their distribution in the local market as well as overseas. | A comprehensive effort to transform the domestic lamp manufacturing capacity to the manufacture of good quality ESLs at marketable prices. | **GEF Increment:** Scientific and technical analysis. GEF costs: $600,000 (and $12.417 million in co-financing for investments).<br><br>**Estimated global benefits:** Direct GHG emission reduction as a result of the availability of good quality ESLs. |
| **Outcome 2:** Strengthened and harmonized quality and performance-based standards and procedures in Vietnam, including compliance with regard to nationally and internationally traded lighting products. | Absence of quality and performance-based standards with regard to lamps produced and used in Vietnam and increasing import, export, sale, and use of energy inefficient lighting products as well as procedures for handling and disposing of mercury-containing ESLs. | Establishment of an improved QA/QC framework to gradually reduce the domestic production, import, export, sale, and use of energy inefficient lighting products and improve the handling and disposal of mercury-containing ESLs. | **GEF Increment:** Scientific and technical analysis and technical assistance. GEF costs: $600,000 (and $5.25 million in co-financing for technical assistance).<br><br>**Estimated global benefits:** Indirect, as a result of the establishment of QA/QC framework for ESLs. |
| **Outcome 3:** Enhanced awareness about benefits of ESLs and significant increase in sales of ESLs and significant reduction in sales of ILs. | Lack of interest among producers, retailers, and users of electric lighting products to switch to good quality ESLs that have affordable prices. | Development and implementation of a National Social Marketing campaign for rural and residential users of electric lighting products to develop a roadmap/ master plan and supporting policies for IL replacement and ESL promotion as well as demonstration projects in rural areas. | **GEF Increment:** Scientific and technical analysis and technical assistance. GEF costs: $915,000 (and $1.4 million in co-financing for technical assistance).<br><br>**Estimated global benefits :** Indirect, as a result of increased awareness among producers, retailers, and users of lighting products about the benefits of ESLs. |
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| **<u>Outcome 4:</u>** Policy and institutional systems are able to support and monitor phasing out of the manufacture, sales, and use of ILs and the availability of good quality ESLs in the domestic market**.** | Inadequate policy and institutional systems to support and monitor phasing out of the manufacture, sales, and use of ILs and promote the availability of good quality ESLs in the domestic market. | Development of a national roadmap and master plan as well as the establishment of an institutional structure for the phase out of ILs and poor quality ESLs and the promotion of good quality ESL, including policy regimes, M&E system, and financial incentives supporting the transformation of IL manufacturers and the development of the market for ESLs. | **GEF Increment:** Technical assistance.<br>GEF costs: $356,000 (and $798,800 in co-financing for technical assistance).<br><br>**Estimated global benefits :** Indirect, as a result of the establishment of an adequate institutional and policy framework for production and use of ESLs. |

## Appendix 4: Results Framework – Logical Framework Analysis

| Project Strategy | Indicators | Baseline | Target | Means of Verification | Assumptions |
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| Objective: The overall aim of the project is to phase out incandescent lamps (ILs) production and sale through the transformation of the lighting products market as well as the promotion of high quality energy saving lamps (ESLs) in Vietnam thus reducing greenhouse gas (GHG) emissions | ILs are phased out<br><br>System and procedures for production and testing of quality ESLs are developed.<br><br>Quality parameters are harmonized with international requirements<br><br>Guidelines for recycling and safe disposal of ESLs | 60 million ILs in use<br>25 million poor quality CFLs with life less than 1 year are illegally imported<br>Manufacturers capacity to produce high quality ESLs is weak<br>Regulations to promote, use , recycle, and dispose ESL not in place | ILs are phased out and GHG reduction will be estimated based on CFLs installed<br>System and procedures for production and testing of quality EFLs are developed.<br>Quality parameters are harmonized with international requirements<br>Guidelines of recycling and safe disposal | Terminal and Final Evaluation reports<br>Field visits | Government would encourage policies to enable market transformation |
| **Outcome 1: Successful business transformation of manufacturers of ILs and improved quality of locally produced ESLs at marketable prices** | • Number of IL manufacturers that have changed their production line from ILs to ESLs ( a minimum of 35% by mid-term and a minimum of 70% at project completion)<br>• Annual volume of good quality ESLs manufactured and sold in Vietnam (35 million, 40 million, and 45 million, by the end of the second, third, and fourth year, respectively of project implementation).<br>• A minimum of two large manufacturers will produce good CFLs for local market that comply with the local standards | • 60 million ILs are still in use<br>• Small number of manufac-turers of good quality ESLs<br>• ILs are still produced by a large number of manufac-turers and CFLs being manufactured are generally of low quality | • Good quality CFLs with average life of 6,000 hours manufactured and sold with a total the total volume of sold CFLs is 45 million | • Project progress reports<br>• Production numbers<br>• Meetings, including PSC and tripartite meetings | • Government will continue to encourage policies to enable market transformation |
| **Output 1.1***:* Market research on the current status of the ESL & IL markets in Vietnam | • Baseline data (annual volume production, annual volume sales, market share of ILs and ESLs quality details of ESLs produced) | • Total number of ILs still in use and penetration of ESLs in domestic market | • 60 million ILs phased out by the end of the Project | • Baseline market survey report | • Government policies encourage the phase out |
| **Output 1.2** Technical aids on conversion of IL | • IL manufacturers are trained on all aspects on | • Inadequate capacity to | • ESL production | • Technical guidelines report | • The technological |

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| production lines to ESLs | conversion of IL to ESL production by the end of the Project<br>• Technical guidelines and handbooks developed and disseminated | identify the required technology and convert the existing production line to ESL production | lines operational | from technical consultants<br>• Participants list of training courses | solutions for conversion are compatible with the existing systems |
| **Output 1.3** Training courses are provided on quality ESL production. | • ESL manufacturers are trained in upgrading ESL production facilities and methods to production of good quality ESLs | • Lack of knowledge continues to exist with regard to high quality ESL production | • Improved and increased domestic ESL production | • Training courses documentation and list of attendees | • Manufacturers see benefits of upgrading production lines to manufacture good quality ESLs |
| **Output 1.4** Business transformation plans agreed for two to four ESL products for two main enterprises | • Trained IL manufacturers have developed and submitted business plans for conversion of IL production to production of two to four good quality ESLs<br>• Business plans for conversion of IL production to production of good quality ESLs are accepted | • Inadequate knowledge and no business plans for conversion of IL lines to high quality ESL production lines | • Improved and increased domestic ESL production | • Project documents<br>• Business plans | • Manufacturers see benefits of conversion of production lines to manufacture ESLs |
| **Output 1.5** Technical support for selected local manufacturers towards quality ESL production at marketable cost | • Specific local manufacturers that would benefit most from the technical support have been identified | • Manufacturers will continue to produce ILs and CFLs of low quality and have inadequate lamp testing facilities and procedures | • Employees of at least two manufacturers are trained and technically capable of converting existing production lines<br>• At least two testing facilities of local manufacturers are supported | • Mission reports of experts<br>• Report on support for testing facilities | • Manufacturers see benefits of conversion of production lines to manufacture ESLs |

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| **Outcome 2:** **Strengthened and harmonized quality and performance-based standards and procedures in Vietnam, including compliance with regard to nationally and internationally traded lighting products.** | • Lighting standards strengthened and are in compliance with international standards, with particular reference to minimum operating hours, minimum energy efficiency (EE) standards, and maximum mercury content<br>• Number of quality- and performance-based standards, and procedures has been developed and adopted<br>• New Energy Efficiency (EE) Law has been adopted, which will allow regulations to be developed for the efficient use of lighting products | • Lighting standards for ESL are do not exist or are not harmonized with international standards<br>• Quality inspection system for ESLs does not exist<br>• Facilities and capacity to test high quality ESLs do not exist<br>• No regulations on disposal and recycling of mercury containing ESLs | • Strengthened and harmonized quality- and performance-based standards and procedures in Vietnam, including compliance in nationally and internationally traded lighting products | • Project progress report<br>• Documentation on Vietnam lighting standards<br>• Meetings, including PSC and tripartite meetings | • Guidelines for implementation of the same will be issued by GoV |
| **Output 2.1** Energy, environmental, and quality standards for ESLs are tightened and harmonized in line with regional or international best practices. | • Adoption of such standards for most commonly used ESLs that are harmonized with regional and international best practices | • Adequate lighting standards for ESLs do not exist and are not harmonized with international best practices | • Lighting standards for ESLs are harmonized with international best practices | • Documentation of revised standards | • GoV continues to support development of such standards |
| **Output 2.2** National quality inspection system for ESLs is established. | • A widely known and highly supported quality supervision system is established by year 2 | • Quality inspection system for ESLs do not exists | • Quality supervision system is established by year 2 | • Project progress reports | • GoV endorses the system developed |
| **Output 2.3** Capacity of two testing labs is strengthened. | • Identified specific requirements and recommended course of action based on needs assessment by international consultants | • Adequate facilities and capacity to test ESLs do not exist | • Upgrading of existing testing laboratories to test the quality and performance of ESLs | • Assessment reports from experts<br>• Project annual progress report | • GoV takes necessary action to facilitate strengthening of the laboratories |
| **Output 2.4** Green Customs program to reduce import/export of ILs and low quality ESLs implemented. | • Workshop has been successfully conducted under the Green Customs Initiative to train customs officials in reducing import/export of ILs and low quality ESLs<br>• Number of seized shipments has increased | • Inadequate capacity of customs officials to identify or differentiate between good and poor quality ESLs and permitted | • Reduce import/ export of ILs and low quality ESLs | • Workshop documentation and list of attendees | • Customs officials continue to fully support Green Customs program |

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| | | ILs | | | |
| **Output 2.5** Capacity of civic authorities to handle and safely dispose mercury in ESLs and to engage in recycling strengthened | • Technical guidelines are developed<br>• Draft regulations on ESL recycling and disposal have been submitted<br>• Incentive plan for recycling ESLs has been submitted<br>• Plan to raise mercury awareness has been submitted | • No regulations on recycling and disposal of mercury containing ESLs | • Ensure that the increased use of ESLs will not lead to the release of mercury into the environment | • Documentation on technical guidelines and draft regulations<br>• Documentation on incentive plan for recycling of ESLs<br>• Documentation on mercury awareness-raising plan | • All concerned ministries and national agencies support guidelines and regulations developed for the disposal and recycling of mercury-containing ESLs |
| **Outcome 3: Enhanced awareness about benefits of ESLs and significant increase in sales of ESLs and significant reduction in sales of ILs**. | • All stakeholders and at least 50% of consumers have become aware of the benefits of ESLs | • Inadequate consumer awareness about the benefits of CFLs, in particular, in provincial cities and rural areas | • Increase awareness among the general public about the benefits of ESLs<br>• Increase the capacity of stakeholders to effectively promote the use of ESLs | • GoV surveys and studies<br>• Project progress reports<br>• Meetings, including PSC and tripartite meetings | • Continual GoV commitment to promoting the use of ESLs |
| **Output 3.1** National social marketing campaign for rural and residential users designed and implemented | • GoV has carried out at least one ESL awareness raising and promotion campaign for each province, produced and dissemi-nated annual ESL promotional materials starting from 2011, and developed a roadmap/master plan for ESL promotion | • Continual lack of awareness about the benefits of ESLs at a national level | • Increase awareness about the benefits of ESLs and enhance capacity of stake-holders to effectively promote the use of ESLs | • Campaign materials<br>• ESL promotion materials<br>• Project progress reports | • Cooperation by provinces and campaigns are carried out over sufficiently long periods<br>• Appropriate media are used |
| **Output 3.2** Documented results of the market study on ESL promotional campaign and roadmap/master plan for ESL promotion | • Study has been carried out to evaluate impact of ESL promotional campaigns<br>• A roadmap/master plan for ESL promotion has been developed | • Absence of a roadmap/master plan for ESL promotion | • Ensure that promotion for the use of ESLs is done in a systematic manner | • Market study | • Findings are discussed and accepted by all stakeholders |
| **Output 3.3** Demonstration projects in rural areas implemented | • Minimum of three demonstration projects, involving the installation of a minimum of 1,000 ESL products each, have been developed and implemented in selected rural areas | • Continual unawareness in rural areas about the benefits of ESLs | • Increase awareness about ESL benefits in rural areas | • Implementation report on demonstration projects<br>• Project progress reports | • Cooperation by concerned local authorities in rural areas |
| **Output 3.4** ESL procurement plan for public sector developed | • Regulations on ESL procurement for the public sector have been developed | • Absence of a plan to procure ESLs for the public sector | • Ensure that ESL are also used in the public sector | • ESL procurement plan for public sector and its regulations | • ESL procurement plan for public sector and its regulations is |

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| | | | | | acceptable to GoV |
| **<u>Outcome 4:</u> Policy and institutional systems able to support and monitor phasing out of the manufacture, sales and use of ILs and availability of good quality ESLs in the domestic market** | • Appropriate policy and institutional systems are in place and operational | • Inadequate GoV and other national support available to transform the lighting market in Vietnam to an EE one | • Establishment of the appropriate policy and institutional framework for an EE lighting market | • GoV reports and announcements<br>• Project progress reports<br>• Meetings, including PSC and tripartite meetings | • GoV commitment to agree to the policy and institutional systems and continue to support them in the future |
| **Output 4.1** Agreed national roadmaps and master plans for the phase-out of ILs and promotion of good quality ESLs | • Actual national roadmaps and master plans for the phase-out of ILs and promoting ESLs that are ready for implementation | • Unfocused and insufficient GoV efforts to phase out ILs and promote good quality ESLs | • Time-bound plans that will guide GoV and other stake-holders to phase out ILs and promote good quality ESLs | • GoV publications and announcements<br>• Roadmaps and master plans | • GoV commitment to implement roadmaps and master plans and acceptance of the same by stakeholders |
| **Output 4.2** Established national policy for phasing out ILs | • Recommendations have been made to GoV with regard to phasing out ILs<br>• Draft guidelines on the implementation of the EE law with regard to the efficient use of lighting products have been developed<br>• Adopted policies on phasing out production and utilization of ILs by the end of the Project | • Inadequate policy framework for phasing out ILs | • Adoption and use of the appropriate national policy required for the phasing out of ILs | • GoV publications and announcements | • Adopted policies are acceptable to all stakeholders |
| **Output 4.3** Proposed policy measures and incentives for ESL market development and enhancement, through local partners | • Implementation of incentive for ESL recycling<br>• Proposals of other potential incentives are made to GoV with focus on financial mechanism<br>• Adopted policies on the promotion of ESLs by the end of the Project | • Inadequate policy framework for ESL market development and enhance-ment | • Adoption and use of appropriate policy measures and incentives required for ESL market development and enhancement | • Project implementation report on recycling incentives<br>• Documentation on potential incentives for ESL market development | • Adopted policy measures and incentives are responsive to the requirements of the stakeholders |

## Appendix 5: Work plan and Timetable

| Activities | Year 1 | | Year 2 | | | | Year 3 | | | | Year 4 | | | | Year 5 | | Outputs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | |
| Conduct market research on status of ESL and Ils markets and degree of penetration of ESLs in Vietnam | | | | | | | | | | | | | | | | | · Market research on the current status of the ESL & IL markets in Vietnam |
| Study on the status of IL production lines in large scale industries and identification of technical aid to convert it to ESL production line of high quality | | | | | | | | | | | | | | | | | · Technical aids on ESLs & conversion of IL production lines to quality ESLs |
| Developing business plans for production of 2 to 4 ESL products in place of IL production lines without high cost implications on product | | | | | | | | | | | | | | | | | · Business transformation plans agreed for 2 to 4 ESL products for 2 main manufacturers |
| Training programme for industries on implementation of the technical aids for conversion of IL production lines to good quality ESL production line and selection of 2 manufacturers for implementation | | | | | | | | | | | | | | | | | · Training courses on quality ESL production |
| One to one technical backstopping to the 2 selected manufacturers | | | | | | | | | | | | | | | | | · Technical support for selected local manufacturers towards quality ESL production at marketable cost |
| Analysis of the existing energy, environment and quality standard with regards to ESLs and identification of gaps in comparison to the international standards or best practices | | | | | | | | | | | | | | | | | · Energy, environmental and quality standards for ESLs are strengthened and harmonized in line with regional or international best practices |
| Recommendation for the strengthening and harmonization of the quality, environment and energy standards with international best practices and development of national quality inspection system | | | | | | | | | | | | | | | | | · National quality inspection system for ESLs is established |

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| Analysis of the capabilities of the existing quality testing laboratories and recommendation with regards to the technological upgrading of 2 laboratories. | | | | | | | | | | | | | | | | | · Capacity of two testing labs is strengthened |
| Training programme for upgrading of skills and procedures of technicians involved in testing for quality of products | | | | | | | | | | | | | | | | | |
| Training programme for customs officials effecting reduction in imports or exports of low quality ESLs | | | | | | | | | | | | | | | | | · "Green customs" program to reduce import/export of ILs & low quality CFLs implemented |
| Guidelines for safe disposal of used ESLs containing mercury developed | | | | | | | | | | | | | | | | | · Capacity of civic authorities to handle and safely dispose mercury in ESLs and to engage in recycling strengthened |
| Guidelines for recycling of ESLs developed | | | | | | | | | | | | | | | | | |
| Training programme for civic authorities to handle and safely dispose mercury in ESLs and to engage in recycling | | | | | | | | | | | | | | | | | |
| Development of National social marketing and awareness campaign on energy saving by use of ESLs and disposal related issues | | | | | | | | | | | | | | | | | · National social marketing campaign for rural and residential users designed and implemented |
| Development of media plan | | | | | | | | | | | | | | | | | |
| Conduct awareness programme according to media plan | | | | | | | | | | | | | | | | | |
| Conduct market study on the effectiveness of the media campaign and document the results | | | | | | | | | | | | | | | | | · Documented results of the market study on ESL promotional campaign and roadmap/ master-plan for ESL promotion |
| Undertake demonstration project in rural areas to highlight the feasibility for use of the ESL products | | | | | | | | | | | | | | | | | · Demonstration projects in rural areas implemented |
| Development of guidelines for procurement of ESL products by public sector | | | | | | | | | | | | | | | | | · ESL procurement plan for public sector developed |
| Development and proposing of National policies and incentives for phasing out ILs and promotion of good quality ESLs and developing road map for | | | | | | | | | | | | | | | | | · Agreed and adopted national roadmap and master-plan for the phase-out of ILs & promotion of good quality ESLs |

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| implementation of the same | | | | | | | | | | | | | | | | | · Established national policy for phasing out ILs<br>· Proposed policy measures and incentives for ESL market development and enhancement, through local partners |
| Midterm evaluation | | | | | | | | | | | | | | | | | |
| Final evaluation | | | | | | | | | | | | | | | | | |

## Appendix 6: Key Deliverables and Benchmarks

The project has four main components which include: (i) Local Lighting Industry Capacity Enhancement Program, (ii) Improved QA/QC Framework, (iii) ESL Market Transformation and Consumer Education and Awareness, and (iv) National Policy and Institutional Support Program towards Phasing-out of Incandescent Lamps and Promotion of ESLs.

| Components | Outcome | Outputs/ Deliverables | Benchmarks |
|---|---|---|---|
| Local Lighting Industry Capacity Enhancement Program | **1a.** Successful business transformation of manufacturers of incandescent lamps (ILs) | • Market research on the current status of the ESL & IL markets in Vietnam<br>• Technical aids on ESLs & conversion of IL production lines to quality ESLs<br>• Business transformation plans agreed for 2 to 4 ESL products for 2 main manufacturers | • A minimum 35% of IL manufacturers have changed their production line from ILs to ESLs by mid-term and 70% at project completion<br>• Annual volume of good quality ESLs products manufactured and sold in Vietnam are 35 million, 40 million, and 45 million, by the end of the second , third, and fourth year, respectively, with CFLs having an envisaged minimum operational lifetime of 6,000 hours.<br>• A minimum of two large manufacturers will produce CFLs for local market that comply with the local standards (i) TCVN 7541-1: 2005 high efficient lighting equipment – Part I: Minimum Energy Performance Standards (MEPS) and (ii) TCVN 7541-2: 2005 High efficient lighting equipment – Part II: Determining Methodology of Energy Performance |
| | **1b.** Improved quality of locally produced energy saving lamps (ESLs) at marketable prices, to enable consumer confidence, as well as | • Training courses on quality ESL production<br>• Technical support for selected local manufacturers towards quality ESL production at marketable cost | • Locally manufactured ESLs that meet established quality criteria, including a minimum of 6,000 working hours for CFLs |

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| | achieve energy and environmental targets | | |
| Improved QA/QC Framework | **2.** Strengthened and harmonized quality and performance-based standards and procedures in Vietnam, including compliance in nationally and internationally traded lighting products | • Energy, environmental and quality standards for ESLs are strengthened and harmonized in line with regional or international best practices<br>• National quality inspection system for ESLs is established<br>• Capacity of two testing labs is strengthened<br>• "Green customs" program to reduce import/export of ILs & low quality CFLs implemented<br>• Capacity of civic authorities to handle and safely dispose mercury in ESLs and to engage in recycling strengthened | • Lighting standards strengthened and are in compliance with international standards, with particular reference to minimum operating hours, minimum energy efficiency standards, and maximum mercury content<br>• A number of quality- and performance-based standards, and procedures developed and adopted..<br>• New Energy Efficiency (EE) Law adopted, which would allow regulations to be developed for the efficient use of lighting products |
| ESL Market Transformation and Consumer Education and Awareness | **3.** Enhanced national awareness and action – by project completion, at least 50 % of consumers (with respect to base-line) are aware. Enhanced capacity of stakeholders for ESL promotion. Improved understanding of the need for lumens and not more watt | • National social marketing campaign for rural and residential users designed and implemented<br>• Documented results of the market study on ESL promotional campaign and roadmap/ master- plan for ESL promotion<br>• Demonstration projects in rural areas implemented<br>• ESL procurement plan for public sector developed | • 50% of consumers will become aware of ESLs<br>• 2 ESL awareness raising and promotion events designed and carried out<br>• 1 package of ESL promotional materials produced and disseminated<br>• 1 ESL awareness raising and promotion scheme for each province developed and implemented |
| National Policy and Institutional Support Program towards Phasing-out of Incandescent Lamps and Promotion of ESLs | **4.** Policy and institutional systems able to support and monitor phasing out of the manufacture, sales and use of ILs and availability of good quality ESLs in the domestic market | • Agreed and adopted national roadmap and master-plan for the phase-out of ILs & promotion of good quality ESLs<br>• Established national policy for phasing out ILs<br>• Proposed policy measures and incentives for ESL market development and enhancement, through local partners | • Adopted policies on phasing out production and utilization of ILs<br>• Adopted policies on the promotion of ESLs |

## Appendix 7: Reporting Requirements

**Tasks and Responsibilities of the Project Management Entities:**
·Project Manager and Task Manager will be appointed by UNEP.

| M&E Activity | Description | Responsible Parties | Time Frame |
|---|---|---|---|
| Progress and financial reports | ▪ part of UNEP procedures for project monitoring<br>▪ Detailed progress reports and financial reports with justification of any change | ▪ UNEP project manager<br>▪ Support : Project Management Office (PMO) & MONROE<br>▪ Approval: UNEP Coordination | ▪ 2 reports for any given year (31 July and 31 January)<br>▪ last Progress & Financial Report (Final Report) within 60 days of Project Closure |
| Inception Report | ▪ Report prepared immediately following the Inception Workshop<br>▪ Includes a detailed Annual Work Plan (AWP) for the first year, as well as overview of AWP for subsequent years, divided in quarterly time-frames detailing the activities and progress indicators<br>▪ Includes the dates of specific field visits, support missions from the GEF focal point in Vietnam or the UNEP/DTIE or consultants, as well as time-frames for meetings of the project's decision making structures<br>▪ Details project budget, a more detailed narrative of institutional responsibilities, coordinating actions and feedback mechanisms, and any monitoring and evaluation requirements | ▪ Execution: UNEP DTIE<br>▪ Support: PMO, ISPONRE<br>▪ Approval: UNEP Coordination, Project Steering Committee (PSC) | Immediately following project start-up |
| Progress Reports | ▪ Short progress reports describing project activities implementation status<br>▪ Thematic periodic reports could | ▪ Execution: PMO<br>▪ Support: UNEP DTIE, ISPONRE<br>▪ Approval: PSC | Quarterly<br>As necessary for the thematic reports |

| M&E Activity | Description | Responsible Parties | Time Frame |
|---|---|---|---|
| | also be prepared to focus on specific issues or areas of activity covered by the project | | |
| Annual Project Reports (APR) | ▪ Analyses project performance over the reporting period<br>▪ Describes constraints experienced in the progress towards results and the reasons<br>▪ Describes the AWP and the detailed budget for activities implemented<br>▪ Draws lessons and makes clear recommendations for future orientation in addressing key problems in lack of progress. | ▪ Execution: UNEP DTIE<br>▪ Support: PMO, ISPONRE, and Government Counterparts<br>▪ Approval: PSC | Annually |
| Project Implementation Review (PIR) | ▪ Annual monitoring process mandated by the GEF. It is an essential management and monitoring tool for project managers.<br>▪ Prepared in collaboration with UNEP Coordination and Government counterparts within a year of project start.<br>▪ The PIR is discussed during the Tripartite Review meetings and approved by the Government, GEF and UNEP DTIE. | ▪ Execution: UNEP DTIE<br>▪ Support: PMO and ISPONRE<br>▪ Approval: PSC & Tripartite meeting | Annually |
| Tripartite Review (TPR) | ▪ Highest policy-level meeting of the parties directly involved in project implementation.<br>▪ The project team will prepare and submit an Annual Project Report (APR) to UNEP/GEF at least two weeks prior to the TPR for review and comments. | ▪ Execution: UNEP DTIE<br>▪ Input: Government Counterparts<br>▪ Support: PMO and ISPONRE<br>▪ Approval: PSC & Tripartite meeting | At least once every year upon receipt of APR |
| Terminal Tripartite Review (TTR) | ▪ The project team will draft and submit a Terminal Project Report (TPR) to the UNEP/GEF, at least two weeks before the TTR meeting for their review and comments | ▪ Execution: UNEP/DTIE<br>▪ Input: Government counterparts<br>▪ Support: PMO | During last month of project closure |

| M&E Activity | Description | Responsible Parties | Time Frame |
|---|---|---|---|
| | ▪ The TTR considers the implementation of the project as a whole with focus on the achievement of its stated objectives and contribution to the broader environmental objective.<br>▪ decides whether any action is needed to achieve the sustainability of project results<br>▪ draws lessons to be captured into other projects. | and ISPONRE<br>▪ Approval: PSC & Tripartite meeting | |
| Project Terminal Report | ▪ Comprehensive report summarizing all activities, achievements, lessons learnt, objectives met or not achieved structures and systems implemented, etc.<br>▪ lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the Project's activities | ▪ Execution: UNEP/DTIE<br>▪ Contribution: Government of Vietnam (GoV)<br>▪ Support: PMO and ISPONRE<br>▪ Approbation: PSC and Tripartite meeting | During last three months of project implementation |
| Mid-term Independent Evaluation | ▪ Determine progress being made towards the achievement of outcomes and identify course corrections if needed.<br>▪ Focus on the effectiveness, efficiency and timeliness of project implementation; highlight issues requiring decisions and actions; and present initial lessons learned about project design, implementation and management. | ▪ Execution: Independent Consultants<br>▪ Input: PMO, UNEP/DTIE, ISPONRE<br>▪ Approval: PSC | At the mid-point of project implementation. |
| Final External Evaluation | ▪ Focus on the same issues as the mid-term evaluation<br>▪ Look at the impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals | ▪ Execution: Independent Consultants<br>▪ Input: PMO, UNEP/DTIE, ISPONRE<br>▪ Approval: PSC | Three months prior to the terminal TPR meeting |

## Appendix 8: Budgeted M&E plan

1. Monitoring Framework and Budget

| Objective/Outcome | Outcome/ Objective level indicator | Baseline Conditions | Mid-Point Target (as relevant) | End of Project Target | Means of Verification | Monitoring/ Sampling (frequency /size) | Location/ Group | Responsibility | Time frame | Budget (Object of expenditure and Cost) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Project Objective:**<br>The overall aim of the Project is to phase out incandescent lamps (ILs) production and sale through the transformation of the lighting products market as well the promotion of high quality energy saving lamps (ESLs) | • ILs are phased out<br>• System and procedures for production and testing of quality ESLs are developed<br>• Quality parameters are harmonized with international requirements<br>• Guidelines for recycling and safe disposal of ESLs | • Domestic lighting market is dominated by the production, import, sale, and use of energy inefficient lamps<br>• Poor quality ESLs are imported<br>• Manufacturers capacity to produce high quality ESLs is weak<br>• Regulations to promote, use , recycle, and dispose ESL not in place | • Substantial increase in the use of ESLs<br>• Substantial decrease in the production of ILs and import of poor quality ESLs | • ILs are phased out<br>• Estimate of GHG reduction based on number of CFLs installed under the project<br>• System and procedures for production and testing of quality EFLs are developed.<br>• Quality parameters are harmonized with international requirements<br>• Regulations for recycling and safe disposal of ESLs issued | • Mid-term Evaluation report<br>• Terminal and Final Evaluation reports | • VLA and EVN annual reports<br>• GoV trade statistics | • GoV<br>• MONRE<br>• PMO | • PMO<br>• (ISOPONRE + UNEP/ DTIE) | • Yearly | GEF:<br>• US$ 50,000 for Mid-term Evaluation<br>• US$ 50,000 for Final Evaluation<br>• US$ 40,000 for tripartite and PSC meetings<br><br>Co-financing: US$ 85,000 |

| Objective/Outcome | Outcome/ Objective level indicator | Baseline Conditions | Mid-Point Target (as relevant) | End of Project Target | Means of Verification | Monitoring/ Sampling (frequency /size) | Location/ Group | Responsibility | Time frame | Budget (Object of expenditure and Cost) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Outcome 1:** Successful business transformation of manufac-turers of ILs and improved quality of locally produced ESLs at marketable prices | • Number of IL manufacturers that have changed their production line from ILs to ESLs<br>• Annual volume of good quality ESLs manufac-tured and sold in Vietnam<br>• A minimum of two large manu-facturers will produce good quality ESLs for local market that comply with the local standards | • 60 million ILs are still in use<br>• Small number of manufacturers of good quality ESLs<br>• ILs are still produced by a large number of manufacturers and ESLs being manufactured are generally of low quality | • Good quality ESLs with average life of 6,000 hours manufactured with an annual volume of 35 million manufactured and sold ESLs<br>• 35% of IL manufacturers have changed production line from ILs to ESLs<br>• A minimum of one large manufacturer will produce good quality ESLs for local market that comply with the local standards | • Good quality ESLs with average life of 6,000 hours manufactured and sold with an annual volume of 45 million manufactured sold CFLs<br>• 70% of IL manufacturers have changed production line from ILs to ESLs<br>• A minimum of two large manu-facturers will produce good quality ESLs for local market that comply with the local standards | • Project progress reports<br>• Production numbers<br>• Field visits<br>• Meetings, including PSC meetings | • GoV and Project publications<br>• VLA annual reports | • Local lamp manufacturers<br>• PMO | • PMO (ISOPONRE + UNEP/ DTIE) | • Twice a year | GEF:<br>• US$ 1,250 per year for reporting<br><br>Co-financing: US$ 5,000 |

| Objective/Outcome | Outcome/ Objective level indicator | Baseline Conditions | Mid-Point Target (as relevant) | End of Project Target | Means of Verification | Monitoring/ Sampling (frequency /size) | Location/ Group | Responsibility | Time frame | Budget (Object of expenditure and Cost) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Outcome 2:** Strengthened and harmonized quality and performance-based standards and procedures in Vietnam, including compliance with regard to nationally and internationally traded lighting products | • Lighting standards strengthened and are in compliance with international standards, with particular reference to minimum operating hours, minimum energy efficiency (EE) standards, and maximum mercury content<br>• Number of quality- and performance-based standards, and procedures has been developed and adopted<br>• New Energy Efficiency (EE) Law has been adopted, which will allow regu-lations to be developed for the efficient use of lighting products | • Lighting standards for ESL are do not exist or are not harmonized with international standards<br>• Quality inspection system for ESLs does not exist<br>• Facilities and capacity to test high quality ESLs do not exist<br>• No regulations on disposal and recycling of mercury containing ESLs | • Draft lighting standards have been developed<br>• A number of draft quality- and performance-based standards has been developed<br>• New EE Law has been submitted for GoV approval | • Strengthened and harmonized quality- and performance-based standards and procedures in Vietnam, including compliance in nationally and internationally traded lighting products | • Project progress report<br>• Documentation on Vietnam lighting standards<br>• Field visits<br>• Meetings, including PSC meetings | • Sampling of (Residential and commercial) buildings and construction projects at the beginning of the project implementation and after every year. | • MOST<br>• STAMEQ<br>• PMO | • PMO (ISOPONRE+ UNEP/ DTIE) | • Yearly (the first at the beginning of the project implementation) | GEF:<br>• US$ 1,250 per year for reporting<br><br>Co-financing: US$ 5,000 |

| Objective/Outcome | Outcome/ Objective level indicator | Baseline Conditions | Mid-Point Target (as relevant) | End of Project Target | Means of Verification | Monitoring/ Sampling (frequency /size) | Location/ Group | Responsibility | Time frame | Budget (Object of expenditure and Cost) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Outcome 3:** Enhanced awareness about benefits of ESLs and significant increase in sales of ESLs and signify-cant reduction in the sales of ILs | • All stakeholders and at least 50% of consumers have become aware of the benefits of ESLs | • Inadequate consumer awareness about the benefits of CFLs, in particular, in provincial cities and rural areas | •About 50% of the stake-holders and 25% of consumers have become aware of the benefits of ESLs | • Increase awareness among the general public about the benefits of ESLs<br>• Increase the capacity of stakeholders to effectively promote the use of ESLs | • GoV surveys and studies<br>• Project progress reports<br>• Field visits<br>• Meetings, including PSC meetings | • Publications<br>• Training session reports | • MONRE<br>• EVN<br>• PMO | • PMO (ISOPONRE + UNEP/ DTIE) | • Twice a year | GEF:<br>• US$ 1,250 per year for reporting<br><br>Co-financing: US$ 5,000 |
| **Outcome 4:** Policy and institutional systems able to support and monitor phasing out of the manufac-ture, sales, and use of ILS and availability of good quality ESLs in the domestic market | • Appropriate policy and institutional systems are in place and operational | • Inadequate GoV and other national support available to transform the lighting market in Vietnam to an EE one | •Draft outline of policy and institutional systems have been developed as well as action plans for achieving full operations, including M&E | • Establishment of the appropriate policy and insti-tutional frame-work for an EE lighting market and improved national M&E system | • GoV reports and announcements<br>• Project progress reports<br>• Field visits<br>• Meetings, including PSC meeting | • Publications<br>• Training sessions reports | • MONRE<br>• PMO | • PMO (ISOPONRE+ UNEP/ DTIE) | • Twice a year | GEF:<br>• US$ 1,250 per year for reporting<br>• US$ 15,000 for workshop to strengthen national M&E system<br><br>Co-financing: US$ 50,000 |

2. Cost of Mid-term Review/Evaluation and Terminal Evaluation

The duration of the Project is four years and the total cost specifically allocated to both the independent mid-term and terminal evaluation is US$ 100,000.
The Mid-term evaluation is to be done independently and will be carried out by a project evaluation specialist that will be recruited by the PMO (ISOPONRE jointly with UNEP/DTIE) in consultation with UNEP's EOU. A total amount of US$ 50,000 has been allocated for the independent midterm evaluation. Likewise, the Terminal evaluation will be done in a similar manner and a total amount of US$ 50,000 has been allocated for this purpose.

## Appendix 9: Terms of Reference for the Evaluation

**1. Objective and Scope of the Evaluation**

The objective of this terminal evaluation is to examine the extent and magnitude of any project impacts to date and determine the likelihood of future impacts. The evaluation will also assess project performance and the implementation of planned project activities and planned outputs against actual results. The evaluation will focus on the following main questions:

1. Did the project help to accelerate the phasing-out of incandescent lamps (ILs) through involvement of key target audiences (international conventions and initiatives, national level policy-makers, regional and local policy-makers, resource managers and practitioners).
2. Did the outputs of the project articulate options and recommendations for phase-out of ILs? Were these options and recommendations used? If so, by whom?
3. To what extent did the project outputs produced have the weight of scientific authority and credibility necessary to influence policy makers and other key audiences?

**Methods**

This terminal evaluation will be conducted as an in-depth evaluation using a participatory approach whereby the UNEP/DGEF Task Manager, key representatives of the executing agencies and other relevant staff are kept informed and consulted throughout the evaluation. The consultant will liaise with the UNEP/EOU and the UNEP/DGEF Task Manager on any logistic and/or methodological issues to properly conduct the review in as independent a way as possible, given the circumstances and resources offered. The draft report will be circulated to UNEP/DGEF Task Manager, key representatives of the executing agencies and the UNEP/EOU. Any comments or responses to the draft report will be sent to UNEP / EOU for collation and the consultant will be advised of any necessary or suggested revisions.

The findings of the evaluation will be based on the following:

1. A desk review of project documents including, but not limited to:
   (a) The project documents, outputs, monitoring reports (such as progress and financial reports to UNEP and GEF annual Project Implementation Review reports) and relevant correspondence.
   (b) Notes from the Steering Group meetings.
   (c) Other project-related material produced by the project staff or partners.
   (d) Relevant material published on the project web-site such as reports about workshops held, case studies, policy recommendations, and environmental benefits on the use of EE lighting in specific situations.

2. Interviews with project management and technical support including discussion of overall progress during project implementation, delivery of project outputs, and achievement of project outcomes.
3. Interviews and Telephone interviews with intended users for the project outputs and other stakeholders involved with this project, including key countries and international bodies that were involved in the project through exchange of information, participation in workshops and meeting, and formulation of policy recommendations. The Consultant shall determine whether to seek additional information and opinions from representatives of donor agencies and other organizations. As appropriate, these interviews could be combined with an email questionnaire.

4. Interviews with the UNEP/DGEF project task manager and Fund Management Officer, and other relevant staff in UNEP dealing with climate change mitigation-related activities as

necessary. The Consultant shall also gain broader perspectives from discussions with relevant GEF Secretariat staff.

5. Field visits36 to project staff

**Key Evaluation principles.**
In attempting to evaluate any outcomes and impacts that the project may have achieved, evaluators should remember that the project's performance should be assessed by considering the difference between the answers to two simple questions ***"what happened?***" and ***"what would have happened anyway?"***. These questions imply that there should be consideration of the baseline conditions and trends in relation to the intended project outcomes and impacts. In addition it implies that there should be plausible evidence to **attribute** such outcomes and impacts **to the actions of the project**.

Sometimes, adequate information on baseline conditions and trends is lacking. In such cases this should be clearly highlighted by the evaluator, along with any simplifying assumptions that were taken to enable the evaluator to make informed judgments about project performance.

**2. Project Ratings**
The success of project implementation will be rated on a scale from 'highly unsatisfactory' to 'highly satisfactory'. In particular the evaluation shall **assess and rate** the project with respect to the eleven categories defined below:37

**A. Attainment of objectives and planned results:**
The evaluation should assess the extent to which the project's major relevant objectives were effectively and efficiently achieved or are expected to be achieved and their relevance.

- *Effectiveness:* Evaluate how, and to what extent, the stated project objectives have been met, taking into account the "achievement indicators". The analysis of outcomes achieved should include, *inter alia*, an assessment of the extent to which the project has directly or indirectly assisted policy and decision-makers to apply information supplied by biodiversity indicators in their national planning and decision-making. In particular:
  - Evaluate the immediate impact of the project on climate change mitigation monitoring and in national planning and decision-making and international understanding and use of biodiversity indicators.
  - As far as possible, also assess the potential longer-term impacts considering that the evaluation is taking place upon completion of the project and that longer term impact is expected to be seen in a few years time. Frame recommendations to enhance future project impact in this context. Which will be the major 'channels' for longer term impact from the project at the national and international scales?
    - *Relevance*: In retrospect, were the project's outcomes consistent with the focal areas/operational program strategies? Ascertain the nature and significance of the contribution of the project outcomes to the United Nations Framework Convention on Climate Change and the wider portfolio of the GEF.
    - *Efficiency*: Was the project cost effective? Was the project the least cost option? Was the project implementation delayed and if it was, then did that affect cost-effectiveness? Assess the contribution of cash and in-kind co-financing to project implementation and to what extent the project leveraged additional resources. Did the project build on earlier initiatives, did it make effective use of available scientific and / or technical information. Wherever possible, the evaluator should also compare the cost-time vs. outcomes relationship of the project with that of other similar projects.

**B. Sustainability:**
Sustainability is understood as the probability of continued long-term project-derived outcomes and impacts after the GEF project funding ends. The evaluation will identify and assess the key conditions or factors that are likely to contribute or undermine the persistence of benefits after the

project ends. Some of these factors might be outcomes of the project, e.g. stronger institutional capacities or better informed decision-making. Other factors will include contextual circumstances or developments that are not outcomes of the project but that are relevant to the sustainability of outcomes. The evaluation should ascertain to what extent follow-up work has been initiated and how project outcomes will be sustained and enhanced over time.

Five aspects of sustainability should be addressed: financial, socio-political, institutional frameworks and governance, environmental (if applicable). The following questions provide guidance on the assessment of these aspects:

- *Financial resources.* Are there any financial risks that may jeopardize sustenance of project outcomes? What is the likelihood that financial and economic resources will not be available once the GEF assistance ends (resources can be from multiple sources, such as the public and private sectors, income generating activities, and trends that may indicate that it is likely that in future there will be adequate financial resources for sustaining project's outcomes)? To what extent are the outcomes of the project dependent on continued financial support?
- *Socio-political:* Are there any social or political risks that may jeopardize sustenance of project outcomes? What is the risk that the level of stakeholder ownership will be insufficient to allow for the project outcomes to be sustained? Do the various key stakeholders see that it is in their interest that the project benefits continue to flow? Is there sufficient public / stakeholder awareness in support of the long term objectives of the project?
- *Institutional framework and governance.* To what extent is the sustenance of the outcomes of the project dependent on issues relating to institutional frameworks and governance? What is the likelihood that institutional and technical achievements, legal frameworks, policies and governance structures and processes will allow for, the project outcomes/benefits to be sustained? While responding to these questions consider if the required systems for accountability and transparency and the required technical know-how are in place.
- *Environmental.* Are there any environmental risks that can undermine the future flow of project environmental benefits? The TE should assess whether certain activities in the project area will pose a threat to the sustainability of the project outcomes. For example; construction of dam in a protected area could inundate a sizable area and thereby neutralize the biodiversity-related gains made by the project; or, a newly established pulp mill might jeopardize the viability of nearby protected forest areas by increasing logging pressures; or a vector control intervention may be made less effective by changes in climate and consequent alterations to the incidence and distribution of malarial mosquitoes.

**C. Achievement of outputs and activities:**

- Delivered outputs: Assessment of the project's success in producing each of the programmed outputs, both in quantity and quality as well as usefulness and timeliness.
- Assess the soundness and effectiveness of the methodologies used for developing the technical documents and related management options in the participating countries
- Assess to what extent the project outputs produced have the weight of scientific authority / credibility, necessary to influence policy and decision-makers, particularly at the national level.

**D. Catalytic Role**

Replication and catalysis. What examples are there of replication and catalytic outcomes? Replication approach, in the context of GEF projects, is defined as lessons and experiences coming out of the project that are replicated or scaled up in the design and implementation of other projects. Replication can have two aspects, replication proper (lessons and experiences are

replicated in different geographic area) or scaling up (lessons and experiences are replicated within the same geographic area but funded by other sources). Specifically:

- Do the recommendations for management of the Global Market Transformation for Efficient Lighting project coming from the country studies have the potential for application in other countries and locations?

If no effects are identified, the evaluation will describe the catalytic or replication actions that the project carried out.

**E. Assessment monitoring and evaluation systems.**

The evaluation shall include an assessment of the quality, application and effectiveness of project monitoring and evaluation plans and tools, including an assessment of risk management based on the assumptions and risks identified in the project document. The Terminal Evaluation will assess whether the project met the minimum requirements for 'project design of M&E' and 'the application of the Project M&E plan' (see minimum requirements 1&2 in *Annex 4* to this Appendix). GEF projects must budget adequately for execution of the M&E plan, and provide adequate resources during implementation of the M&E plan. Project managers are also expected to use the information generated by the M&E system during project implementation to adapt and improve the project.

**M&E during project implementation**

- *M&E design.* Projects should have sound M&E plans to monitor results and track progress towards achieving project objectives. An M&E plan should include a baseline (including data, methodology, etc.), SMART indicators (see Annex 4) and data analysis systems, and evaluation studies at specific times to assess results. The time frame for various M&E activities and standards for outputs should have been specified.
- *M&E plan implementation.* A Terminal Evaluation should verify that: an M&E system was in place and facilitated timely tracking of results and progress towards projects objectives throughout the project implementation period (perhaps through use of a logframe or similar); annual project reports and Progress Implementation Review (PIR) reports were complete, accurate and with well justified ratings; that the information provided by the M&E system was used during the project to improve project performance and to adapt to changing needs; and that projects had an M&E system in place with proper training for parties responsible for M&E activities.
- *Budgeting and Funding for M&E activities.* The terminal evaluation should determine whether support for M&E was budgeted adequately and was funded in a timely fashion during implementation.

**F. Preparation and Readiness**

Were the project's objectives and components clear, practicable and feasible within its timeframe? Were the capacities of executing institution and counterparts properly considered when the project was designed? Were lessons from other relevant projects properly incorporated in the project design? Were the partnership arrangements properly identified and the roles and responsibilities negotiated prior to project implementation? Were counterpart resources (funding, staff, and facilities), enabling legislation, and adequate project management arrangements in place?

**G. Country ownership / driveness:**

This is the relevance of the project to national development and environmental agendas, recipient country commitment, and regional and international agreements. The evaluation will:

- Assess the level of country ownership. Specifically, the evaluator should assess whether the project was effective in providing and communicating biodiversity information that catalyzed action in participating countries to improve decisions relating to the conservation and management of the focal ecosystem in each country.

- Assess the level of country commitment to the generation and use of biodiversity indicators for decision-making during and after the project, including in regional and international fora.

**H. Stakeholder participation / public awareness:**

This consists of three related and often overlapping processes: information dissemination, consultation, and "stakeholder" participation. Stakeholders are the individuals, groups, institutions, or other bodies that have an interest or stake in the outcome of the GEF- financed project. The term also applies to those potentially adversely affected by a project. The evaluation will specifically:

- Assess the mechanisms put in place by the project for identification and engagement of stakeholders in each participating country and establish, in consultation with the stakeholders, whether this mechanism was successful, and identify its strengths and weaknesses.
- Assess the degree and effectiveness of collaboration/interactions between the various project partners and institutions during the course of implementation of the project.
- Assess the degree and effectiveness of any various public awareness activities that were undertaken during the course of implementation of the project.

**I. Financial Planning**

Evaluation of financial planning requires assessment of the quality and effectiveness of financial planning and control of financial resources throughout the project's lifetime. Evaluation includes actual project costs by activities compared to budget (variances), financial management (including disbursement issues), and co- financing. The evaluation should:

- Assess the strength and utility of financial controls, including reporting, and planning to allow the project management to make informed decisions regarding the budget and allow for a proper and timely flow of funds for the payment of satisfactory project deliverables.
- Present the major findings from the financial audit if one has been conducted.
- Identify and verify the sources of co- financing as well as leveraged and associated financing (in co-operation with the IA and EA).
- Assess whether the project has applied appropriate standards of due diligence in the management of funds and financial audits.
- The evaluation should also include a breakdown of final actual costs and co-financing for the project prepared in consultation with the relevant UNEP/DGEF Fund Management Officer of the project (table attached in *Annex 1* to this Appendix Co-financing and leveraged resources).

**J. Implementation approach:**

This includes an analysis of the project's management framework, adaptation to changing conditions (adaptive management), partnerships in implementation arrangements, changes in project design, and overall project management. The evaluation will:

- Ascertain to what extent the project implementation mechanisms outlined in the project document have been closely followed. In particular, assess the role of the various committees established and whether the project document was clear and realistic to enable effective and efficient implementation, whether the project was executed according to the plan and how well the management was able to adapt to changes during the life of the project to enable the implementation of the project.
- Evaluate the effectiveness and efficiency and adaptability of project management and the supervision of project activities / project execution arrangements at all levels (1) policy decisions: Steering Group; (2) day-to-day project management in UNEP/DTIE.

**K. UNEP Supervision and Backstopping**

- Assess the effectiveness of supervision and administrative and financial support provided by UNEP/DGEF.
- Identify administrative, operational and/or technical problems and constraints that influenced the effective implementation of the project.

The ***ratings will be presented in the form of a table***. Each of the eleven categories should be rated separately with **brief justifications** based on the findings of the main analysis. An overall rating for the project should also be given. The following rating system is to be applied:

HS = Highly Satisfactory
S = Satisfactory
MS = Moderately Satisfactory
MU = Moderately Unsatisfactory
U = Unsatisfactory
HU = Highly Unsatisfactory

**3. Evaluation report format and review procedures**

The report should be brief, to the point and easy to understand. It must explain; the purpose of the evaluation, exactly what was evaluated and the methods used. The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should be presented in a way that makes the information accessible and comprehensible and include an executive summary that encapsulates the essence of the information contained in the report to facilitate dissemination and distillation of lessons.

The evaluation will rate the overall implementation success of the project and provide individual ratings of the eleven implementation aspects as described in Section 1 of this TOR. The ratings will be presented in the format of a table with brief justifications based on the findings of the main analysis. Evidence, findings, conclusions and recommendations should be presented in a complete and balanced manner. Any dissident views in response to evaluation findings will be appended in an annex. The evaluation report shall be written in English, be of no more than 50 pages (excluding annexes), use numbered paragraphs and include:

i) An **executive summary** (no more than 3 pages) providing a brief overview of the main conclusions and recommendations of the evaluation;
ii) **Introduction and background** giving a brief overview of the evaluated project, for example, the objective and status of activities; The GEF Monitoring and Evaluation Policy, 2006, requires that a TE report will provide summary information on when the evaluation took place; places visited; who was involved; the key questions; and, the methodology.
iii) **Scope, objective and methods** presenting the evaluation's purpose, the evaluation criteria used and questions to be addressed;
iv) **Project Performance and Impact** providing *factual evidence* relevant to the questions asked by the evaluator and interpretations of such evidence. This is the main substantive section of the report. The evaluator should provide a commentary and analysis on all eleven evaluation aspects (A − K above).
v) **Conclusions and rating** of project implementation success giving the evaluator's concluding assessments and ratings of the project against given evaluation criteria and standards of performance. The conclusions should provide answers to questions about whether the project is considered good or bad, and whether the results are considered positive or negative. The ratings should be provided with a brief narrative comment in a table (see *Annex 1* to this Appendix);
vi) **Lessons (to be) learned** presenting general conclusions from the standpoint of the design and implementation of the project, based on good practices and successes or problems and mistakes. Lessons should have the potential for wider application and use. All lessons should 'stand alone' and should:
    - Briefly describe the context from which they are derived
    - State or imply some prescriptive action;
    - Specify the contexts in which they may be applied (if possible, who when and where)

vii) **Recommendations** suggesting *actionable* proposals for improvement of the current project. In general, Terminal Evaluations are likely to have very few (perhaps two or three) actionable recommendations.

*Prior to each recommendation*, the issue(s) or problem(s) to be addressed by the recommendation should be clearly stated.

A high quality recommendation is an actionable proposal that is:

1. Feasible to implement within the timeframe and resources available
2. Commensurate with the available capacities of project team and partners
3. Specific in terms of who would do what and when
4. Contains results-based language (i.e. a measurable performance target)
5. Includes a trade-off analysis, when its implementation may require utilizing significant resources that would otherwise be used for other project purposes.

viii) Annexes may include additional material deemed relevant by the evaluator but must include:

1. The Evaluation Terms of Reference,
2. A list of interviewees, and evaluation timeline
3. A list of documents reviewed / consulted
4. Summary co-finance information and a statement of project expenditure by activity
5. The expertise of the evaluation team. (brief CV).

TE reports will also include any response / comments from the project management team and/or the country focal point regarding the evaluation findings or conclusions as an annex to the report, however, such will be appended to the report by UNEP EOU.

Examples of UNEP GEF Terminal Evaluation Reports are available at www.unep.org/eou

**Review of the Draft Evaluation Report**

Draft reports submitted to UNEP EOU are shared with the corresponding Programme or Project Officer and his or her supervisor for initial review and consultation. The DGEF staff and senior Executing Agency staff are allowed to comment on the draft evaluation report. They may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions. The consultation also seeks feedback on the proposed recommendations. UNEP EOU collates all review comments and provides them to the evaluators for their consideration in preparing the final version of the report.

**4. <u>Submission of Final Terminal Evaluation Reports.</u>**

The final report shall be submitted in electronic form in MS Word format and should be sent to the following persons:

Chief,
UNEP Evaluation and Oversight Unit
P.O. Box 30552-00100
Nairobi, Kenya
Tel.: +(254-20)762-4181
Fax: +(254-20)762-3158
Email: Segbedzi.Norgbey@unep.org

With a copy to:

Maryam Niamir-Fuller,
Director
UNEP/Division of GEF Coordination

P.O. Box 30552-00100
Nairobi, Kenya
Tel: +(254-20)762-4166
Fax: +(254-20)762-4041/2
Email: Maryam.Niamir-Fuller@unep.org

Edu Hassing
Task Manager
UNEP/Division of GEF Coordination
15 rue de Milan
75441 Paris Cedex 09, France
Tel: +(33-1) 44 37 14 72
Fax: +(33-1) 44 37 14 74
Email: edu.hassing@unep.org

The Final evaluation will also be copied to all the GEF National Focal Points of the countries that have been associated with the Project.

The final evaluation report will be published on the Evaluation and Oversight Unit's web-site www.unep.org/eou and may be printed in hard copy. Subsequently, the report will be sent to the GEF Office of Evaluation for their review, appraisal and inclusion on the GEF website.

**5. Resources and schedule of the evaluation**

This final evaluation will be undertaken by an international evaluator contracted by the Evaluation and Oversight Unit, UNEP. The contract for the evaluator will begin on 1 April 2013 and end on 15 July 2013 (75 days) spread over 14 weeks (50 days of travel to France (UNEP/DTIE) and major countries associated with the Project including China and India as well as 25 days desk study). The evaluator will submit a draft report on 1 August 2013 to UNEP/EOU, the UNEP/DGEF Task Manager, and key representatives of the executing agencies. Any comments or responses to the draft report will be sent to UNEP / EOU for collation and the consultant will be advised of any necessary revisions. Comments to the final draft report will be sent to the consultant by 15 August 2013 after which, the consultant will submit the final report no later than 1 September 2013.

The evaluator will after an initial telephone briefing with EOU and UNEP/GEF conduct initial desk review work and later travel to France and meet with project staff at the beginning of the evaluation. Furthermore, the evaluator is expected to travel to Thailand, Vietnam, and a third one to be determined at the evaluation stage and meet with representatives of the agencies, which have been associated with the Project and the intended users of Project's outputs.

In accordance with UNEP/GEF policy, all GEF projects are evaluated by independent evaluators contracted as consultants by the EOU. The evaluator should have the following qualifications:

The evaluator should not have been associated with the design and implementation of the project in a paid capacity. The evaluator will work under the overall supervision of the Chief, Evaluation and Oversight Unit, UNEP. The evaluator should be an international expert in policy development for the introduction of new EE technologies with a sound understanding of climate change mitigation and economic issues. The consultant should have the following minimum qualifications: (i) experience in issues related to the introduction and application of EE lamps; (ii) experience with management and implementation of large energy efficiency improvement projects and in particular with development of corresponding policies targeted at policy-influence and decision-making; (iii) experience with project evaluation. Knowledge of UNEP programmes and GEF activities is desirable. Knowledge of French is an advantage. Fluency in oral and written English is a must.

**6. Schedule of Payment**

The consultant shall select one of the following two contract options:

**Lump-Sum Option**
The evaluator will receive an initial payment of 30% of the total amount due upon signature of the contract. A further 30% will be paid upon submission of the draft report. A final payment of 40% will be made upon satisfactory completion of work. The fee is payable under the individual Special Service Agreement (SSA) of the evaluator and **is inclusive** of all expenses such as travel, accommodation and incidental expenses.

**Fee-only Option**
The evaluator will receive an initial payment of 40% of the total amount due upon signature of the contract. Final payment of 60% will be made upon satisfactory completion of work. The fee is payable under the individual SSAs of the evaluator and is **NOT** inclusive of all expenses such as travel, accommodation and incidental expenses. Ticket and DSA will be paid separately.

In case, the evaluator cannot provide the products in accordance with the TORs, the timeframe agreed, or his products are substandard, the payment to the evaluator could be withheld, until such a time the products are modified to meet UNEP's standard. In case the evaluator fails to submit a satisfactory final product to UNEP, the product prepared by the evaluator may not constitute the evaluation report.

### *Annex 1 to Appendix 9: Overall Ratings Table*

| Criterion | Evaluator's Summary Comments | Evaluator's Rating |
|---|---|---|
| **A. Attainment of project objectives and results (overall rating)** **Sub criteria (below)** | | |
| A. 1. Effectiveness | | |
| A. 2. Relevance | | |
| A. 3. Efficiency | | |
| **B. Sustainability of Project outcomes (overall rating)** **Sub criteria (below)** | | |
| B. 1. Financial | | |
| B. 2. Socio Political | | |
| B. 3. Institutional framework and governance | | |
| B. 4. Ecological | | |
| **C. Achievement of outputs and activities** | | |
| **D. Monitoring and Evaluation (overall rating)** **Sub criteria (below)** | | |
| D. 1. M&E Design | | |
| D. 2. M&E Plan Implementation (use for adaptive management) | | |
| D. 3. Budgeting and Funding for M&E activities | | |
| **E. Catalytic Role** | | |
| **F. Preparation and readiness** | | |
| **G. Country ownership / drivenness** | | |
| **H. Stakeholders involvement** | | |
| **I. Financial planning** | | |
| **J. Implementation approach** | | |
| **K. UNEP Supervision and backstopping** | | |

## RATING OF PROJECT OBJECTIVES AND RESULTS

Highly Satisfactory (HS): The project had no shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Satisfactory (S): The project had minor shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Moderately Satisfactory (MS): The project had moderate shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Moderately Unsatisfactory (MU): The project had significant shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Unsatisfactory (U) The project had major shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Highly Unsatisfactory (HU): The project had severe shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

**Please note:** Relevance and effectiveness will be considered as critical criteria. The overall rating of the project for achievement of objectives and results **may not be higher** than the lowest rating on either of these two criteria. Thus, to have an overall satisfactory rating for outcomes a project must have at least satisfactory ratings on both relevance and effectiveness.

## RATINGS ON SUSTAINABILITY

A. Sustainability will be understood as the probability of continued long-term outcomes and impacts after the GEF project funding ends. The Terminal evaluation will identify and assess the key conditions or factors that are likely to contribute or undermine the persistence of benefits after the project ends. Some of these factors might be outcomes of the project, i.e. stronger institutional capacities, legal frameworks, socio-economic incentives /or public awareness. Other factors will include contextual circumstances or developments that are not outcomes of the project but that are relevant to the sustainability of outcomes.

**Rating system for sustainability sub-criteria**

On each of the dimensions of sustainability of the project outcomes will be rated as follows.

Likely (L): There are no risks affecting this dimension of sustainability.

Moderately Likely (ML). There are moderate risks that affect this dimension of sustainability.

Moderately Unlikely (MU): There are significant risks that affect this dimension of sustainability

Unlikely (U): There are severe risks that affect this dimension of sustainability.

According to the GEF Office of Evaluation, all the risk dimensions of sustainability are deemed critical. Therefore, overall rating for sustainability will not be higher than the rating of the dimension with lowest ratings. For example, if a project has an Unlikely rating in any of the dimensions then its overall rating cannot be higher than Unlikely, regardless of whether higher ratings in other dimensions of sustainability produce a higher average.

## RATINGS OF PROJECT M&E

Monitoring is a continuing function that uses systematic collection of data on specified indicators to provide management and the main stakeholders of an ongoing project with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds. Evaluation is the systematic and objective assessment of an on-going or completed project, its design, implementation and results. Project evaluation may involve the definition of appropriate standards, the examination of performance against those standards, and an assessment of actual and expected results.

The Project monitoring and evaluation system will be rated on 'M&E Design', 'M&E Plan Implementation' and 'Budgeting and Funding for M&E activities' as follows:

Highly Satisfactory (HS): There were no shortcomings in the project M&E system. Satisfactory(S): There were minor shortcomings in the project M&E system.

Moderately Satisfactory (MS): There were moderate shortcomings in the project M&E system.

Moderately Unsatisfactory (MU): There were significant shortcomings in the project M&E system.

Unsatisfactory (U): There were major shortcomings in the project M&E system.

Highly Unsatisfactory (HU): The Project had no M&E system.

"M&E plan implementation" will be considered a critical parameter for the overall assessment of the M&E system. The overall rating for the M&E systems will not be higher than the rating on "M&E plan implementation."

All other ratings will be on the GEF six point scale.

| GEF Performance Description | | Alternative description on the same scale |
|---|---|---|
| HS | = Highly Satisfactory | Excellent |
| S | = Satisfactory | Well above average |

| | | |
|---|---|---|
| MS | = Moderately Satisfactory | Average |
| MU | = Moderately Unsatisfactory | Below Average |
| U | = Unsatisfactory | Poor |
| HU | = Highly Unsatisfactory | Very poor (Appalling) |

***Annex 2 to Appendix 9: Co-financing and Leveraged Resources***

Co-financing (basic data to be supplied to the consultant for verification)

| Totals | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

| Co financing (Type/Source) | IA own Financing (mill US$) | | Government (mill US$) | | Other* (mill US$) | | Total (mill US$) | | Total Disbursement (mill US$) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Planned** | **Actual** | **Planned** | **Actual** | **Planned** | **Actual** | **Planned** | **Actual** | **Planned** | **Actual** |
| – Grants | | | | | | | | | | |
| – Loans/Concessional (compared to market rate) | | | | | | | | | | |
| – Credits | | | | | | | | | | |
| – Equity investments | | | | | | | | | | |
| – In-kind support | | | | | | | | | | |
| – Other (*)<br>-<br>-<br>-<br>-<br>- | | | | | | | | | | |

***** Other is referred to contributions mobilized for the project from other multilateral agencies, bilateral development cooperation agencies, NGOs, the private sector and beneficiaries.

***Leveraged Resources***

Leveraged resources are additional resources—beyond those committed to the project itself at the time of approval—that are mobilized later as a direct result of the project. Leveraged resources can be financial or in-kind and they may be from other donors, NGO's, foundations, governments, communities or the private sector. Please briefly describe the resources the project has leveraged since inception and indicate how these resources are contributing to the project's ultimate objective.

**Table showing final actual project expenditure by activity to be supplied by the UNEP Fund management Officer. (insert here)**

***Annex 3 to Appendix 9: Review of the Draft Report***

Draft reports submitted to UNEP EOU are shared with the corresponding Programme or Project Officer and his or her supervisor for initial review and consultation. The DGEF staff and senior Executing Agency staff provide comments on the draft evaluation report. They may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions. The consultation also seeks agreement on the findings and recommendations. UNEP EOU collates the review comments and provides them to the evaluators for their consideration in preparing the final version of the report. General comments on the draft report with respect to compliance with these TOR are shared with the reviewer.

**Quality Assessment of the Evaluation Report**

All UNEP GEF Mid Term Reports are subject to quality assessments by UNEP EOU. These apply GEF Office of Evaluation quality assessment and are used as a tool for providing structured feedback to the evaluator.

The quality of the draft evaluation report is assessed and rated against the following criteria:

| **GEF Report Quality Criteria** | **UNEP EOU Assessment** | **Rating** |
|---|---|---|
| A. Did the report present an assessment of relevant outcomes and achievement of project objectives in the context of the focal area program indicators if applicable? | | |
| B. Was the report consistent and the evidence complete and convincing and were the ratings substantiated when used? | | |
| C. Did the report present a sound assessment of sustainability of outcomes? | | |
| D. Were the lessons and recommendations supported by the evidence presented? | | |
| E. Did the report include the actual project costs (total and per activity) and actual co-financing used? | | |
| F. Did the report include an assessment of the quality of the project M&E system and its use for project management? | | |
| **UNEP EOU additional Report Quality Criteria** | **UNEP EOU Assessment** | **Rating** |
| G. Quality of the lessons: Were lessons readily applicable in other contexts? Did they suggest prescriptive action? | | |
| H. Quality of the recommendations: Did recommendations specify the actions necessary to correct existing conditions or improve operations ('who?' 'what?' 'where?' 'when?)'. Can they be implemented? Did the recommendations specify a goal and an associated performance indicator? | | |
| I. Was the report well written?<br>(clear English language and grammar) | | |
| J. Did the report structure follow EOU guidelines, were all requested Annexes included? | | |
| K. Were all evaluation aspects specified in the TORs adequately addressed? | | |
| L. Was the report delivered in a timely manner | | |

**GEF Quality of the MTE report = 0.3*(A + B) + 0.1*(C+D+E+F)**
**EOU assessment of MTE report = 0.3*(G + H) + 0.1*(I+J+K+L)**
**Combined quality Rating = (2* 'GEF EO' rating + EOU rating)/3**
**The Totals are rounded and converted to the scale of HS to HU**

**Rating system for quality of terminal evaluation reports**

A number rating 1-6 is used for each criterion: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, Highly Unsatisfactory = 1, and unable to assess = 0.

***Annex 4 to Appendix 9: GEF Minimum requirements for M&E***

**Minimum Requirement 1: Project Design of M&E**[38]

All projects must include a concrete and fully budgeted monitoring and evaluation plan by the time of Work Program entry (full-sized projects) or CEO approval (medium-sized projects). This plan must contain at a minimum:

- SMART (see below) indicators for project implementation, or, if no indicators are identified, an alternative plan for monitoring that will deliver reliable and valid information to management
- SMART indicators for results (outcomes and, if applicable, impacts), and, where appropriate, corporate-level indicators
- A project baseline, with:
  - a description of the problem to address
  - indicator data
  - or, if major baseline indicators are not identified, an alternative plan for addressing this within one year of implementation
- An M&E Plan with identification of reviews and evaluations which will be undertaken, such as mid-term reviews or evaluations of activities
- An organizational setup and budgets for monitoring and evaluation.

**Minimum Requirement 2: Application of Project M&E**

- Project monitoring and supervision will include implementation of the M&E plan, comprising:
- Use of SMART indicators for implementation (or provision of a reasonable explanation if not used)
- Use of SMART indicators for results (or provision of a reasonable explanation if not used)
- Fully established baseline for the project and data compiled to review progress
- Evaluations are undertaken as planned
- Operational organizational setup for M&E and budgets spent as planned.

SMART INDICATORS GEF projects and programs should monitor using relevant performance indicators. The monitoring system should be "SMART":

1. **Specific**: The system captures the essence of the desired result by clearly and directly relating to achieving an objective, and only that objective.
2. **Measurable:** The monitoring system and its indicators are unambiguously specified so that all parties agree on what the system covers and there are practical ways to measure the indicators and results.
3. **Achievable and Attributable:** The system identifies what changes are anticipated as a result of the intervention and whether the result(s) are realistic. Attribution requires that changes in the targeted developmental issue can be linked to the intervention.
4. **Relevant and Realistic:** The system establishes levels of performance that are likely to be achieved in a practical manner, and that reflect the expectations of stakeholders.
5. **Time-bound, Timely, Trackable, and Targeted:** The system allows progress to be tracked in a cost-effective manner at desired frequency for a set period, with clear identification of the particular stakeholder group to be impacted by the project or program.

***Annex 5 to Appendix 9: List of intended additional recipients for the Terminal Evaluation***

(to be completed by the IA Task Manager)

| Name | Affiliation | Email |
|---|---|---|
| Aaron Zazuetta | GEF Evaluation Office | azazueta@thegef.org |
| **Government Officials** | | |
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| **GEF Focal Point(s)** | | |
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| | | |
| **Executing Agency** | | |
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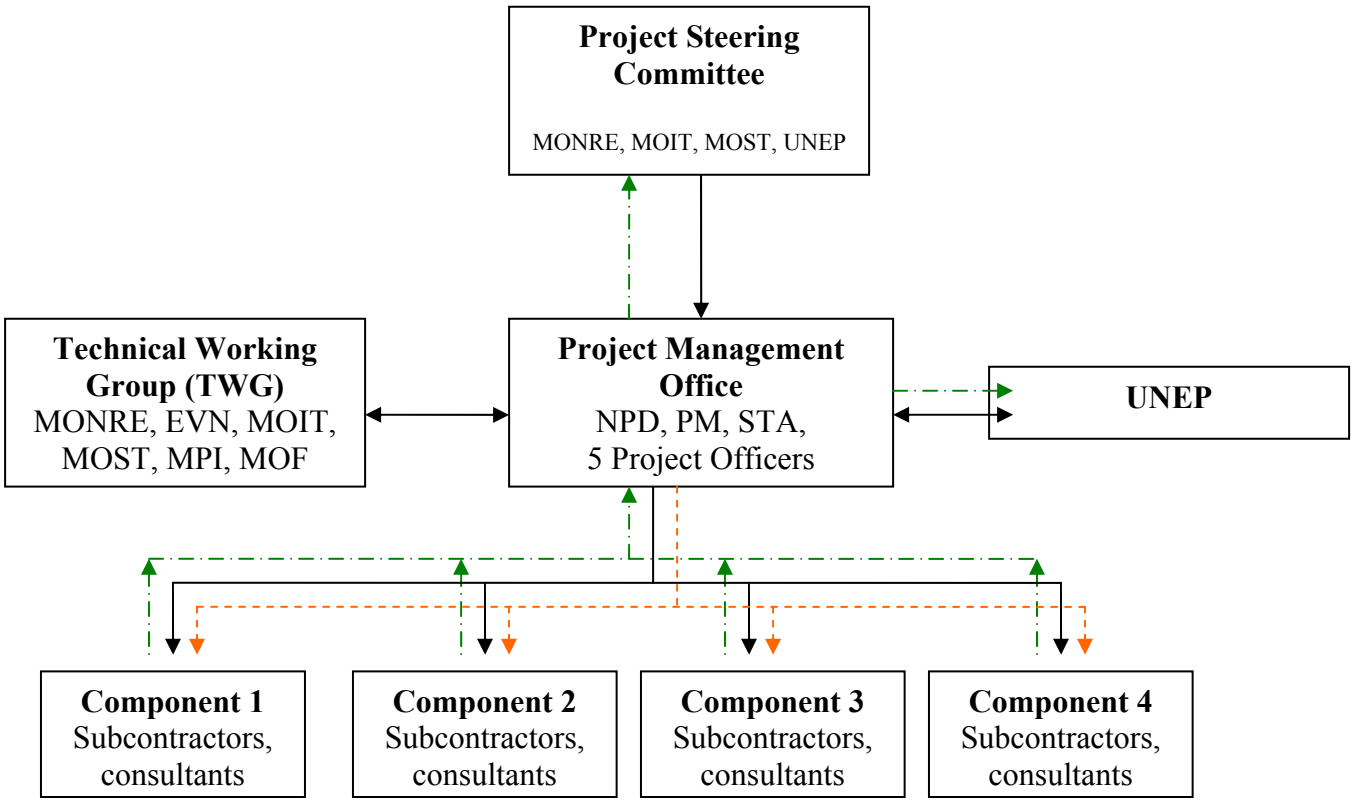
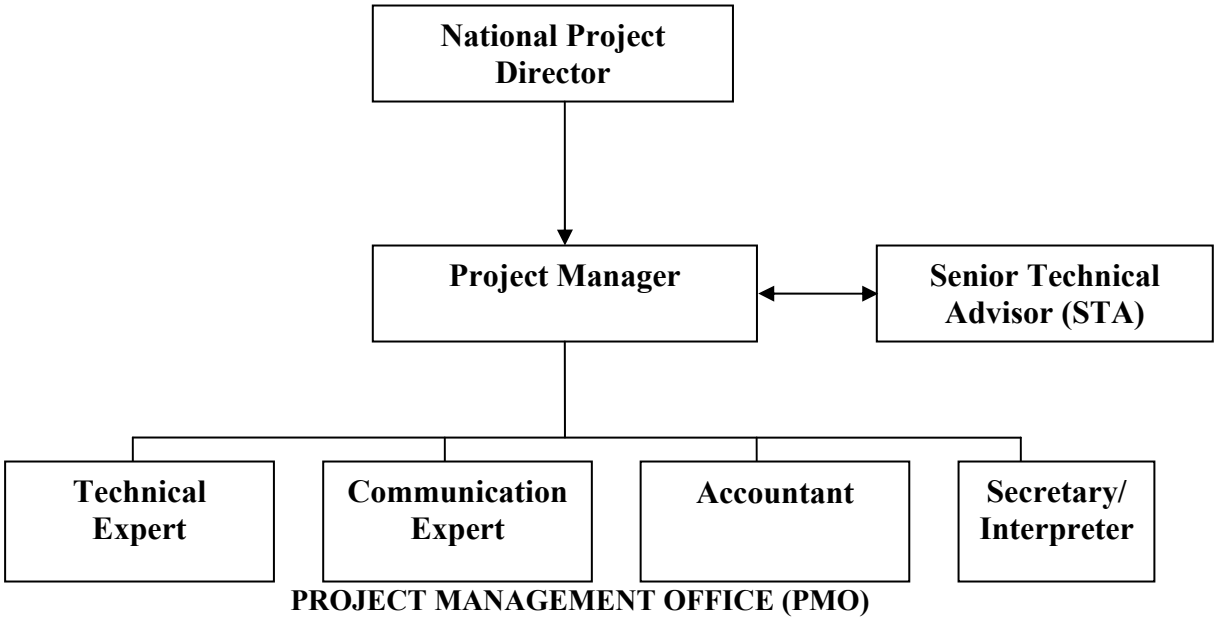
| **Implementing Agency** | | |
| | UNEP DGEF Quality Assurance Officer | |
| | | |
| | | |

The TOR will be discussed with UNEP Monitoring and Evaluation Unit.

**Appendix 10: Decision-Making Flowchart (Project Implementation Arrangement)**




**_____: project management line ; reporting line ; : financial flow**




**PROJECT MANAGEMENT OFFICE (PMO)**

## Appendix 11: Terms Of Reference

The Ministry of Natural Resources and Environment (MONRE) is the executing partner and is accountable to GoV and UNEP/GEF for ensuring: (i) the substantive quality of the project, (ii) the effective use of both international and national resources allocated to it, (iii) the availability of time for national contributions to support project implementation, and (iv) the proper coordination among all project stakeholders, in particular national parties.

The ISPONRE is the assigned by MONRE executing agency for the project. ISPONRE will be responsible to MONRE, UNEP for the achievement of the project objectives, for all projects reporting, including the submission of work plans and financial reports. As executing agency, ISPONRE will ensure the delivery of the project outputs and the judicious use of the project resources.

The project management arrangement is expected to consist of following:

- The Project Steering Committee (PSC)
- The National Project Director (NPD)
- The Project Management Office (PMO)
- The Technical Working Group (TWG)

### *Steering Committee*

The Project Steering Committee (PSC) will consist of high level representatives from MONRE, MOST, MOIT, and UNEP. It will be chaired by the Vice-Minister of MONRE. The primary roles of the PSC are: (i) to provide overall guidance to the implementation of the project, (ii) to ensure good coordination among participating agencies, sectors and international organizations. The PSC meets at least once a year, to discuss the progress of the project and provide future guidance.

### *National Project Director*

The Director General of ISPONRE is expected to be the National Project Director (NPD). The NPD's overall role is to ensure the successful execution and implementation of the project toward achieving project results. The NPD represents MONRE and is accountable to the Government and UNEP for the substantive quality of the Project and for the proper use of project resources. The NPD is responsible for mobilizing all national and international project inputs in a timely manner, supporting project management and implementation, organizing project activities in accordance with the project work plan, and reporting to MONRE and UNEP the progress and the financial status of the Project.

### *Project Management Office (PMO)*

ISPONRE will create a Project Management Office (PMO) responsible of the overall operational and financial management and reporting of the UNEP/DTIE funds in accordance with the rules and regulations for nationally executed projects. The PMO will manage day-to-day operations of the Project, and will be based at the premises of ISPONRE. The PMO will comprise seven members, including: (i) the NPD who works part-time for the project as in-kind contribution of the Government; (ii) project manager; (iii) senior technical advisor; (iv) technical expert; (v)

communication expert; (vi) accountant and; (vii) secretary/interpreter. The international senior technical advisor (STA) will not be a permanent staff but will be recruited from time to time to assure the quality of the outputs. In addition, a number of subcontractors and international experts will support the PMO as and when needed to undertake the project activities.

The PMO will prepare quarterly progress reports to review achievement in the previous quarter, prepare financial report and develop work plan and budget for next quarter. All such documents would be endorsed by the Task Manager.

The PMO will hold quarterly meetings with UNEP representative during their visit to Vietnam to discuss a quarterly progress report, a quarterly work plan, a quarterly budget and any other relevant issues. It will also produce annual progress reports, which must be submitted to the SC at least two weeks before the annual meeting. At the end of the project, the PMO will produce the terminal report, which is to be submitted to the SC at least two weeks before the final meeting.

***Technical Working Group***

A Technical Working Group (TWG) will be established to provide overall comments of key program activities including fund commitments and co-financing arrangements. The TWG will consist of ISPONRE, senior representatives from the relevant departments of MONRE, MPI, MOST, MOIT, MOF as well as ESL production companies, lighting R&D institutions, and lighting industry associations. The TWG will meet regularly during the project implementation.

Considering the typical gestation period for obtaining GEF funding commitment, actual project development, evaluation and approval, it is anticipated that the project will kick-off by July 2010. It will operate for a period of 4 years until 31 July 2014. A detailed project implementation plan will be formulated after preparation and discussion with the UNEP international consultant.

Implementation of any project activity goes through following steps:

- Preparation of the work plan, development of Terms of Reference (TOR)
- Recruitment of consultants
- Verification of the outputs quality
- Documentation, printing of the output
- Dissemination

**TORs for personnel from Project Management Office (Local )**

| **Designation** | **Project Director / Local recruitment** |
|---|---|
| **Qualifications** | ➢ Minimum of University degree in Science or Engineering and post-graduate Masters Degree in Management or a Masters in Business Administration<br>➢ Minimum 15 years experience in the energy sector and minimum 10 years in managing a regional energy-related organization/agency or program<br>➢ Extensive knowledge of power sector, regulation and reform, energy policy and lighting issues in Vietnam<br>➢ Evidence of published books or journal articles on energy sector, regulation and reform, energy policy , social issues etc<br>➢ Knowledge of UNEP/GEF facility as well as associated GEF Climate Program priorities, project preparation and implementation mechanisms<br>➢ Knowledge and experience in working with government and NGOs in Vietnam |

| | |
|---|---|
| | ➢ Widely traveled in the region, with good contacts in key institutions including power utilities, regulatory bodies, private energy companies, government ministries etc.<br>➢ Demonstrated ability in managing a multi-disciplinary team<br>➢ Experience in regional cooperation and networking/cooperation with government officials, financiers, NGOs representatives and private sector executives in Africa<br>➢ Excellent oral and written communication skills in English and Vietnamese<br>➢ - Ability and willingness to travel at short notice |
| **Responsibilities** | ➢ Overall coordination, management, oversight as well as review of applications from, appointments (in conjunction with Steering Committee) and monitoring of key project experts, staffers and sub-contractors.<br>➢ In charge of coordination the compilation and updating of Vision, Roll-out Strategy and Sustainability Business Plan.<br>➢ Review of key outputs of the project, including market survey and assessment studies, business plans<br>➢ Responsible for reporting to Co-implementing Agencies (UNEP/GEF) and as well as to steering committee.<br>➢ Provides direction and overall leadership to the project Office<br>➢ - Take overall responsibility for the organization and execution of the project<br>➢ Ensure that the activities are carried out according to the project design and the outcomes and outputs/deliverables are achieved within the approved timeframe and budget<br>➢ Participate in the Steering Committee as well as provide regular reports to the Steering Committee on the progress and plans of the project |

| **Designation** | **Project Manager / Local recruitment** |
|---|---|
| **Qualifications** | ➢ Minimum of University degree in Science or Engineering and post-graduate Masters Degree in Management or a Masters in Business Administration<br>➢ Minimum 10 years experience in the energy sector and minimum 7 years in managing a regional/local energy-related organization/agency or program<br>➢ Extensive knowledge of power sector, regulation and reform, energy policy and lighting issues in Vietnam<br>➢ Evidence of published books or journal articles or reports on energy sector, regulation and reform, energy policy , social issues etc<br>➢ Knowledge of UNEP/GEF facility as well as associated GEF Climate Program priorities, project preparation and implementation mechanisms would be an advantage.<br>➢ Knowledge and experience in working with government and NGOs in Vietnam<br>➢ Good contacts in key institutions including power utilities, regulatory bodies, private energy companies, government ministries etc.<br>➢ Demonstrated ability in managing a multi-disciplinary team<br>➢ Excellent oral and written communication skills in English and Vietnamese<br>➢ Ability and willingness to travel at short notice<br>➢ Adequate computer literacy. |
| **Responsibilities** | ➢ Overall management as well as review of activities and monitoring of key project consultants, staffers and sub-contractors.<br>➢ In charge of coordination the compilation and updating of annual reports, half yearly reports and financial reports<br>➢ Review and provide key input of key outputs of the project, including market |

| | |
|---|---|
| | survey and assessment studies, business plans<br>➢ Responsible for reporting to UNEP and as well as to steering committee.<br>➢ Provides direction and overall management to the project Office<br>➢ Take overall responsibility for the management and execution of the project<br>➢ Ensure that the activities are carried out according to the project design and the outcomes and outputs/deliverables are achieved within the approved timeframe and budget<br>➢ Help in organizing of training programs, ensure adequate participation and quality of reports |

| **Designation** | **Senior Technical Advisor / Local recruitment** |
|---|---|
| **Qualifications** | ➢ Minimum of University degree in Engineering and post-graduate Masters Degree<br>➢ Minimum 12 years experience in the energy sector and minimum 10 years in managing a regional energy-related organization/agency or program<br>➢ Extensive knowledge of lighting sector, regulation and reform, energy policy and lighting issues in Vietnam<br>➢ Evidence of published books or journal articles on energy sector, regulation and reform, energy policy , social issues etc<br>➢ Knowledge and experience in working with government and NGOs in Vietnam<br>➢ Widely traveled in the region, with good contacts in key institutions including lighting industry, power utilities, regulatory bodies, private energy companies, government ministries etc.<br>➢ Demonstrated ability in providing advisory services to industries on technological issues.<br>➢ Sound understanding of quality issues related to production line of appliances and equipments would be an advantage.<br>➢ Excellent oral and written communication skills in English and Vietnamese<br>➢ Adequate computer literacy. |
| **Responsibilities** | ➢ Providing overall technical advice on all issues related to project implementation.<br>➢ Review the terms of reference of the external consultants hired for specific purposes.<br>➢ Review of key outputs of the project, including market survey and assessment studies, business plans<br>➢ Review the technical reports submitted by the consultants<br>➢ Prepare technical training program agenda and ensure participation.<br>➢ Liaise with the manufacturers of the ESLs in Vietnam and motivates them to adopt manufacturing line for quality products<br>➢ Provides direction to the project.<br>➢ Ensure that the activities are carried out according to the project design and the outcomes and outputs/deliverables are achieved within the approved timeframe and budget |

| **Designation** | **Technical Advisor / Local recruitment** |
|---|---|
| **Qualifications** | ➢ Minimum of University degree in Engineering<br>➢ Minimum 7 years experience in the energy sector and minimum 4 years in executing a local energy-related organization/agency or program<br>➢ Knowledge of lighting sector, regulation and reform, energy policy and lighting issues in Vietnam<br>➢ Evidence of published books or journal articles on energy sector, regulation and |

| | |
|---|---|
| | reform, energy policy , social issues etc<br>➢ Knowledge and experience in working with government and NGOs in Vietnam<br>➢ Contacts in key institutions including lighting industry, power utilities, regulatory bodies, private energy companies, government ministries etc.<br>➢ Demonstrated ability in providing advisory services to industries on technological issues.<br>➢ Understanding of quality issues related to production line of appliances and equipments would be an advantage.<br>➢ Excellent oral and written communication skills in English and Vietnamese<br>➢ Adequate computer literacy. |
| **Responsibilities** | ➢ Backstopping the technical advisor in his duties and responsibilities.<br>➢ Providing technical advice on all issues related to project implementation.<br>➢ Preparing of the terms of reference of the external consultants hired for specific purposes.<br>➢ Critical review of key outputs of the project, including market survey and assessment studies, business plans<br>➢ Review the technical reports submitted by the consultants<br>➢ Organize technical training program and ensure participation.<br>➢ Liaise with the manufacturers of the ESLs in Vietnam and motivates them to adopt manufacturing line for quality products |

| **Designation** | **Communication expert / Local recruitment** |
|---|---|
| **Qualifications** | ➢ Minimum of University degree<br>➢ Minimum 7 years experience in the communications<br>➢ Knowledge of lighting sector, regulation and reform, energy policy and lighting issues in Vietnam<br>➢ Experience in working with government and NGOs in Vietnam<br>➢ Demonstrated ability in providing advisory services to industries on communication issues.<br>➢ Excellent oral and written communication skills in English and Vietnamese<br>➢ Adequate computer literacy. |
| **Responsibilities** | ➢ Prepare a work plan, liaise with relevant participants, coordinate regular press conference and ensure visibility of the project<br>➢ Supervise the work of consultants in particular the consultant for component 3 with regard to the development of communication plans and regularly discuss findings and recommendations with project team members<br>➢ Review, amend, discuss and disseminate directly to project partners all project-related documentation that would be available to the general public;<br>➢ Identify specific services required under the project such as surveys, or other matters with regard to raising awareness and acceptability, and organize with Project Manager, project team, delivery of adequate tools/material/training programmes and lists of contacts /networks.<br>➢ Report on the main issues and difficulties encountered so that lessons can be drawn with regard to the preparation of successive similar projects |

| **Designation** | **Finance and Account / Local recruitment** |
|---|---|
| **Qualifications** | ➢ Minimum of University degree in Accounts<br>➢ Minimum 7 years experience of work in large organization/agency or program |

| | |
|---|---|
| | ➢ Experience in working on international projects would be an asset.<br>➢ Excellent oral and written communication skills in English and Vietnamese<br>➢ Adequate computer literacy. |
| **Responsibilities** | ➢ Design, implementation and updating of project accounting system<br>➢ Preparing regular financial reports<br>➢ Reviewing and processing project payments and ensuring overall effective management of project accounts<br>➢ Support UNEP in financial reporting<br>➢ Any other tasks assigned by the project Director |

| **Designation** | **Secretary/Interpreter / Local recruitment** |
|---|---|
| **Qualifications** | ➢ Minimum of University degree in language<br>➢ Minimum 5 years experience of work in large organization/agency or program<br>➢ Experience in working on international projects would be an asset.<br>➢ Excellent oral and written communication skills in English and Vietnamese<br>➢ Adequate computer literacy. |
| **Responsibilities** | ➢ Build and update a database of project partners contacts as well as any others relevant individual or institution in relation to the project;<br>➢ Organize meetings of the project steering committee and maintain records of the events including dates, list of participants, and minutes of meetings;<br>➢ Maintain files of all project documentation;<br>➢ Maintain records and report expenses<br>➢ Maintain agendas for team members and remind them with regard to dated for reporting, etc.<br>➢ Liaise with UNEP, DTIE, and DGEF on any matter of relevance to the work<br>➢ Help in interpretation to English language during meeting etc.<br>➢ Report on the main issues and difficulties encountered so that lessons can be drawn with regard to the successive similar projects. |

**TORs for consultants (local and international)**

**Consultants on Environmental Issues**

His/her specific tasks would be:

- Defining acceptable mercury levels in relation to the number of compact fluorescent lamps (CFLs) that are (to be) installed;
- Identification of waste disposal and recycling possibilities and solutions with associated costs, possible partners and constraints according to various specific national circumstances; and
- Support for national authorities to ensure successful national lighting market transformation in Vietnam
- Prepare a work plan, in particular, a list of possible practices in Vietnam with regard to mercury related waste disposal, recycling of CFLs and handling other mercury wastes, liaise with relevant institutions, and organize meetings as appropriate.
- Prepare and discuss specific guidelines regarding issues of safe disposal and recycling of ESLs, in particular produce information material that is understandable to all parties and, in particular, to general policy makers to support policy dialogue and national policy development.

- Develop draft regulation on mercury recycling and CFL disposal along with the consultant on policy issue
- Work with various institutions whether public or private, involved in waste management and recycling to ensure network development in this area and provide concrete options to countries supported under the project; and
- Report on the main issues and difficulties encountered so that lessons can be drawn with regard to the preparation of successive similar projects.

**Consultants on Policy Issues**
His/her specific tasks would be:

- Gather, synthesize, transfer knowledge, support national authorities in project to secure successful national lighting market transformation.
- Prepare a background paper on lighting market transformation policy tools and requirements in Vietnam taking into account the findings and recommendations of recent conferences held elsewhere
- Develop policy guideline for the consideration of the government regarding phasing out IL and development of ESL market after extensive meetings
- Develop draft regulation on ESL procurement for public sector
- Develop proposal for national incentive on ESL recycling and potential incentives to accelerate penetration of ESL.
- Report on the main issues and difficulties encountered so that lessons can be drawn with regard to the preparation of successive similar projects.

**Consultants on Marketing**
His/her specific tasks would be:

- Carry out a market study of the lighting market, and main providers together with key contact persons, key capital links, and commercial indicators as well as strategies for market transformation for efficient lighting and provide a full understanding of the dynamics of this market, based on discussions with market parties and producers
- Based on an analysis of the lighting market with key players, propose a modus operandi for PMO, including proposed draft schemes and key decision points
- Design of marketing campaign and develop a media plan
- Recommend strategies to evaluate the effectiveness of marketing campaign

**Consultants on Quality, Standards and Testing**
His/her specific tasks would be:

- List of institutions involved in developing and setting norms and standards, contact persons in relation to the project, and a detailed description of the state development of norms and standards (including performance, environmental aspects, testing methods, etc.) under development at each institution and subsequently, report with a detailed analysis of gaps and inconsistencies in the area.
- Identification of additional testing facilities required if any and identification of skills which needs to be upgraded.
- Recommendations with regard to options towards harmonization;
- Analysis of financing required to comply with proposed levels of quality and effective testing
- Training needs assessment and following consultation with members of the testing laboratories, comprehensive training material to be used during training workshops.
- Developing training material and imparting training on testing and standards evaluation issues.
- Proposing a system of testing for quality parameters for ESLs

**Consultants on Market Research**

His/her specific tasks would be:

- Design a market research program for bringing out the status of various ESLs and IL in Vietnam.
- Conduct market research for the same
- Analyze the degree of penetration and use of the ESLs in the residential sector in Vietnam, including that in rural sector.
- To establish a baseline for the same
- To repeat the same exercise at the end of the project cycle and estimate the impact of the project

**Consultant on Business plan and ESL production**

His/her specific tasks would be:

- Review the ESLs and ILs production technologies in Vietnam
- Comparison with the other more advanced production technologies with focus on quality of the products.
- Developing proposal for the up gradation of the production line for production of better quality ESLs or change/adaptation of the ILs production line to CFLs
- Identify the suppliers of the same.
- Develop a business plan in close association with the manufacturers and work out the cost economics and feasibility of the same.

## Appendix 12: Co-Financing Commitment Letters

CÔNG TY CỔ PHẦN BÓNG ĐÈN PHÍCH NƯỚC RẠNG ĐÔNG
RANG DONG LIGHT SOURCE AND VACUUM FLASK JOINT STOCK COMPANY
87 - 89 Ha Dinh Str. - Thanh Xuan Dist. - Hanoi - Vietnam
Tel : (84-4) 8584310 - 8584165 - 8584576 Fax : (84-4) 8585038
E-mail : ralaco@hn.vnn.vn * Website: www.rangdongvn.com

December 26th, 2009

To: Ms. Monique Barbut
GEF Chief Executive Officer
1818 H Street, NW, MSN G6-602
Washington, DC 20433
USA

**Subject: Co-financing for the "Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam" project**

Dear Ms Barbut,

Firstly, we would like to express our sincere thanks for identifying Rang Dong Light Source & Vacuum Flask Joint Stock Company as partner participating in the above project.

Rang Dong is the biggest company specializing in producing light source and vacuum flask in Vietnam, especially in high quality energy saving lamps (ESLs) with over 40 years of experience. Our company has a network of distribution across the country and has exported products to Korea, Middle East, Sri Lanka, Bangladesh...Our products were selected consecutively several years as top ten, and high quality products by consumers in Vietnam and also were rewarded gold medals from international fair at home and abroad. Furthermore, our company has gained an ISO 9001:2000 quality management systems and our laboratory has gained an ISO/IEC17025: 2001 aimed at controlling product quality to meet customer's requirements.

Rang Dong warmly welcomes and confirms that we will be able to support the above project. Our contribution will be realized through parallel financing (offices and production lines, staff, training sessions, pilot projects on promotion of using ESLs).

Financial contribution to the project are listed below:

| | | |
|---|---|---|
| 1. | Construction of new high efficiency production factory of Metal Halide & LED Lamps: | |
| | - Factory construction: | 600 000 USD |
| | - Technology equipment on production of Metal Halide: | 1 000 000 USD |
| | - Technology equipment on production of LED: | 2 000 000 USD |
| 2. | Staff and Training Sessions: | 200 000 USD |
| 3. | Technology equipment on production of CFLs and Electronic Ballast: | 4 527 000 USD |
| 4. | Pilot project on promotion of using of ESLs: | 1 790 000 USD |
| | **TOTAL:** | **9 917 000 USD** |

We look forward to a fruitful cooperation.

Yours sincerely,

**LE QUOC KHANH**
**Deputy General Director**

1

Number of pages :1/2

CÔNG TY CỔ PHẦN BÓNG ĐÈN
điện quang

Văn phòng: 125 Hàm Nghi - Q1 - TPHCM
Tel: +84 8 38290135 - 38215153
Fax: +84 8 38251518
Email: info@dienquang.com
Website: http://www.dienquang.com

*Ho Chi Minh city - December, 14th 2009*

To : Ms. Monique Barbut
GEF Chief Executive Officer
1818 H Street, NW, MSN G6-602
Washington, DC 24033
USA

Subject : **Co-finacing for the " Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam " project**

Dear Ms. Barbut,

We would like to express our sincere thanks for selecting Dien Quang Lamp Joint Stock Company as the partner participating in the above project.

Dien Quang is one of the leading companies in manufacturing and trading in lighting products in Vietnam. We always care for the interest of customers, community and society.

Nowadays, with the objective in saving energy and protecting environment in all the world, Dien Quang has been a pioneer in manufacturing and trading lighting products successfully for years in Vietnam, especially in high quality energy saving lamps such as CFLs ( Compact fluorescent lamps ).

Moreover, Dien Quang has positively co-operated and participated in the projects of saving energy and protecting environment which were proposed by the Government agencies and other oganizations. We have got much experience in enhancing the awareness and action of community for using high quality energy saved products and protecting environment with the aim of opposing the changes of climate by the activities such as promotion, propaganda, training....

The Institude of strategy and policy on Natural Resources and Environment in Vietnam warmly welcome and confirm that Dien Quang will be able to support GEF in this project. Our contribution will be carried out through tasks and finance at the same time (offices and factories, staff, consultancy, training sessions, program for enhancing the

awareness of energy efficiency, technology equipment on production of CFLs, project on promotion of using of CFLs )

Financial contribution to the project are listed below :

| | |
|---|---|
| Staff : | 350,000 USD |
| Consultancy : | 150,000 USD |
| Technology equipment on production of CFLs | 2,500,000 USD |
| Equipment and instrument for offices and factories | 500,000 USD |
| **TOTAL :** | **3,500,000 USD** |

We look forward to receiving your kind co-operation.

Yours sincerely,

**THE DEPUTY GENERAL DIRECTOR**

S.Đ.K.K.D: 4103003095 - C.T.C.P
CÔNG TY CỔ PHẦN BÓNG ĐÈN DIỆN QUANG
QUẬN 1 TP HỒ CHÍ MINH

Hồ Quỳnh Hưng

Ministry of Natural Resources and Environment
**INSTITUTE OF STRATEGY AND POLICY ON NATURAL RESOURCES AND ENVIRONMENT**
*1116 Hoang Quoc Viet, Cau Giay, Ha Noi, Viet Nam*
*Tel: 84 4 37931629; Fax : 84 4 37931730*
*E-mail: info@isponre.gov.vn; website: www.isponre.gov.vn*

15th December, 2009

To: Ms. Monique Barbut
GEF Chief Executive Officer
1818 H Street, NW, MSN G6-602
Washington, DC 20433
USA

**Subject: Co-financing for the "Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam" project**

Dear Ms Barbut,

We would like to express our sincere thanks for identifying the Institute of Strategy and Policy on Natural Resources and Environment (ISPONRE) as the implementing partner of the "Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam" project.

We are convinced that Viet Nam will benefit greatly from this project in terms of reducing of green house gases emission through a better and more efficient use of energy. Hereby we confirm our willingness and commitment to participate in the project implementation.

We commit to allocate our in-kind contribution equivalent to 500,000 USD to the project for the 4 year period. This contribution includes staff capacity, facilities for meetings and trainings and environmental programs.

We are looking forward to successful implementation of the project.

Yours sincerely,

Dr. Nguyen Van Tai
General Director
Institute of Strategy and Policy on Natural Resources and Environment (ISPONRE)
Ministry of Natural Resources and Environment (MONRE)

# INSTITUTE OF ENERGY

Khuong Thuong - Dong Da
Ha Noi
SR. Viet Nam

Tel. : 84-4-5743279-8523353
Fax. : 84-4-8523311
Email: toanpk@fpt.vn


18 December 2009

To: Ms. Monique Barbut
GEF Chief Executive Officer
1818 H Street, NW, MSN G6-602
Washington, DC 20433
USA

**Subject: Co-financing for the "Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam" project**

Dear Ms. Barbut,

We would like to express our gratitude for identifying the Institute of Energy as partner participating in the above mentioned project.

Institute of Energy is an Energy Research and Planning Institute under the Ministry of Industry and Trade (MOIT) in Vietnam. The Institute works as the focal Body and Consultant for the Government and the power sector in formulation of national strategies and policies on energy and electricity development.

Institute of Energy performed projects which are related to the above mentioned project as follows:

- National Energy Efficiency Program Phase 1: 2006-2010, for MOIT, 2008;
- Study on National Energy Master Plan for S. R. Vietnam (local consultant), with JICA-Japan, 2008;
- The Collaboration Study on Energy Efficiency and Conservation (EEC) in Vietnam - Road Transportation in Hanoi, For METI-Japan, 2008;
- The Project for Promotion of Energy Efficient Appliances in Vietnam (local consultant for Jyukankyo Research Institute, Japan), 2008;
- Sixth Master Plan on National Electric Power Development (2006 - 2015, perspective up to 2025), with MOIT, 2006;
- Database for Research Program on Promotion of Clean Coal Technology in Vietnam, with JICA-Japan, 2005;
- Feasibility Study on Demand Side Management Phase II, with EVN, 2004
- Demand Side Management Program (DSM) Phase I: 2000-2003 (local consultant for cooperation with Fitchner and Hydro Quebec), 2003;

The Institute of Energy warmly welcomes and confirms that we will be able to contribute co-financing to the above mentioned project. Our contribution will be realized in kind of staff, consultancy, training, awareness raising program .....

Our financial contributions to the "Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam" project are listed below:

| | |
|---|---|
| 1. Training sessions: | 30,000 USD |
| 2. Consultancy: | 100,000 USD |
| 3. Staff: | 100,000 USD |
| 4. Awareness raising program: | 40,000 USD |
| 5. Support services: | 30,000 USD |
| TOTAL: | 300,000 USD |

We look forward to a fruitful cooperation.

Yours sincerely,

VIỆN NĂNG LƯỢNG

Pham Khanh Toan
General Director,
Institute of Energy

MINISTRY OF INDUSTRY AND TRADE
**VIETNAM ENERGY EFFICIENCY AND CONSERVATION**
Address: 54 Hai Bà Trưng Str., Hoàn Kiếm Dist., Hà Nội
Tel.: (04) 22202412 Fax: (84- 4) 22202412
Email: kimph@moit.gov.vn

*Hanoi,December 30st, 2009*

To: Ms. Monique Barbut
GEF Chief Executive Officer
1818 H Street, NW, MSN G6-602
Washington, DC 20433
USA

**Subject: Co-financing for the "Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam" project**

Dear Ms. Monique Barbut,

On behalf of Vietnam Energy Efficiency & Conservation Office (VNEEP), I would like to express our gratitude for continuing support EEC activities in Vietnam. The Vietnam Energy Efficiency Office is a under the Science and Technology Department - Ministry of the Industry and Trade (MOIT) which responsible of state management of energy efficiency in Vietnam.

Viet Nam has gained remarkable success in economic development in the last two decades. Accompanying this success, however, there are also environment and energy issues in Vietnam. Our energy intensity per GDP unit is one of the highest in the Asian region. Efficient use and saving energy, therefore, is one of the priorities in our development and environmental protection policies. Our office is the focal point for development of the Law on Efficient Use and Saving Energy, which is now being discussed and expected to be adopted by the National Assembly in May 2010. Under this Law, some policies will be developed such as phasing out the inefficient technology and inefficient energy consumption equipments (including incandescent lamps), incentive mechanisms for production/use of energy efficient products, ect. Awareness raising is also an important activity in promoting use of efficient energy, which have been being implemented actively.

The VNEEP warmly welcomes and confirms our support to the "Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam" project. Our contribution will be realized through financing the parallel activities of National target program on energy efficiency and conservation (staff, consultancy, training sessions, policy development, awareness raising campaign amongst other things).

Financial contributions to the project are listed below:

| | |
|---|---|
| 1. Development of efficient energy policies: | 250,000 USD |
| 2. Awareness raising program on energy efficiency: | 200,000 USD |
| 3. Consultancy: | 250,000 USD |
| 4. Staff: | 150,000 USD |
| 5. Office: | 150,000 USD |
| **Total** | **1000,000 USD** |

We look forward to a fruitful cooperation.
Yours sincerely,

Phuong Hoang Kim
Deputy-Director
Energy Efficiency and Conservation Office

DIRECTORATE FOR STANDARDS, METROLOGY AND QUALITY
**VIETNAM STANDARDS AND QUALITY INSTITUTE**
Address: 8 HoangQuocViet road, Caugiay district, Hanoi, Vietnam
Tel: +844 37564407 Fax: +844 38361771

16th December, 2009

To: Ms. Monique Barbut
GEF Chief Executive Officer
1818 H Street, NW, MSN G6-602
Washington, DC 20433
USA

**Subject: Co-financing for the "Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam" project**

Dear Ms Barbut,

We would like to express our gratitude for identifying Vietnam Standards and Quality Institute (VSQI) as partner participating in the above project.

Standardization activities has passed nearly 50 years, among other activities, VSQI has being organized to develop over 6000 national standards for all fields of engineering - metallurgy, electric - electronics, construction, chemicals, foodstuffs, agricultural products - forestry, consumer products, information technology and environment, and submit Ministry of Science and Technology for approval .

In the field of lighting, VSQI had been participated in World Bank projects – Standards Package for energy efficiency lights and three phase power engines. The results of this Project are 02 of national standard drafts for energy efficiency. These drafts were reviewed, completed, and submitted to Ministry of Science and Technology (MOST) for approval late in 2005 by VSQI, and have been applied for testing, auditing, certification and energy efficiency labeling.

At present, there's no international standards on this field, VSQI has established a national technical committee on energy efficiency of lighting equipment, TCVN/TC/E1/SC2, with experts are representators from laboratory, university, bussiness, association… This technical committee is responsible for developing TCVNs on mentioned field.

VSQI warmly welcomes and confirms that we will be able to support GEF. Our contribution will be realised through parallel financing (staff, consultancy, training sessions, …- and the monitoring and demonstration thereof, amongst other things).
Financial contributions to the GEF project are listed below:

| | |
|---|---|
| 1. Training sessions: | 80,000 USD |
| 2. Consultancy: | 120,000 USD |
| 3. Staff: | 300,000 USD |
| 4. Awareness raising program on energy efficiency: | 60,000 USD |
| 5. Pilot project on promotion of using of CFLs: | 40,000 USD |
| ……. | |
| TOTAL: | 600,000 USD |

We look forward to a fruitful cooperation.
Yours sincerely,

Director of Institute

VIỆN TIÊU CHUẨN CHẤT LƯỢNG VIỆT NAM

Pho Duc Son

1

VIETNAM ENVIRONMENT ADMINISTRATION
WASTE MANAGEMENT AND ENVIRONMENT PROMOTION AGENCY
No 11, Plot 13 A, Trung Hoa Street, , Hanoi; Tel: 84-4-37868431, Fax: 84-4-37868430

December 7th, 2009

To: **Ms. Monique Barbut**
GEF Chief Executive Officer
1818 H Street, NW, MSN G6-602
Washington, DC 20433
USA

**Subject: Co-financing for the "Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam" project**

Dear Ms. Barbut,

Firstly, I would like to express our gratitude for identifying the Agency as partner participating in development of a project entitled "Phasing out Incandescent Lamps throught Lighting Market Transformation in Vietnam".

The Waste Management and Environment Promotion Agency would like to confirm that the Ministry of Natural Resources and Environment shall mobilize and provide co-financing for Project, corresponding to the budget 210,000 USD granted by the GEF and the Ministry of Natural Resources and Environment's co-financing resources are equal to 550,000 USD including contribution of government staffs, outputs of governmental programs in the hazardous waste management.

We highly appreciate the GEF's efforts in supporting Vietnam and look forwards to a successful cooperation with you in development and implementation of the important and challenging Project.

We look forward to a fruitful cooperation.

Your sincerely,

CỘNG HÒA XHCN VIỆT NAM
CỤC QUẢN LÝ CHẤT THẢI VÀ CẢI THIỆN MÔI TRƯỜNG
TỔNG CỤC MÔI TRƯỜNG - BỘ TN&MT

Nguyen Hoa Binh
Director
Waste Management and Environment Promotion Agency
Vietnam Environment Administration
No 11, Plot 13 A, Trung Hoa Street, Hanoi, Vietnam

WASTE MANAGEMENT AND ENVIRONMENT PROMOTION AGENCY
No 11, Plot 13 A, Trung Hoa Street, , Hanoi; Tel: 84-4-37868431, Fax: 84-4-37868430

**Quatest 1**

DIRECTORATE FOR STANDARDS, METROLOGY AND QUALITY (STAMEQ)
QUALITY ASSURANCE AND TESTING CENTER NO.1 (QUATEST1)
No.8 Hoang Quoc Viet Str - Caugiay District - Hanoi - Vietnam
Tel: (84-4) 3756 4632 Fax: (84-4) 3756 4632
E-mail: quatest1@fpt.vn Website: http://www.quatest1.com.vn

*Hanoi, Date of 18th, December 2009*

To: Ms. Monique Barbut
GEF Chief Executive Officer
1818 H Street, NW, MSN G6-602
Washington, DC 20433
USA

**Subject: Co-financing for the "Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam" project**

Dear Ms Barbut,

We would like to express our gratitude for identifying the Quality Assurance and Testing Center 1 (QUATEST 1) as partner participating in the above project. QUATEST 1 is contributing to improve testing quality of Energy Saving Lamps (ESLs) including Compact Fluodescent Lamps (CFLs) in Vietnam.

The QUATEST 1 operates under management of Directorate for Standards, Metrology and Quality (STAMEQ) - Ministry of Science and Technology (MOST) of Vietnam and is a scientific organization serving State management on standardization, metrology and quality and also other requests of manufacturers and trading companies. QUATEST 1 has a Testing Laboratories system incuding the Electric-Electronic Testing Laboratory. The main responsibilities of the Electric-Electronic Testing Laboratory are to carry out the test services, quality and safey inspection for electrical-electronic products as well as work contruction following Vietnamese standards and International standards. Furthermore, this laboratory has been estabilished and applied the quality management system in according with the International standards such as ISO 9001:2000 and ISO/IEC 17025 aimed at controlling effectively the testing work, ensuring the quality of services in order to meet customer's demand. Therefore, participating in the Project will help the testing capacity sthengthened.

QUATEST 1 warmly welcomes and confirms that we will be able to support the project. Our contribution will be realised through parallel financing (staff, consultancy, training sessions, testing equipment and apparatus, office ...).

Financial contributions to the project are listed below:

| | |
|---|---|
| 1. Testing equipment and apparatus: | 310,000 USD |
| 2. Training sessions: | 50,000 USD |
| 3. Setting up testing procedures: | 50,000 USD |
| 4. Experts, staff: | 150,000 USD |
| 5. Testing fee: | 30,000 USD |
| 6. Office, testing area: | 20,000 USD |
| TOTAL: | 610,000 USD |

We look forward to a fruitful cooperation.
Yours sincerely,

Director

GIÁM ĐỐC
*Nguyễn Cảnh Tới*

QUATEST 3

TỔNG CỤC TIÊU CHUẨN ĐO LƯỜNG CHẤT LƯỢNG
DIRECTORATE FOR STANDARDS AND QUALITY
TRUNG TÂM KỸ THUẬT TIÊU CHUẨN ĐO LƯỜNG CHẤT LƯỢNG 3
QUALITY ASSURANCE AND TESTING CENTER 3

Trụ sở chính / Head Office
49 Pasteur, Q.1, TP. Hồ Chí Minh, Việt Nam
Tel:84-8-38294274 Fax:84-8-38293012
E-mail:info@quatest3.com.vn
Khu Thí nghiệm / Testing House
7 đường số 1, Khu CN Biên Hòa 1, Đồng Nai
Tel: 84-61-3836212 Fax: 84-61-3836298
E-mail:qt-kythuattn@quatest3.com.vn
www.quatest3.com.vn

Ho Chi Minh City, 20th December, 2009

To: Ms. Monique Barbut
GEF Chief Executive Officer
1818 H Street, NW, MSN G6-602
Washington, DC 20433
USA

**Subject: Co-financing for the "Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam" project**

Dear Ms Barbut,

Firstly, we would like to express our gratitude for your selection of the Quality Assurance & Testing Center 3 (QUATEST 3) as a partner participating in the above project.

The QUATEST 3 is a Science-technological Organization under the Directorate for Standards and Quality (STAMEQ) – Ministry of Science and Technology (MOST) QUATEST 3 has been providing a broad range of technical services in the fields of metrology, testing and conformity assessment, consultancy and training to authorities, organizations and businesses. Throughout more than 30 years of development and services, QUATEST 3 has been recognized as one of the leading conformity assessment organization in the country. Having 11 testing and 8 calibration laboratories equipped with many instruments of latest technology, employing 400 well professionally trained and hard-working technical staffs with well maintained facility, QUATEST 3 has been providing testing, calibration, inspection and certification services in various fields such as: machinery, metal & non-metallic materials, construction materials and projects, chemical products, foods & foodstuffs, microbiological & GMO, electrical & electronic appliances and equipment, EMC testing, environmental testing and analysis, EIA to projects and so on. QUATEST 3 has also been involved in some energy saving program as a conformity assessment services provider using its technological resources. Currently, QUATEST 3 is one of the seeking body to provide test and assessment of electrical appliances and devices for conformity to energy saving criteria. Beside its technical activities, QUATEST 3 has been also taking part in ministry's programs regarding standardization and technical regulations setting up, including the group of electronic and electrical devices and equipment, EMC testing and regulation…

The QUATEST 3 highly appreciates the given opportunities to be part of the above mentioned project and confirms that is able to support the project of "Lighting Market Transformation in Vietnam". We will contribute to the Project through our existing technical resources (testing –

including EMC, calibration, conformity assessment, consultancy and training capability, laboratories facility and human technical resource thereof, amongst other things). We can also take part in the process of standardization if required.

Basically QUATEST 3's financial contributions to the project may be approximately expressed as following:

1. Existing related technical facility (including EMC labs): 5 000 000 USD (approx.)

2. Testing, calibration and conformity assessment

3. Consultancy and training

4. Standardization activities

TOTALLY: more than 5 000 000 USD

Once again, thank you for your consideration and selection the QUATEST 3 as one of contributing partners to the Projects.

Wishing you and all colleagues best success to the project.

Yours sincerely,

Director of QUATEST 3

BỘ KHOA HỌC VÀ CÔNG NGHỆ
TỔNG CỤC TIÊU CHUẨN ĐO LƯỜNG CHẤT LƯỢNG
TRUNG TÂM KỸ THUẬT TIÊU CHUẨN ĐO LƯỜNG CHẤT LƯỢNG 3

**TRAN VAN DUNG**

VIETNAM LIGHTING ASSOCIATION (VLA)

No.77, To Hien Thanh str.,Hai Ba Trung district, Hanoi,Vietnam
Tel: (84-4) 39745744 Fax : (84-4) 39747463
Email: plic06@vnn.vn Website: http// www.vula.vn

Hanoi, December 21st, 2009

To: Ms. Monique Barbut
GEF Chief Executive Officer
1818 H Street, NW, MSN G6-602
Washington, DC 20433
USA

**Subject: Co-financing for the "Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam" project**

Dear Ms. Barbut,

We would like to express our gratitude to you for identifying the Vietnam Lighting Association (VLA) as the partner participating in the above project. This project is to contribute to the wealth creation through the excellence in technology-oriented career and professional education and training; applied research and service.

The VLA is a non-government organization which includes relating agencies, common members and individuals in the field of lighting in the whole country. It also includes top experts on lighting as well as on information technology and communications.

During the past 6 years, VLA has consulted and researched on effective lighting and energy savings. It has organized many conferences; evaluated and helped improve lighting products; collected data, advertised and provided information; organized many training courses to improve the awareness of using lighting sources with new technology in order to save energy for urban and rural people, reduce the elimination of CO2, climate change mitigation and protect the environment.

The VLA has participated in many programs and projects relating to effective lighting and energy savings, including 3 of 5 parts of the project on high efficient public lighting

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in Vietnam as well as the national program on effectively use of energy in public lighting.

It is a strong belief that VLA will successfully implement assigned activities of this project.

The VLA warmly welcomes and confirms that we will be able to support the project. Our contribution will be realized through parallel financing (as staff, consultancy, training courses, equipments, data of public lighting information center ( PLIC).

Financial contributions to the project are listed below:

| | |
|---|---|
| 1. Staff: | 70,000 USD |
| 2. Consultancy: | 30,000 USD |
| 3. Training courses: | 10,000 USD |
| 4. Equipments, data of PLIC: | 40,000 USD |
| TOTAL: | 150,000 USD |

We are looking forwards to a fruitful cooperation.

Yours sincerely,

HỘI CHIẾU SÁNG VIỆT NAM
BAN CHẤP HÀNH

**Dr. Vu Minh Mao**

**Chairman of the VLA**

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## Appendix 13: Tracking Tools

The project for transforming the lighting market in Vietnam will follow and report on two main indicators as per GEF reporting requirements-tracking tools:

(i) a qualitative indicator related to required quality and performance standards of lights to be used in Vietnam, and

(ii) a quantitative indicator related to the MWh saved during the course of project implementation.

**Laws and associated regulations to transform the lighting market in Vietnam:**

The following indicators will be followed:

0 New Energy Efficiency Law has been adopted and the preparation of regulations for EE lighting is being initiated.

1 Performance and quality standards for EE lighting have been discussed, prepared, and proposed.

2 Performance and quality standards for EE lighting have been formally proposed, but not adopted.

3 Performance and quality standards for EE lighting have been adopted but have no enforcement mechanism.

4 Adopted performance and quality standards for EE lighting have enforcement mechanism(s) and domestic production and sale of good quality ESLs is increasing.

5 Production, sale, and use of ILs have been officially banned.

**MWh saved through the project:**

The total cumulative electricity savings are estimated to be 5,353.523 million kWh. Installation of new ESLs will begin towards the end of the first year