

**UNITED NATIONS DEVELOPMENT PROGRAM
GLOBAL ENVIRONMENT FACILITY
PROJECT BRIEF**

IDENTIFIERS

PROJECT NUMBER:	PIMS 2031
PROJECT NAME:	Vietnam: Energy Efficient Public Lighting
DURATION:	5 years
IMPLEMENTING AGENCY:	United Nations Development Programme (UNDP)
EXECUTING AGENCY:	Vietnamese Academy of Science and Technology
REQUESTING COUNTRY:	Vietnam
ELIGIBILITY:	Ratified UNFCCC on November 16, 1994
GEF FOCAL AREA:	Climate Change
GEF PROGRAMMING FRAMEWORK:	Operational Programme #5: Removal of Barriers to Energy Efficiency and Energy Conservation
GEF STRATEGIC PRIORITY	S1 – Transformation of markets for high volume, commercial, low GHG products or processes

SUMMARY

Public lighting, which includes lighting of streets, schools and hospitals, is still small in Vietnam. Certain barriers have resulted in the installation of public lighting systems that are neither economically optimal, nor environment friendly. As the country continues to develop rapidly, public lighting is expected to grow quickly as well. Without effective intervention, Vietnam is likely to be burdened with a public lighting sector that wastes public resources and contributes disproportionately to the national GHG emissions inventory. Furthermore, consumption of electricity for public lighting is highly correlated with peak demand on the national electricity generation and distribution system. Current generation and distribution capacity are insufficient to meet peak demand and improving public lighting efficiency will make more power available at peak times for other purposes.

The Vietnam Energy Efficient Public Lighting (VEEPL) project will help to remove barriers to energy efficient public lighting through five carefully designed components. Vietnam currently does not have the infrastructure of public policies and technical competence in the local lighting industry to effectively design and install energy efficient public lighting systems. The project includes interventions in cooperation with the local lighting industry, government ministries and cities and towns to build this infrastructure. It is designed to support both the environmental and development objectives of the Government of Vietnam and is in keeping with the government Decree on Energy Conservation and Efficiency issued on September 3, 2003.

COSTS AND FINANCING (MILLION US\$)

GEF:	US\$ 3,000,000
CO-FINANCING:	
- Government:	US\$ 1,408,000
- Private Sector:	US\$ 2,790,000
- Local Governments:	US\$ 8,120,000

TOTAL FULL PROJECT COSTS:	US\$ 15,318,000
+ PDF-B (GEF):	US\$ 309,900
+ PDF-B (CO-FINANCING):	US\$ 65,000
TOTAL PROJECT COSTS INCL. PDF-B:	US\$ 15,692,900

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LIST OF ACRONYMS

ADB	Asian Development Bank
CFL	Compact Fluorescent Lamp
DAUPM	Departments of Architecture, Urban Planning and Public work Management
DITM	Departments of Industrial Technology Management (Ministry of Science and Technology)
DoA	Department of Administration (Ministry of Finance)
DoC	Department of Construction
DoF	Department of Finance
DoI	Department of Industry
DoP	Department of Policy (Ministry of Finance)
DoPIs	Department of Planning and Investment (Localities)
DoT	Department of Transport
DoST	Department of Science and Technology (Ministry of Construction)
DPQM	Department of Product Quality Management (Ministry of Industry)
DSM	Demand Side Management
EVN	Electricity Vietnam
EC&EE	Energy Conservation and Energy Efficiency
ESCOs	Energy Service Companies
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Green House Gases
GoV	Government of Vietnam
HPS	High Pressure Sodium
HUA	Hanoi University of Architecture
HUC	Hanoi University of Construction
HUT	Hanoi University of Technology
ICE	Institute of Construction Economics (Ministry of Construction)
IDA	International Development Association
IFC	International Finance Corporation
IMS	Institute of Materials Science
MoARD	Ministry of Agriculture and Rural Development
MoC	Ministry of Construction
MoF	Ministry of Finance
MoI	Ministry of Industry
MoNR	Ministry of Natural Resources (pre-2003)
MoNRE	Ministry of Natural Resources and Environment (since 2003)
MoT	Ministry of Transport
MPI	Ministry of Planning and Investment
MoST	Ministry of Science and Technology (since 2003)
MoSTE	Ministry of Science and Technology and Environment (pre -2003)
NEA	National Environment Agency
NIRUP	National Institute of Rural and Urban Planning
NGO	Non-Governmental Organizations
ODA	Official Development Assistance
Quatest 1	Quality Assurance and Testing Center 1
SIDA	Swedish International Development Agency
SME	Small and Medium Size Enterprise
SEIER	Systems Efficiency Improvement Equitization and Renewables
UNDP	United Nations Development Programme
VAUE	Vietnam Association of Urban Environment
VAST	Vietnamese Academy of Science and Technology
VEEA	Vietnam Electricity Engineering Association
VEEPL	Vietnam Energy Efficient Public Lighting
VEPF	Vietnam Environment Protection Fund
VSC	Vietnam Standards Center (Ministry of Science and Technology)

BACKGROUND AND CONTEXT

1. Vietnam stretches along a 3,200-kilometre section of the East Vietnam Sea (South China Sea), extending from China in the North to the Gulf of Thailand in the South, and sharing borders with Laos and Cambodia to the west. The total land area of the country is approximately 331,100 km². Three quarters of the land is mountainous and the last quarter consists of rich delta rivers along the coastline that are the rice bowls of Vietnam. The country's population, estimated at 78.7 million at the end of 2001, is growing at an average annual rate of 1.35%. Approximately 19.5 million (25%) of the population is in urban areas (4 central cities, 20 provincial cities and 62 towns). The remaining 75% of the population are in rural areas (510 rural districts, 565 towns under districts and 8,950 communes). This predominance of rural dwellers gives Vietnam the lowest urbanization level of any country in Asia.
2. Although significant strides have been made in the last decade, the overall infrastructure remains poor. Water supply reaches just 47% of the population and sanitation drainage only 45%. Transportation systems are stretched and general infrastructural support is under pressure. Electricity is currently available to about 80% of the population, with an additional 15% to be connected to the grid within 5 years. The national transportation is also being strained by economic growth. The volume of traffic on Vietnam's roads increased at an average annual rate of 12.6% and 9.3%, for goods and passengers respectively, from 1991 to 1997. The annual growth in the number of motor vehicles during this same period was 21.3%.
3. During much of the 1990's, Vietnam's average GDP growth rate was 8%, even reaching 9.54% in 1995 and qualifying the country as one of the regional countries having dynamic economic development. However, this growth rate slowed significantly at the end of the last decade as a result of the Asian financial crisis and delays in implementing structural and policy reforms. The average GDP growth rate in 1998 - 2000 was 5.8%. However, more recently GDP growth has again begun to increase, to 6.8%, in 2001 and 7.04% in 2002, placing additional strain on the infrastructure in general and on energy supply in particular.

NATIONAL CIRCUMSTANCES AND OUTLOOK OF ENERGY SECTOR

4. Vietnam has one of lowest levels of energy consumption of any country in the world (approximately 144 kg of oil equivalent per capita) with an average per capita annual electricity consumption of only 161 kWh. However, current demand for electricity is only just being met, particularly at peak time, and supply remains unstable especially in rural areas. As the economy expands, the consumption of modern energy in Vietnam is expected to grow 30% faster than national GDP, and the need for electricity is expected to grow 70% faster. The same report estimates that by 2010, the consumption of electricity in Vietnam will be 5.5 times 1995 levels (77,406 GWh in 2010 compared with 14,636 GWh in 1995).
5. Electricity in Vietnam is generated from a mix of power generation plants. Presently, bulk of the electricity generated in the country comes from hydropower plants (56%). The average power generation mix (shown in the table below) is expected to be more or less the same up to 2010. By 2020, it is expected that hydroelectricity will still account for bulk of the electricity generated; the share of gas-generated electricity would have doubled; and imported power would make up about 12% of the electricity used in the country. Presently, the average power generation mix is as follows:

Power Plant Type	% of Generation
Hydropower plants	56.0
Coal-fired thermal power plants	12.0
Oil-fired thermal power plants	4.3
Gas-fired gas turbine generators	15.8
Diesel oil-fired gas turbine generators	4.3
Diesel thermal power plants	4.6
Independent power producers	3.1

- Thus, projected economic growth places a huge burden on the government of Vietnam to find an effective solution to the massive increase in electricity demand expected to result from the sustained socio-economic development of the country. Simultaneously, the government must remain cognizant of both the implied need for investment capital in the electricity infrastructure, and also of the international commitments that it has made related to greenhouse gas emissions. The World Bank report makes a number of recommendations on how Vietnam may support this increase in demand for modern energy, including more effective exploitation of national energy resources (fossil fuels and renewable sources), overall reform of the energy sector including price adjustments and governance, improvements in the supply infrastructure and a number of measures to ensure more efficient use of energy. One of the areas of focus for the energy efficiency strategy is the improvement of lighting systems, in particular those in the public sector.

Current Consumption and Growth Levels

- Vietnam consumed 29,459 GWh of electricity in 2001. Public lighting of roads, schools, and hospitals accounted for about 291 GWh (equivalent to 1% of total). Vietnam currently has very low levels of public lighting. Only 23% of roads in the whole country are currently lit with Hanoi having the highest level of street lighting at 58%. However, given the increase in the number of motorized vehicles, and the volume of road traffic, the need for street lighting is expected to grow quite strongly. Given also the contribution that public lighting in general makes to economic and social development and to public health and safety, the overall consumption of energy due to public lighting is projected to grow at an annual compound rate of 20% for urban roads and 10% for rural roads. Without VEEPL, lighting for urban, rural roads, hospitals and schools is projected to reach 1,624 GWh by 2013, which is more than 5.6 times the consumption of this sector in 2001. The successful implementation of VEEPL should lead to a 20% reduction (about 324 GWh) in projected 2013 consumption.
- Vietnam's peak demand for electricity is growing faster than the country's infrastructure is able to provide it and interruptions in service are common. The 2002 system peak was 5,578 megawatts. Public lighting in Vietnam tends to be switched on in the early evening, which means that it coincides with the daily peak electricity demand period, further stretching generation and distribution capacities, particularly in the rural areas.

Current Government Energy Strategy

- The government of Vietnam was relatively late in realizing the need for fundamental structural reforms in order to sustain economic growth and to deliver real socio-economic development to its people. However, over the last decade, and with the assistance of the international community,

Vietnam has taken increasingly rapid steps towards infrastructure development, some market liberalization, and governmental reforms.

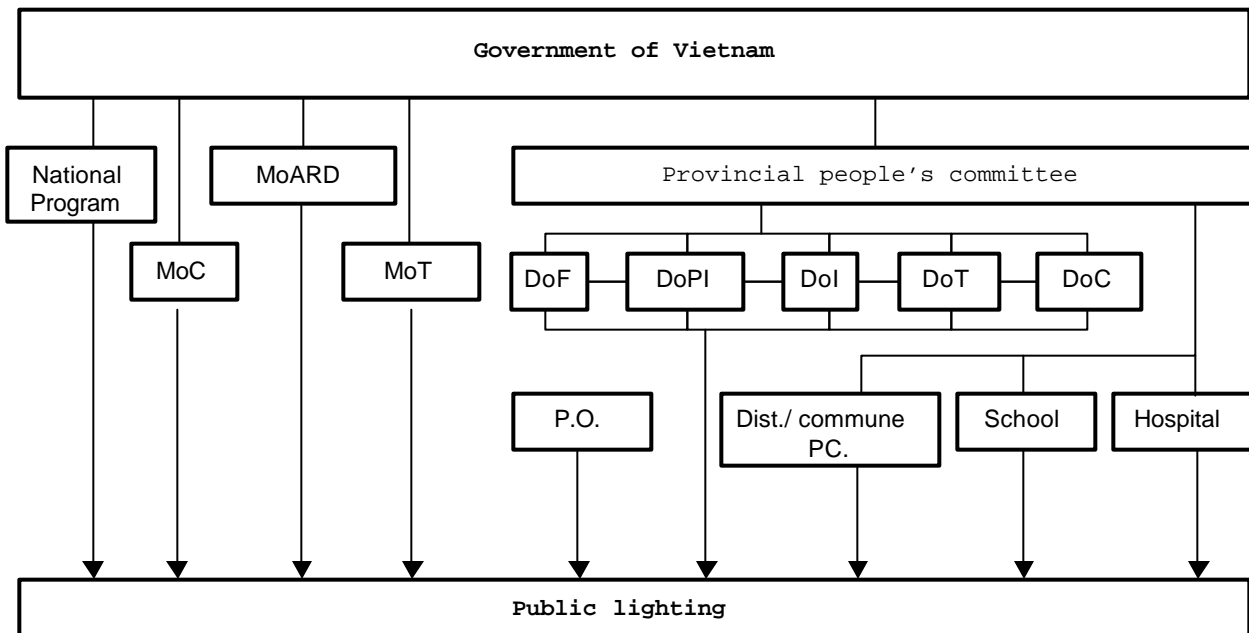
10. This late start in general economic reform applies also to the energy sector. As highlighted in the 1998 World Bank report “Fueling Vietnam Development – New Challenges for the Energy Sector”, without significant action the GoV’s goals related to overall development and industrialization will not be achievable. The report recommends that in order to meet strong growth in demand for modern energy supplies required to support the continued economic development of the country, among other things the Vietnamese government must:
 - a. Reform the State role in the energy sector to ensure better corporate governance of state energy corporations and a more commercial operating environment;
 - b. Reform market structures to increase competition and to mobilize financial resources (governmental and private);
 - c. Develop effective regulations including new legislation to facilitate institutional change and provide legal stability and reforms;
 - d. Streamline government policy and decision making; and,
 - e. Implement Demand Side Management activities to manage the increasing growth in demand.
11. While there are still significant steps to be taken, the Vietnamese Government has signaled its commitment to this reform process by signing international commitments on the control of GHG emissions, and by drafting an Energy Decree (described below) regarding the liberalization of the energy supply system, energy pricing reforms, rural electrification and DSM activities. The reform of Electricity Vietnam (EVN), the state owned electricity supplier, is already underway. EVN has split its generation and distribution functions and has introduced private sector funding for new generation capacity. Similarly, with international assistance, the government is supporting a number of other initiatives including upgrading the distribution system, rural electrification and the development of renewable energy resources.
12. The Vietnamese Efficient Public Lighting (VEEPL) project will complement the national energy strategy. This project will not only deliver increases in energy efficiency for public lighting, but should also contribute to the restructuring of the national and local government decision-making process regarding public lighting, and lead to more effective planning and investment decision making.

Current Legal and Institutional Framework for Public Lighting

Institutional Framework

13. The existing institutional framework governing the regulation, specification, management, installation, operation and maintenance of public lighting in Vietnam is extremely disaggregated and complex. For major national projects, such as national highways, the national government has the ability to specify associated public lighting. The ministries of Construction, Agriculture and Rural Development and Transportation develop and implement public lighting projects on a national scale. Provincial people’s committees can work through a range of provincial Departments to develop and implement public lighting. Local institutions such as schools and hospitals and district communes can work on public lighting projects independently. Finally, the national postal system is responsible for lighting associated with its own facilities.

14. Within urban areas, local authorities invest in public lighting using budget allocations from the provincial government. These allocations are made based on projects proposed by public facility management agencies (e.g., urban lighting companies, urban environment companies or the operators of the schools, hospitals). Following completion of the public lighting investment projects, the operation and maintenance responsibilities pass back to these management agencies and are paid for through local administrative expenditures.
15. The situation is somewhat different at the rural level. There, the commune authorities are responsible for financing infrastructure investment projects, as well as their ongoing operation and maintenance costs. Investment in state-owned schools is the responsibility of the district authority with ongoing operational costs again passing to the commune or local government authorities. In all cases, the approval of lighting investment is subject to director (urban) or chairman (rural) level, local peoples' congress (urban and rural) or ministerial approval depending on the levels of investment requested. This complex organizational structure is further complicated by the lack of any institutionalized planning framework or recognized norms for public lighting.
16. Another complication is that the Ministries and Departments of Construction, Transport and Communications, Planning and Investment, Finance, Science Technology and Environment, and Agriculture and Rural Investment have their own activities that impinge on public lighting. The following diagram illustrates the complex institutional framework.



17. The current lack of national policies related to public lighting, and the very diverse nature of implementation of public lighting investments in Vietnam has tended to discourage appropriate consideration of operation and maintenance costs during the selection and purchase of public lighting equipment. Unfortunately, the failure to appropriately consider complete life-cycle costs for public lighting is by no means peculiar to Vietnam. However, the projected growth in the Vietnamese public lighting sector in the near future makes the local situation particularly

compelling. If investments in public lighting continue as they have, Vietnam could be burdened for a generation or more with a public lighting infrastructure that will waste electricity, cost more to operate than necessary, and contribute disproportionately to the national inventory of green house gas emissions.

Laws and Regulations

18. Given the relatively recent realization of the importance of effective management of energy within Vietnam, there are few effective laws or regulations that are relevant to energy consumption in public lighting. There are regulations governing the construction and operation of different types of equipment and facilities, but these regulations are generally obsolete and not enforced. There are now voluntary standards or norms in Vietnam for: (a) Installation and maintenance of public lighting; (b) Road and square lighting; (c) Exterior lighting of buildings; and, (d) Interior lighting of buildings.
19. Similarly, a procedure exists for the labeling of high quality products that includes consideration of EC&EE. Such standards now exist for: (a) Street light luminaries; (b) Mercury vapor lamps; and, (c) Electromagnetic ballast for use with discharge lighting.
20. However, starting in the year 2000, the government of Vietnam made all existing product performance standards voluntary as part of a trade liberalization effort. Because the standards pertaining to lighting were already largely obsolete and not enforced, the effect was small. Without the structured framework proposed by this project it is unlikely either the product standards or the standards for lighting levels/systems will be effectively upgraded, if at all.

Government of Vietnam Decree on Energy Conservation and Efficiency

21. On September 3, 2003 the government of Vietnam issued a Decree on Energy Conservation and Efficiency that recognizes the potential benefits from effective implementation of policies to encourage end-use energy efficiency. The decree defines an administrative structure and responsibilities for a coordinated set of directions, requirements, regulations and enforcement for the application of energy efficiency and energy conservation measures in all segments of the economy. There are sections that specifically address energy use in factories and buildings, and imports and exports. An important part of the decree will be the formulation of minimum energy efficiency requirements, testing, labeling and marking for compliance. The decree also sets some modest penalties for:
 - a. Manufacturers who fail to indicate energy consumption on their products that use energy;
 - b. Manufacturers who produce products that have been determined to be inefficient;
 - c. Businesses that import products that have been determined to be inefficient; and,
 - d. Inappropriate use of energy efficiency labels.

Somewhat harsher penalties are applied to large energy users that fail to implement an energy conservation and efficiency plan including hiring a dedicated energy manager.

22. The scope and intentions of the Energy Decree are impressive. However, the scope of the decree is very broad, and Vietnam lacks the managerial and technical skills needed to successfully implement it. Therefore it is very unlikely that the decree, by itself, would have a broad impact upon public lighting energy use during the proposed timeframe of the VEEPL project.

23. The Energy Decree should be seen not as a competitive or complicating factor to the VEEPL project, but as tool that sets a positive legal and regulatory context for VEEPL's success. In the public lighting sector, VEEPL will provide an example of practical application of the decree to establish energy efficiency standards for products, and help end-users to build markets for high efficiency equipment.

Previous and Ongoing Relevant Projects

24. In recognition that effective energy supply, and its rational use, is critical to support economic development, MoSTE launched the "Master Plan on Energy Conservation and Efficiency" as part of its national planning for the 1995-2000 period. This plan focused on the creation of a legal framework for energy in the commercial and industrial sectors. In addition to the Energy Decree described above, other objectives identified in the plan are the establishment of Energy Saving Centers in all large cities in Vietnam and a National Programme for Energy Saving.
25. Implementation plans for these objectives were drafted, unfortunately funding was made contingent upon the imposition of a national import duty on petroleum. The Ministry of Finance (MoF) has since deemed this mechanism to be illegal, and therefore implementation could not be undertaken. However, two of the recommendations made within the Draft National Programme for Energy Saving were to implement projects designed to "Reduce Energy Consumption of Lighting" and "Promote Energy Conservation within Small and Medium Sized Enterprises".
26. The Vietnamese Government commissioned a feasibility study on lighting efficiency under the government's Energy Conservation and Efficiency Programme (EC&E). This resulted in the report "Potential for Energy Efficiency Improvement in Lighting in Vietnam (1997)" identifying a potential to save 100 MW (100,000 tons of CO₂/yr) from more efficient use of lighting in Vietnam. This report recommended programs to reduce lighting energy consumption in the transportation, industrial, commercial and the domestic sectors. However, only one of these recommendations received further support (related to Public Lighting) following the private sector funding of a demonstration project in Hai Duong city (1998-2001) proving the feasibility of the overall public lighting project. It is this project that the Vietnamese government is now supporting through the submission of this proposal. The second project recommendation made in the "Draft National Programme for Energy Saving" on promoting energy conservation & efficiency in SMEs, i.e., Vietnam: Promoting Energy Conservation in Small and Medium-Scale Enterprises (PECSME).
27. PECSME is presently being designed using GEF PDF-B funding and implemented by UNDP. The project team at the Ministry of Science, Technology is currently preparing the project brief for the full-scale project. The full-scale PECSME project will promote energy-efficient technologies and practices in small and medium enterprises (SMEs) in Vietnam with either fewer than 300 employees or with revenues of less than 10 million dong. The project targets enterprises involved with brick making, ceramics, paper and pulp, textiles, and food processing.
28. PECSME and VEEPL will reinforce each other in the area of energy-efficient lighting. Specifically, the lighting standards and labeling activities planned for VEEPL can be directly adapted for use by PECSME, making it easier to identify and market energy efficient lighting products to SMEs.

29. In 1997, EVN, with WB assistance, commissioned the “Demand-Side Management Assessment for Vietnam” to determine the potential for demand-side management (DSM) to assist the power sector to meet the country’s future power resource requirements. The DSM Assessment conclusion recommended a two-phased approach for implementing DSM. A US\$ 3 million Swedish SIDA grant supported the first phase. Phase I was launched in late 2000 and program outputs and pilots are only now being completed. EVN’s DSM Cell, which was established in November 2000, and MoI/ EVN management are now defining appropriate institutional arrangements, financing and funding mechanisms, program models, program screening and planning functions to justify a substantial DSM program.
30. The Vietnam Demand-Side Management and Energy Efficiency Project (VN-DSM) is a US\$ 18.56 million WB/GEF project designed to: (1) Develop and expand demand-side management business program and test new market transformation efforts within the national electric utility, Electricity of Vietnam (EVN); and, (2) Develop sustainable business model and mechanisms to support energy efficiency retrofit investments in commercial and industrial facilities. It represents the second phase of a longer, 12-year (1998-2010) proposed IDA/GEF-supported DSM and energy efficiency program designed to achieve significant and sustainable reductions in energy consumption and peak power demand in Vietnam. The program would, in the course of 3-4 phases, test, develop and scale-up successful and sustainable business models to promote DSM and energy efficiency and promote investments. The first phase of VN-DSM was developed under the ongoing IDA/Swedish SIDA supported DSM program under the IDA-supported Transmission, Distribution and Disaster Reconstruction Project and is now essentially complete.
31. VEEPL is in line with the recommendations on DSM within the Vietnamese lighting sector and is fully complementary with the VN-DSM activities focusing on the domestic sector. VN-DSM and VEEPL focus on different lighting technologies and markets, with the possible exception of linear fluorescent lamps. VEEPL will coordinate with VN-DSM project staff on the use of relevant EE lighting specifications and label and will collaborate with VN-DSM project activities where possible. For example, some Vietnamese communities may be recipients of both a VN-DSM compact fluorescent promotion targeting the domestic sector, and a VEEPL public lighting initiative. In such cases, a joint public education campaign may be able to achieve a greater impact than separate efforts.
32. A number of other related projects are underway. Of particular note are the \$150 million (WB loan) rural electrification project that is currently being implemented and the \$225 million (IDA loan) SEIER Project to be undertaken by EVN. The WB, ADB, SIDA and the French Government have supported several projects of less relevance to this proposal.

BASELINE AND ALTERNATIVE SCENARIOS

33. Public lighting can be defined as lighting systems that illuminate facilities used for public benefit, owned by public sector entities and purchased and maintained by public sector budgets. VEEPL targets lighting and signaling for streets, as well as lighting for schools and hospitals.
34. Public lighting in Vietnam is characterized by low efficiency light sources housed within poorly designed luminaires and installed in inappropriate locations. For example, 85% of street lighting in Vietnam is provided by obsolete technology (either mercury or incandescent lamps) and installed without benefit of proper planning and engineering analysis. There is an increasing trend to use higher efficiency lamps (High Pressure Sodium, Metal Halide and Compact

Fluorescent) in the more affluent urban areas, but this is not being reflected in the majority of the country, particularly among the rural communes. Further, even where the higher efficiency lamp units are installed, their positioning is usually non-optimal. Nor are the associated lamp peripherals and control systems.

35. The current state of public lighting in Vietnam can be attributed to the following:
 - a. Lack of lighting-related knowledge and skills among policy makers, specifiers, designers, manufacturers and operators/maintainers of lighting for public facilities. This lack includes knowledge about technology options and of the potential benefits of using energy efficient lighting products and designs;
 - b. Lack of comprehensive national and local policies and laws encouraging energy efficiency in public lighting. In addition, even if such laws or policies did exist, current regulatory enforcement mechanisms and reporting and monitoring systems are inadequate to ensure that they would be carried out.
 - c. Poor availability of low cost, high quality, energy efficient lighting products;
 - d. Lack of local production of low cost, high quality, energy efficient lighting products; and,
 - e. Ineffective administrative structure and a lack of finance to support the installation, operation and maintenance of energy efficient lighting.
36. This situation is highly likely to remain unchanged unless some forms of intervention to remove these barriers are implemented. If there is no intervention, a significant opportunity to improve the public lighting infrastructure will be missed. If inefficient public lighting continues to be installed throughout the country as economic development continues, it will waste precious resources and make it that much harder for Vietnam to meet its international environmental commitments.
37. The proposed GEF-supported alternative to the “baseline” scenario in public lighting development in Vietnam is intended to support the country's sustainable development objectives and its goal of reducing the annual growth rate of GHG emissions by promoting and facilitating the widespread use of energy efficient lighting in the public sector. The VEEPL project will build on existing Vietnamese national policies, as well as on the lessons learned from previous and ongoing initiatives and projects. It will comprise a range of interventions that will address specific policy, information, technical and financing barriers that have persisted until now.
38. The “alternative” scenario results in significant reductions in energy consumption and associated emissions within the public lighting sector, at least up to the year 2013. Furthermore, reductions in peak load electricity demand and creation of a market for energy efficient lighting products that may be supplied by domestic manufacturers, will contribute to improving the socio-economic position of the country.
39. Under the baseline scenario it is assumed that public lighting in Vietnam will continue to follow the trends observed over recent years. Under the alternative scenario, conservative estimates were made about changes to technology penetration and the public lighting market as a result of project implementation. These impacts were then incorporated into an energy consumption forecast shown in the alternative scenario described in the next paragraph. Full details of the scenario development and forecast assumptions are shown in Annex F.

40. Overall, by 2013, the net energy savings and CO₂ emissions reduction attributable to the impacts of VEEPL project implementation (i.e. the difference between the two scenarios) are estimated at 229 GWh and 99 kTons¹ of CO₂ annually (2008-2013), respectively. The cumulative energy savings and CO₂ emissions reduction by 2013 are 1,321 GWh and 568 kTons of CO₂, respectively. Projections of energy savings and CO₂ reductions are shown graphically in Figures 1 & 2.

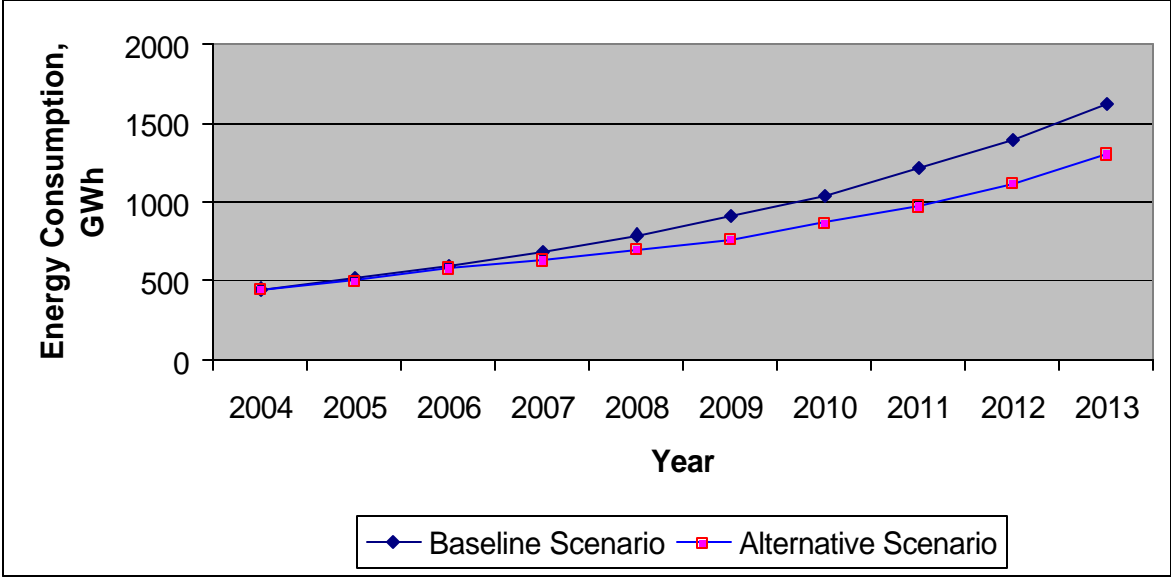


Fig. 1: Projected Energy Consumption in Public Lighting Sector (2004-2013)

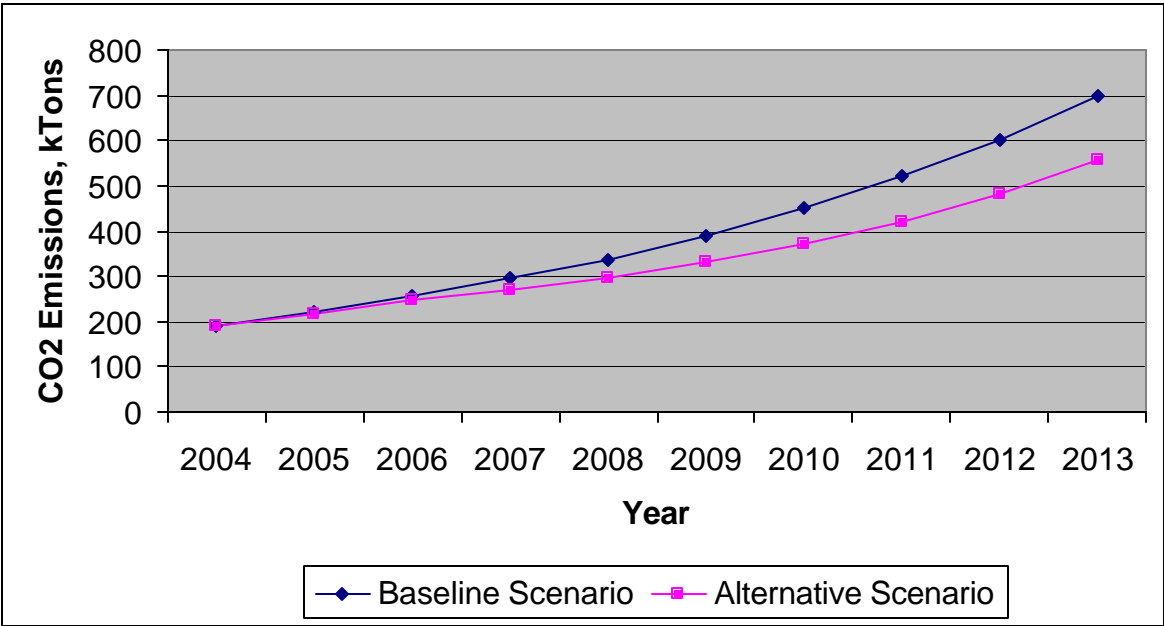


Fig. 2: Projected CO₂ Emissions based on Electricity Usage in Public Lighting Sector

¹ The CO₂ emission factor used is a pro-rated average based on the average power generation mix in Vietnam during the period (2001-2010).

Barriers to the Widespread Adoption of Energy Efficient Lighting in the Public Sector

41. Energy efficient public lighting is highly successful in many countries, but in Vietnam the barriers listed below prevent it from flourishing. There is an active interplay of informational, institutional, policy, technical, financial and marketing problems that impedes the development of energy efficient lighting in the country. See Annex E for details about these persistent barriers.
- a. Lack of a national professional academic and technical network on lighting - Lighting technology continues to evolve rapidly, and research into vision and optics continually suggests new ways to improve lighting quality and efficiency. Without effective communication between academicians, policy makers and technical experts on lighting it is impossible to establish policies and directions that will help to optimize the development of public lighting in Vietnam.
 - b. Absence of energy consumption reporting and monitoring - No systematic reporting and monitoring mechanism for public lighting energy consumption exists, which has led to limited understanding of energy consumption patterns by cities and towns. This limited understanding and a lack of baseline data have hindered the formulation of effective policies, laws and regulations.
 - c. Low level of awareness about energy efficient public lighting options and their benefits - Due to lack of comprehensive information on the potential for energy efficiency and its positive impacts, many policy makers, lighting system service providers, manufacturers and end-users are simply not aware of energy efficient public lighting and its benefits.
 - d. Lack of effective policies for public lighting - Very few policies, law, regulations and standards currently exist in Vietnam for public lighting. Without good data on public lighting energy use, or on the potential savings from improved technology and implementation, it is difficult for the government to formulate good public lighting policy.
 - e. Lack of appropriate training and skills for personnel in the public lighting sector - The lighting industry in Vietnam consisting of manufacturers of lighting systems, energy service companies and government organizations has limited skills in lighting product and system design and economic analysis. Therefore, public lighting products available in Vietnam have been characterized by high-cost, low-quality, preventing the market for public lighting from growing.
 - f. Limited availability of some energy efficient lighting products – The lack of local production, low sales volumes and import tariffs combine to make energy efficient public lighting products difficult to obtain in some parts of Vietnam. High import taxes (20% - 40%) and the high transaction costs for imported efficient lighting products are among the barriers to lighting technology transfer from abroad.
 - g. Lack of funds for public lighting systems - Costs for installations, operations and maintenance of public lighting facilities are paid from state budgets. However, these budgets are often insufficient for appropriate installation, operation and maintenance of public lighting, which has led to the current inadequate public lighting systems.
 - h. Lack of financing for efficient public lighting systems - Even when funding is available, a lack of project financing mechanisms available to cities and towns, manufacturers and energy service

companies means that public lighting projects tend to proceed to the extent they can be paid for with currently available funds. This discourages consideration of the total life-cycle costs of different public lighting technologies, and a preference to whatever equipment is available at the lowest possible price. The lack of credit discourages the kind of planning that can result in more optimal public lighting system design, and discourages the purchase of more energy efficient equipment.

RATIONALE AND OBJECTIVES

42. The VEEPL project will decrease Vietnam's contributions to global GHG emissions by fielding program components designed to remove the identified barriers and thereby reduce the consumption of electricity by public lighting. VEEPL will reduce electricity consumption in Vietnam compared to what would have occurred if the project does not take place during the next years of anticipated intensive economic development. In addition to increasing the efficiency of public lighting, VEEPL will also enhance Vietnam's national capacity to implement efficient lighting in general, and will be complementary with efficiency projects that target other lighting technologies and sectors.
43. This project is consistent with GEF's Operational Programme #5, which is on the Removal of Barriers to Improved Energy Efficiency and Conservation. VEEPL is in line with the GEF strategic priorities for OP#5 of market transformation of EE products and technologies, and for increased access to funds for energy efficiency projects. Markets for public lighting in general, and EE lighting in particular in Vietnam are immature and disorganized. Classic market failures of insufficient information and insufficient capital typically result in communities making sub-optimal public lighting technology choices. The lifecycle cost benefits of energy efficient public lighting are not well understood by either purchasers, or financial organizations. Therefore, communities tend to choose lighting options with the lowest initial capital cost. Finally, current low market volumes and lack of significant local production also tends to drive up prices of EE, as compared to conventional, public lighting products, further exacerbating the market failure.
44. VEEPL is designed stimulate and accelerate transformation of the market for EE public lighting in Vietnam by providing high quality technical information to relevant stakeholders, and by helping to establish a pool of capital that is dedicated to EE public lighting investment. VEEPL will build on and expand the foundation established by prior or current GEF-funded EE lighting initiatives.
45. VEEPL is in line with the objectives of the GoV's draft Energy Efficiency and Energy Conservation Decree. Further, the project follows the findings of the GEF-supported "Asian Least-Cost Greenhouse Gas Abatement Strategy" that concluded that use of more efficient lighting products could lead to major energy savings and would be a cost-effective way to reduce future carbon emissions in the region.

Global Benefits

46. Reduction of GHG emissions - The Institute of Materials Science (IMS-VAST) has estimated the effects of the proposed project on the national power supply by comparing baseline and alternative scenario electricity consumption forecasts. Reductions in projected electricity consumption are converted to approximate reductions in GHG emission based on information on the current carbon intensity of the Vietnamese electricity generation system.

47. Applications of energy efficient technologies in public lighting will focus proven technologies that have established solid records of performance in the field. For example, mercury vapor, incandescent, Fluorescent T12 wide tubes, and low-efficiency fluorescent ballasts will be replaced with high-pressure sodium, compact fluorescent, fluorescent T8 thin tubes, and low-loss ballasts respectively. Single-level street lighting control systems will be replaced with automatic bi-level controls to allow reduced light levels, and electricity consumption, during low traffic times. Finally, incandescent traffic signals will be replaced with signals that use Light Emitting Diodes.
48. These interventions and their consequent impacts are expected to yield long-term, verifiable reductions in GHG emissions. Perhaps more importantly, by helping to establish a system of efficiency standards for public lighting, and a mechanism for technology review, VEEPL should help Vietnam more effectively access future public lighting technologies that may yield even greater energy savings.

National Benefits

49. The following are the beneficiaries of the proposed VEEPL Project:
 - a. Vietnamese National and Local Government - The project will develop improved capacity within Vietnam to make more effective and efficient allocation of national resources to the public lighting system. More optimal design, implementation and operation of public lighting will free funds to make additional public lighting investments, particularly in rural areas. Imports of energy-efficient lighting equipment may increase in the short run to meet new demand created by VEEPL, but technical transfer activities will support Vietnamese lighting industry expansion to meet these new markets, eventually replacing imports and creating new jobs. The project will also be a significant contribution to the National Government's international commitments related to the Environment and emissions control.
 - b. Electricity Vietnam (EVN) - By reducing demand electricity for public lighting, particularly during the peak load period, the project will help to offset the need for additional generation capacity. The reduction in peak load requirement will also contribute to improved system stability.
 - c. Public Facilities (Hospitals and Schools) - Improved lighting equipment quality, design and installation will provide a better, and more consistent standard of illumination for public facilities. Improved illumination will improve road safety, help health care professionals to better care for patients, and help students to learn. Reductions in operating expenses for lighting will allow public facilities to use scarce resources for other areas of service provision.
 - d. Lighting System Designers and Installers - Through the training initiatives provided as part of the project, and the development of product and lighting standards, lighting system installers and designers will be in a position to offer enhanced levels of service to their customers, in both the public and private sectors.
 - e. Lighting Product Manufacturers - Vietnamese lighting product manufacturers will gain significantly from the project. Through technology transfer training initiatives and upgraded

test facilities, manufacturers will be capable of design, development and production of new efficient lighting products. This facilitates the ability to generate additional income at the national level through value-added products and opens the possibility of new export markets that cannot be exploited with current low-quality product offerings.

- f. Equipment Suppliers and Energy Services Companies (ESCOs) - A number of lighting suppliers currently offer ESCO services (energy auditing, finance, etc). By developing and disseminating standardized technical and financial analysis tools, VEEPL will help to popularize the ESCO concept, and demonstrate the utility of these services to customer groups (primarily the local lighting companies and agencies).
- g. The Environment of Vietnam - Local environmental benefits in Vietnam from the avoided consumption of electricity include avoidance of a range of pollutants typically associated with thermal power generation such as sulfur dioxide (SO₂) and Nitrogen oxides (NO_x). Additional environmental benefits may included the reduction of thermal pollution of rivers and streams by discharge from thermal power plants, and a reduction in environmental damage associated with the transport of fossil fuels to power plants.
- h. The Economy of Vietnam - The VEEPL project will lead directly to better public lighting throughout Vietnam. Better public lighting means safer streets, better student academic performance in schools, and health care in hospitals. The avoided expenditures on additional generation and distribution capacity can be redirected to other areas of economic development.

Project Objectives

- 50. In line with the GEF mandate, the overall goal of the project is the reduction of the growth rate of GHG emissions from the Vietnamese power generation sector. The purpose of the project is to achieve this reduction through the removal of the major barriers to the adoption of energy efficient lighting technologies and practices for public lighting in Vietnam. VEEPL recognizes that effective and efficient lighting must be considered as a system, a system that is supported by a technical, commercial and professional infrastructure that does not currently exist in Vietnam. Therefore VEEPL goes beyond technology substitution and addresses the underlying causes that prevent efficient lighting from being installed in Vietnam. By doing so, VEEPL intends to have impacts that are both replicable and sustainable.
 - a. Develop policies for national and local governments on public lighting - In Component 1, VEEPL will work with the various government agencies that have public lighting responsibilities with the assistance of local and international experts to develop appropriate guidelines and policies to encourage energy-efficient public lighting. VEEPL will also follow up to try and make sure that new policies are actually implemented.
 - b. Transfer information, tools and skills to public lighting stakeholders - In Components 2 and 4, VEEPL will draw upon local and international lighting experts, to provide training to manufacturers, financiers, lighting companies, public lighting system service providers and other stakeholders. VEEPL will also develop lighting technical and financial analysis tools that can be used to estimate the costs and benefits of public lighting projects.

- c. Create an Energy Conservation Investment Fund for efficient public lighting - In component 3, VEEPL will organize investment from ODAs, from commercial lenders and possibly from the lighting industry into an Energy Conservation Investment Fund to provide project financing for public lighting projects in Vietnam that meet minimum efficiency and quality requirements.
- d. Organize public lighting stakeholders - In many developed and developing countries there are forums for academics, technicians and policy makers in the field of lighting to come together, share information and discuss interests and concerns. One such example is the Commission International d'Eclairage (CIE), chapters of which exist in many countries. Vietnam currently has no CIE chapter, or other such forum for lighting. In Component 5, channels already established by VAST will be used to reach out and establish a lighting network including academia, industry and other government agencies.
- e. Generate and disseminate information on efficient public lighting - Also in Component 5, VEEPL will gather information on the current status of public lighting in Vietnam, and on the costs and benefits associated with different technology choices. VEEPL will also work to make sure that this information is useful by tailoring the information so that it meets the needs of the various stakeholders involved in public lighting in Vietnam.

PROJECT COMPONENTS AND EXPECTED RESULTS

- 51. The project is designed to address barriers in the development and implementation of energy efficient lighting in the public sector in Vietnam. To achieve this objective, the project is organized into five components, which are on the following: (a) Policy Development; (b) Technical Support; (c) Financing; (d) Technology Demonstration; and, (e) Information Dissemination and Awareness Raising.
- 52. Each of the project components listed has been designed to undertake specific activities that address specific barriers and gaps that have existed. Further, these have been designed to ensure that all objectives stated above are addressed. Each of the project component descriptions below assumes that the administrative and managerial capacity already exists to support execution of the activities under the component.

Component 1: Public Lighting Policy Development

- 53. This program component will help the GOV to develop, implement and sustain policies for public lighting. First, existing policies and regulations relating to public will be carefully reviewed. Then, a comprehensive policy on efficient public lighting will be formulated with appropriate roles defined for relevant GOV entities. This will include drafting of rules and regulations for review and adoption by national and local government.
- 54. The Public Lighting Data Facility described in Component 5 will aid implementation and enforcement of new lighting policies. Component 3 will also study the potential application of a tariff system for public lighting. The tariff system would provide sustainable financing for public lighting that meets efficiency standards. Finally, efforts will be made to encourage cities and towns to incorporate public lighting into their development plans, and to mainstream energy efficient public lighting into city planning.

- a. Creation of National Lighting Advisory Committee – This activity will involve the creation of a National Lighting Advisory Committee (NLAC), which would comprise of academicians, technical experts, and relevant policy makers with an interest in lighting, and serve as a resource to the project, and help establish a permanent forum for the discussion of lighting technical and policy topics in Vietnam. The members of the temporary network that was formed under the VN-DSM program would be recruited to serve again under VEEPL. The NLAC will also provide a link between policy makers, academics and industry, which could be used, for example, to sponsor product exhibition or buyers conferences where purchases of lighting for hospitals, schools and roads can meet with lighting manufacturers and find out about new products and pricing. *GEF support is not required.*
- b. Conduct of a comprehensive national policy study on public lighting - This activity will provide technical advice and review of existing Vietnamese policies and regulations relating to public lighting. A national policy study will be conducted to provide a comparison with policies and regulations in other countries, lighting design, and lighting system operation and maintenance with the aim of promoting and supporting EC&EE in lighting systems, starting with the public sector. Such study will be carried out with input from the NLAC, and will be coordinated with government agencies such as VAST, MoC, MoF, MPI, MoH and MoET. The study will also evaluate possible policy support activities and strategies that can be considered to encourage private sector involvement in lighting system EC&EE, in general, and public lighting system EC&EE, in particular. It will involve the review of existing policies review of policies in other countries, best practices, incentives, regulations, lighting standards, and lighting design practices. *GEF support is required for TA on the study methodology design.*
- c. Evaluation of opportunities for energy efficiency improvements in public lighting - In this activity, the potential savings from improvements to public lighting systems in Vietnam will be identified using information collected in the Public Lighting Data Facility. This activity will generate outputs that will be useful in the design of new or expanded public lighting systems, as well as for identifying attractive areas for energy efficiency investments in existing lighting systems. This activity will also define current best practices for the utilization of EE lighting systems in public facilities and for street lighting. As part of this study, a few cities and towns will be selected for more detailed case studies to illustrate how public lighting system improvements would be made, with guidelines for local officials to follow in determining their own public lighting technical potential. A report highlighting detailed findings and recommendations for improvements will be prepared and distributed to appropriate GOV agencies and to the lighting industry. *GEF support is required to provide TA in developing performance evaluation reports and improvement recommendations.*
- d. Development of economic and technical tools to support rational public lighting investments – This activity includes a tariff pricing study for electricity used in public lighting, particularly street lighting, that will be carried out by the MOC’s Construction Economics Institute. The study will further investigate and evaluate various options for financial incentives to encourage EC&EE in public lighting systems, including investment incentives. After evaluating each option, specific recommendations for incentive structures and levels to encourage public lighting energy efficiency will be proposed. Recommendations for the implementing rules and regulations of the public lighting policy that will be developed under the project will also be provided. *GEF support is required for TA on the study, particularly in*

the pricing for public lighting including the prices of electricity, equipment, operation and maintenance as well as on financial incentive proposals.

- e. Development and assistance in the enforcement of public lighting regulations - This activity will involve technical assistance to relevant GOV agencies in developing implementing rules and regulations (IRR) to aid in the effective enforcement of the new public lighting policies, using the information and tools produced in Activities 1.c and 1.d. The IRRs will be subject to public review prior to approval, and will cover, among others, lighting standards, lighting design practices, lighting energy accounting, reporting and monitoring, lighting fees and fee collection. Capacity building will be provided on drafting IRRs and in the use of the developed tools and techniques. *GEF support is required for TA to help develop IRRs, and to organize the involvement of relevant stakeholders.*
- f. Integration of public lighting into local development plans - This activity will build the capacity of local governments (particularly the planning offices) in integrating public lighting into their development planning processes, with a focus on EC&EE. Training would be provided on public lighting regulations and energy consumption monitoring and reporting, as well as working with potential partners such as ESCOs, lighting system manufacturers and suppliers, and the lighting service industry in the design and implementation of energy efficient public lighting systems. *GEF support is required for providing TA capacity development of integrating public lighting plans in city and town development planning for local government.*
- g. Development of local public lighting policy – As part of this activity, an outreach program offering technical advice to cities and towns in formulating local public lighting policies will be carried out, with the aim of developing and disseminating consistent local policies that are compliant with national policy, and facilitate private sector investment in energy efficient public lighting in smaller cities and towns and rural areas. This outreach will be done in consultation with different stakeholders, particularly those in the private sector, to make sure that it effectively addresses barriers to the achievement of EC&EE in public lighting systems. A participatory approach will be applied in the presentation and evaluation of the proposed public lighting policies, including linking their impacts to other related national EC&EE policies. *GEF support is required for provision TA in developing the proposals on new public lighting, organizing the consultation meeting with relevant stakeholders.*
- h. Public lighting regulations monitoring and evaluation - This activity entails the monitoring and evaluation of the impacts of the enforcement of new policy; pricing and regulatory measures generated by other activities in this program component. Lessons learned around issues such as incentive mechanisms, further barriers to EC&EE in public lighting, and policy strategies will be identified and appropriate actions recommended. *GEF support is required for TA help design regulations monitoring and evaluation protocols, and to assess the impacts of the enforcement of policy, pricing and regulatory measures.*
- i. Review of public lighting policy - This activity will review and evaluate the local and national public lighting policy recommendations developed as a result of monitoring of demonstration activities. Revised policy and implementing guidelines covering pricing, incentives, etc. for EE public lighting systems will be formulated and recommended to the appropriate national and local agencies. *GEF support is required for TA in analyzing the results of the demonstration component's implementation.*

Component 2: Public Lighting Technical Support Program

55. Activities under this component include a thorough assessment of the current status of the technical capacity of professionals in the Vietnamese public lighting sector, and the quality and availability of technical training programs related to lighting. Efforts will be made to upgrade national lighting laboratory facilities to allow research and support the enforcement of standards. The issue of toxic waste associated with energy efficient lighting products will also be treated under this component. Efforts will be made to obtain support for these efforts from the international lighting industry.

- a. Technical capacity building for lighting energy standards and labeling - VEEPL will take full advantage of the resources presented by other past and anticipated global standards and labeling activities². In this activity, an assessment of the feasibility of, and requirements for, standardizing the procurement, supply and manufacturing of public lighting system components and products in Vietnam will be carried out. Assessment reports will be prepared and submitted to MoC highlighting findings and recommendations for MEPS, and for possible mass procurement of lighting system equipment and components. Starting with standards and labeling reviews already completed under the VN-DSM project, and under the VEEPL PDF-B, a study will be conducted on the development of appropriate performance (energy and quality) norms for major lighting system equipment and components such as compact fluorescent lamps, ballasts (electronic and/or low loss magnetic), and automatic lighting controls. Part of this activity is the consolidation of lighting equipment performance and standards based on relevant codes/standards in other countries. Developed standards will be proposed for consideration to the relevant government agencies.

Technical support from VEEPL will be provided to government deliberations concerning the setting of standards or regulations concerning the specification and performance of lighting system equipment used in the country. The technical assistance will be on standards setting and accompanying testing procedures for components of lighting system equipment and components. Specifically, this would be on: (1) Developing performance standards for CFLs, electronic ballasts, low- loss magnetic ballasts and automatic lighting controls; and (2) Upgrading lighting standards for streets, hospitals, schools and post offices. *GEF support is required for the abovementioned technical assistance.*

- b. Provision of technical assistance to Vietnamese lighting manufacturers – In this activity, public lighting system and product manufacturers will receive specialized instruction on the design and manufacturing of energy efficient lighting products. Technical capacity building

² Many relevant energy efficient lighting projects have taken place around the world. Of particular note are two GEF-funded projects: the IFC/GEF Poland Efficient Lighting Project (PELP) and the IFC/GEF Seven Countries Energy Efficiency Lighting Initiative (ELI) both implemented by the IFC; and the Barrier Removal for Energy Efficient Products and Systems in China (“China Green Lights Project”) also implemented by UNDP. In these cases, significant effort has been given to the development of lighting standards, effective project evaluation and to project sustainability. The VEEPL project builds upon the foundation laid by these previous GEF-funded projects, and to utilize the intellectual capital generated by them. It will draw on the work of ELI and China Green Lights in the adoption or development of Vietnamese technical standards for energy efficient lighting equipment. The VEEPL project will also follow the example of these prior projects with regard to evaluation techniques (adopting consistent methodologies wherever possible) and program sustainability replicability.

will be provided to Vietnamese lighting product manufacturers in improving their product designs to comply with lighting product standards developed (under Activity 2.a), and in improving the energy efficiency of their manufacturing processes³. This technical assistance will be carried out as part of a demonstration scheme for showcasing the technical and economic viability of EE improvements in the local manufacturing of lighting products. The demonstration schemes that will be carried out under this activity, to which technical assistance will be provided under this activity includes:

- *Improvement in the design and manufacturing of lamp luminaires* – This demonstration will be carried out in 2 companies (Hapulico Co., and Schreder Co.). Both companies are investing on improvements in their luminaire product design and manufacturing process.
- *Improvement in the design and manufacture of lamp ballasts* – Two local companies (Viettronics Dong Da Co., and VINAKIP Co.) will host this demonstration. Viettronics will be manufacturing electronic ballasts for T8 fluorescent lamps and CFLs, while VINAKIP plans to manufacture low loss magnetic ballasts for T8s, and for HPS (70W, 150W, 250W) bulbs.
- *Manufacture of energy efficient lamps* – A local lamp manufacturer, Dien Quang Co., will host this demonstration. The technology of manufacturing energy efficient lamps will be demonstrated through upgrades in the manufacturing process to facilitate production of T8s and 2 pin 26W CFLs.

GEF support is required for TA in transferring the designs of EE lighting products and capacity developing on product quality for local manufacturers.

- c. EEL Technology Transfer – Technical capacity building activities will be carried out specifically on the design of energy efficient lighting products⁴. These include:
- Establishment and training of a technology transfer group (TTG) within the Institute of Materials Science (IMS) and the Hanoi University of Technology (HUT) - The TTG staff members will be trained in appropriate countries on the energy efficient design of ballasts for fluorescent and high pressure sodium lamps, and in developing software for lighting and luminaire design. The TTG will develop the software in Vietnamese for ballast, luminaire and lighting designs that are compatible with local technical capacities and local lighting products;
 - Compilation of a users manual and guideline of the developed software in Vietnamese for widespread application; and,
 - Organization and conduct of training courses at HUT for local lighting product manufacturers.

³ The executing agency of the VEEPL will coordinate with the IDA/GEF DSM project to avoid duplication of the technical assistance to manufacturers of FTLs and efficient ballasts.

⁴ Initial contacts have already been made, and expected to become on a regular basis, with institutions like the China Center for Energy Conservation Product (CECP), which is the recipient of the IFC/GEF Efficient Lighting Initiative (ELI) Legacy, and the significant technical and intellectual capacity for testing and certification that it represents. The VEEPL PMO has already hosted a visit by CECP director, Mr. Li Tienan at VAST in Hanoi. In 2002, ELI-Philippines has provided technical assistance in one of the workshop organized under the PDF-B exercise.

The VEEPL project development team identified international lighting manufacturers that were willing to engage in technology transfer. These include:

- Lighting Technologies Inc. (USA) for lighting design software;
- International Rectifier Company (USA) for ballast design software;
- Philips semiconductor Singapore for ballast design; and,
- Optical & Photometric Technology (Australia) for testing equipment.

GEF support is required for all the associated technical assistance in the transfer of EEL technology.

- d. Networking with the international lighting industry - VEEPL will help the domestic lighting industry increase both the capacity and quality of its manufacturing of efficient lighting products. This activity will help the local lighting manufacturers keep abreast with both business and technology developments in the international lighting industry. *GEF support is required for TA in establishing an international industry forum for VEEPL, and for maintaining communications with the international lighting industry.*
- e. Upgrading of national lighting product testing capabilities – This activity will involve the provision of technical assistance in the upgrading of lighting product testing capabilities. This technical assistance will be provided to three test laboratories:
- QUATEST 1, which is a government accredited laboratory in Northern Vietnam that is currently testing domestic and imported lighting products, but can only test only electrical, and not optical, properties of lighting products.
 - Lighting laboratory of the Institute of Material Sciences at VAST, which is in the process of initiating lighting laboratory upgrades at their facility.
 - Department of Physics Laboratory of the Hanoi University of Technology (HUT), which is finalizing plans to upgrade its lighting test equipment.

These laboratories will further develop their capacity for comprehensive testing of lighting equipment, and are targeted to provide lighting product testing and research services to local lighting product manufacturers and/or importers in product quality testing, and for new energy efficient public lighting product design. The idea of having these 3 testing laboratories do (for a fee) the testing requirements of other lighting product manufacturers and/or importers is part of the plan in upgrading their capabilities and stature. *GEF support is required for TA in the staff testing capacity upgrades in these 3 facilities.*

- f. Assessment of the capabilities of local lighting system service providers – Vietnamese engineering firms will be evaluated to determine their present individual capacity to perform appropriate technical and maintenance services (including lighting energy audits) for public lighting systems. This evaluation will be based on the preliminary assessment carried out during the PDF-B exercise as to the availability of lighting products and related planning, installation and maintenance services. Assessment reports highlighting findings and recommendations will be prepared and submitted to the MoC. *GEF support is required for TA in assessing the local lighting system service providers and for preparing recommendations on improving their capacities.*

- g. Technical capacity building on the design, operation and maintenance of EE public lighting systems - This activity will promote the design and management of public lighting systems, and targets relevant technical personnel in cities and towns, lighting system manufacturers and suppliers, ESCOs, engineering firms and architects, and the MoC. By considering lighting as a system, equipment, design, installation and maintenance may all be optimized to provide the highest quality lighting service for the intended purpose, at the lowest possible life-cycle cost. Capacity building will be carried out through training courses and seminars, workshops, and study tours. This activity will also involve the development of a certification program for lighting system service providers to be administered by VAST through VEEPL. The capacity building activities will be coordinated with those of the IDA/GEF DSM project, particularly those that are targeted at ESCOs. *GEF support is required for TA in the capacity building activities and in the design and implementation of the certification program.*
- h. Public lighting sustainable technical development program - This activity will involve the design and development of sustainable lighting system technology, R&D and replication program supported by the local lighting product manufacturers and lighting product suppliers. As part of the program, a plan of action for the design, financing, implementation and M&E for replication projects that will be carried out in cities/towns, and lighting product companies (manufacturers and suppliers). *GEF support is required for TA in program design.*

Component 3: Public Lighting Financing Program

- 56. As with many energy efficient end-uses, energy efficient public lighting typically requires a higher initial capital expense compared to inefficient public lighting, but saves several times the incremental cost difference in avoided electricity usage over the lifetime of the equipment. The lack of project financing has a particularly negative impact on energy efficiency because without financing purchasers often need to minimize initial capital outlays in order to purchase the required equipment, even if that means higher lifecycle costs. The limited penetration of efficient public lighting in Vietnam is also attributed at least partly to a lack of project financing available to cities, towns, manufacturers, service providers and other parties involved in selecting, designing and installing public lighting systems. Vietnamese financial institutions, both public and private, have little knowledge of life cycle cost analysis with regards to public lighting investments and have not realized the need for financial schemes for efficient public lighting projects. This has led to insufficient investment in the installation, operation and maintenance of public lighting systems in general.
- 57. This component will increase the capacity of Vietnamese financial organizations to analyze and evaluate energy efficient public lighting investments. It will also design and implement a pilot revolving fund to finance energy efficient public lighting projects. Results and experiences derived from this component will be documented and disseminated to encourage the wider use of the new financial schemes and upgrade the financial schemes systems where appropriate.
 - a. Promotion of EE public lighting to the financial sector - Under this activity, appropriate financial analysis tools will be developed and provided to local financial institutions. Interested financial institutions will be encouraged to support the efforts of cities and towns to improve (and generate energy and energy cost savings from) their public lighting systems. *GEF support is required for TA in organizing promotional workshops and designing an informational brochure.*

- b. Capacity building EE/EC for financial sector - This activity will involve the conduct of training courses on public lighting project financing for: (1) private and government financial institutions; (2) commercial banks; and, (3) private entrepreneurs. Included in these courses will be training on life-cycle costs analysis for energy efficient public lighting. *GEF support is required for provision TA in preparing the programs and holding training courses.*
- c. Comprehensive study of public lighting financing schemes - In this activity, VEEPL experts, together with the financial community, will conduct a study of applicable financing schemes to support EE public lighting systems in Vietnam. The study will include recommendations for appropriate financing schemes for cities and towns. Tasks carried out under this activity will include: (i) A review of the latest international literature and experience on financial mechanisms for public services; (ii) An assessment of potential community or beneficiary cost sharing in public lighting projects, and, (iii) The provision of technical assistance in the design of appropriate financing schemes for public lighting improvement projects. *GEF support is required in the form of TA to help develop recommendation on applicable financing schemes and accompanied mechanics.*
- d. Technical assistance in the establishment of energy conservation fund - This activity will entail the provision technical assistance to the VAST in meeting requirements of various organizations in Vietnam that provides multilateral and bilateral development assistance⁵. VEEPL financing experts will provide guidance, information and support on how to access such development assistance for use in EC&EE projects, such as those on EE public lighting systems. *GEF support is required for all related TA.*
- e. Development of an energy conservation fund⁶ – This activity will include the provision of advice and recommendations on the appropriate and applicable financing schemes (based on Activities 3.c & 3.d) that would assist prospective local lighting product manufacturers and cities/towns that are interested in investing in EE public lighting projects. Moreover, the development of selection criteria for the financing schemes and the selection of eligible public lighting projects, as well as those for improved local lighting products manufacturing will also be covered under this activity. *GEF support is required for all related TA.*

Component 4: Public Lighting System Demonstration Program

58. Access to energy efficient lighting products, technical expertise and project financing are necessary, but in themselves insufficient, to transform the market for public lighting in Vietnam. Successful market transformation must be driven by market demand for energy efficient public lighting projects. Market demand will only grow when Vietnamese cities and towns clearly perceive energy efficient public lighting projects to be executable, and attractive.

⁵ SIDA is one donor agency that is targeted to provide funds for the ECF, which will provide loans to eligible applications including: (1) large end-users (public lighting contractors and companies, hotels, hospitals, schools and garment-textile companies; (2) local manufacturers who can produce EE lighting products; (3) High volume importers of EE lighting products; and, (4) lighting engineering companies as well as energy service companies who can provide energy efficient lighting products for their customers.

⁶ The funds (US\$ 5 to 10 million) that will be secured for the ECF are considered future leveraged co-financing, hence are not yet included in the financial plan of the proposed VEEPL project.

59. In this component, elements of all of the above components are brought together to realize actual improvements in the public lighting system of cities/towns. Demonstration of the design, development, installation, operation and maintenance of energy efficient lighting systems will be demonstrated in 7 Vietnamese cities and towns: Ho Chi Minh City, Quy Nhon, Hue, Vinh, Ha Tinh, Tuy Hoa, and Quang Ngai. Under this VEEPL project component, the following major activities will be carried in the implementation of the demonstration schemes:
- a. Review of the technical potential for public lighting efficiency improvements in the host demonstration cities and towns;
 - b. Training of relevant local government officials/personnel in the host demonstration cities and towns on the use of evaluation tools for assessing potential investments in public lighting upgrades or expansion; and,
 - c. Deliver the lighting equipment and services selected by the host demonstration cities and towns.
60. A review of the recommended demonstration schemes during the PDF-B exercise will be carried out. The schemes will be modified/changed (if necessary) to make them more practical and easy to implement. The schemes will be implemented, with close review and evaluation of their effectiveness and efficiency. Upgrading will be made continuously based upon the evaluation in order to produce the most successful framework, which will then be disseminated nation-wide for replication. Dalico, formerly the lighting company of Da Nang City and now a subsidiary of Vinaship, which is the National Shipbuilding Agency; and Sapulico, the lighting company of Ho Chi Minh City, will carry out the installation of the energy efficient lighting systems under the demonstration schemes.
- a. Review of technical and economic feasibility of demonstration schemes – The pre- feasibility analyses that were conducted during the PDF-B phase of the VEEPL project will be reviewed to determine and verify the demonstration scheme implementation requirements. If necessary, further feasibility assessments will be carried out, with technical assistance from VEEPL, by the host demonstration cities. This will involve carrying the existing site studies for the demonstration forward to detailed technical design and engineering, cost calculation, cost-benefit analysis, design of operation and maintenance concept, assessment of financing aspects (finance mix, cash flow, tariff collection, loan repayment). *GEF support is required for TA in reviewing of the proposed techno-economic feasibility of the demonstration schemes.*
 - b. Baseline data information on the demonstration sites - Electricity consumption and demand and baseline public lighting performance information will be gathered in all demonstration project sites. An overview of socio-economic conditions at the sites will also be performed to enable tracking of secondary economic benefits from improved public lighting. Operating performance targets for the public lighting systems will be established. *Additional GEF support is not needed.*
 - c. Specific demonstration scheme implementation barrier removal activities - Certain activities may be required to facilitate the smooth and effective implementation of the demonstration schemes. Among these are: (i) Verification and confirmation of the cooperation of relevant stakeholders in the host demonstration cities; (ii) Defining the terms of participation so that it

is clear what is expected of communities before during and after they complete the demonstration component⁷; (iii) Completion of the analytical tools and policy guidelines to be prepared under Component 2; (iv) negotiation with financing agencies to provide any financial mechanisms, for example import credits, that may be necessary to allow participating cities and towns to access energy efficient public lighting products and, (v) Other potential legal requirements (if any). In addition, technical assistance will be provided to help with administration, as well as the operation and maintenance systems at the demonstration cities (e.g., designation of administrator, caretakers, operators; establishing of guidelines and procedures; organizing lighting fee collection, etc.). *Additional GEF support not needed.*

- d. Implementation of demonstration schemes - This activity will provide technical assistance during the preparation of detailed public lighting system engineering designs. This will be particularly important in areas in the host cities where engineering designs for public lighting have not previously been applied. VEEPL will also provide technical advice on the evaluation of project technical and economic feasibility. The tasks under this activity for each demonstration site will be similar to that in full public works project implementations, starting from the conceptual design, to feasibility study, engineering design, installation, operation, monitoring and evaluation. Technical assistance will also be provided in the installation work. *GEF support is required to provide TA to develop and implement the basic engineering designs of the demonstration projects.*
- e. Monitoring and performance review of demonstration projects – The performance of the installed public lighting energy systems in the demonstration cities will be monitored before, during and after implementation to review energy saved, policies implemented, satisfaction with the demonstration implementation process and other lessons learned. *GEF support is required in the form of TA for the development and implementation of the monitoring and performance review process.*
- f. Action plan for dissemination of demonstration results - This activity entails the documentation and dissemination of the results (and lessons learned) from the public lighting system demonstration schemes implementation. The action plan will begin by defining the data to be gathered from each participant in the VEEPL demonstration project, and by setting a calendar for data collection. The action plan will also include the production of a demonstration project summary report and individual case studies showcasing project costs, benefits and lessons learned. Successful case studies will be used to establish benchmarks that are specific to the different applications and technologies for comparison with future public lighting projects. The action plan will define the role of the VEEPL advisory board and other stakeholders in reviewing the demonstration project. It will also develop and discuss ways in which project stakeholders can use the information from the VEEPL demonstration to implement public lighting regulations at their own agencies, or to make presentations to specific audiences.

Finally, the action plan will also cover activities necessary to provide follow through on all these activities to encourage uptake of successful demonstration component activities by

⁷ In their letters of commitment to VEEPL, communities participating in the VEEPL demonstration component were asked to state that they are willing to make relevant project technical and financial data available to the VEEPL PMO.

other cities and towns, as well as in other lighting product companies (manufacturers and suppliers). Such replication plan will include specific arrangements for the provision of technical assistance in the conceptualization, design, engineering, financing, and implementation of replication projects that will be carried out in cities/towns, and lighting product companies (manufacturers and suppliers). Such plan will also delineate who will be responsible for the M&E, documentation and dissemination of the results of the replication projects.

GEF support is needed for the publication and dissemination of demonstration results, and for the preparation of the action plan.

Component 5: Information Dissemination and Awareness Raising

61. One of the major factors hindering the development of efficient public lighting in Vietnam is a lack of information and awareness at all levels. Information exchange regarding public lighting has been difficult in Vietnam because of the large number of cities and towns in different economic situations, and by the geographic and historic north/south separation of the country. The fact that 80% of the Vietnamese population lives in rural areas also makes communication more difficult. Local public lighting management companies, offices of the MoC, and private companies provide some information on public lighting, but no systematic public lighting information dissemination program has ever been established. The quantity and quality of the available information is often far from satisfactory and it is often poorly managed and understood. The available public lighting information also tends to be generic, and does not acknowledge the diverse needs of different types of cities and towns in Vietnam.
62. This component will take the information generated in the various components of the project and will create an integrated VEEPL concept and approach. This VEEPL “identity”, backed by the wide array of market data, analytical tools and technical and financial resources developed through the other program components, will be used to promote energy efficient public lighting to targeted audiences in Vietnam. Specific targets include local governments, lighting manufacturers and suppliers, and the general public. This project component will provide broad access to high quality lighting technical information but also to the policies, regulations and market data required to design and implement energy efficient public lighting systems.
 - a. Establishment of a public lighting data facility - A database of national public lighting information, the public lighting data facility, as a resource to the rest of the VEEPL project components, to national and local government, and to the lighting industry, will be established under this activity. Cities and towns will be required to submit periodic reports (e.g., quarterly) of their lighting energy consumption for city-, and town-owned and operated buildings and facilities, including street lighting. The periodic reports will be requested by the Ministry of Construction (MoC), which will monitor and evaluate the lighting energy performance of the cities/towns. Information collected by the public lighting energy consumption reporting and monitoring (PLECRM) program will be stored in public lighting data facility. The data facility will include modules for lighting energy technology information and public lighting energy consumption data. It will be designed to provide high-level data storage, as well as to enable sophisticated statistical analysis for continuous public lighting energy improvement programs. The relevant staff members of the MoC, and of the general services or utilities departments of cities and towns will be trained to carry out electricity metering (and in some cases systematic calculation or estimation) of the energy

consumption of public lighting facilities. The training will also include lighting electricity consumption reporting and ways and means to improve the energy utilization in the lighting of public facilities.

The PLERCM program is designed to become an ongoing activity of the MoC even after the VEEPL implementation. Hence, information collected under the program and encoded in the database will also support the evaluation of VEEPL. The initial review of public lighting and energy consumption will allow the verification of the pre-project baseline in Vietnam. As the VEEPL activities progress, the PLERCM program will track market transformation indicators to determine program impacts. The database will be designed so that it can be easily expanded in the future to include other lighting sectors, or other energy end uses (e.g., building air conditioning, water supply and distribution, public transport systems). *GEF support is required for the TA in the database design and capacity building on its use and maintenance.*

- b. VEEPL identity and branding – This activity will promote and protect the VEEPL identity, or “brand” so that stakeholders and targeted audiences can easily recognize VEEPL materials. It will include developing a VEEPL logo and label, publications format, and other VEEPL identity materials. By consistently providing high quality, impartial and independent data on public lighting that is tailored for Vietnam, VEEPL will become a recognized, respected source of useful information. *GEF assistance is required to help develop and maintain appropriate identity and branding materials.*
- c. Efficient public lighting promotional campaign - VEEPL will mount a campaign to raise the general awareness of public lighting issues with policy makers, appropriate officials in cities and towns, the lighting industry and the general public. Campaign articles, which will be designed based on findings and recommendations from the PDF-B exercise, will be published in trade and industry publications, presentations will be made at government meetings, and VEEPL staff or consultants will participate in appropriate public events. Whenever possible, VEEPL promotional activities will coordinate with similar activities delivered through other programs, in particular the VN-DSM project. *GEF assistance is required to help develop a plan for the general outreach campaign, and to leverage support from potential campaign partners, like the lighting industry.*
- d. Public lighting performance rating and recognition - As part of the promotional campaign, this activity is intended to encourage competition between cities and towns in Vietnam to improve EC&EE in public lighting. Using the information gathered from the public lighting data facility, a performance-rating scheme will be designed; developed and implemented that recognizes cities and towns that meet public lighting energy efficiency targets. The MoC, in cooperation with local governments and lighting manufacturers and suppliers, will carry out this annual activity. *GEF assistance is required in supply TA for the design of the rating scheme, including the implementation of guidelines, rules and regulations.*
- e. Provision of information to the Vietnamese lighting industry - This activity will address the need for an enhanced local expertise in the area of lighting technology that will support the public lighting EC&EE improvement efforts. It will also include provision of up-to-date technical information and capacity building for local engineering consultants in providing services on lighting systems. This industry is expected to develop and provide the technical services associated with the design, installation, and maintenance and troubleshooting of

lighting systems, including those in the public sector and street lighting. *GEF support is required for TA on the design and production of appropriate public lighting information materials, and on the capacity development of lighting engineering and energy consulting firms in Vietnam.*

- f. Establishment of a National Public Lighting Information Center (PLIC) – In this activity, a Public Lighting Information Center (PLIC) will be established within the MoC to cater to the information needs of the citizenry (government and city/town population) regarding EC&EE in general, and public lighting EC&EE in particular. This activity will involve provision of technical advice and some logistical support in the creation of the PLIC. The PLIC will help to disseminate VEEPL project output information. The PLIC will also facilitate exchange of information on public lighting EC&EE among the various cities and towns in the country. Cities and towns will be encouraged to set up individual or regional information centers with the assistance provided by the national PLIC. *GEF support is required for TA on setting up the PLIC including the design of the suitable mechanism for the information exchange as well as on preparing and publishing half-yearly newsletters on public lighting.*
- g. VEEPL Project outputs distribution - This activity will involve the documentation and dissemination of the results of the various activities of the VEEPL. A workshop will take place at the end of the VEEPL project to present results of the various VEEPL project activities to an audience of stakeholders and other interested parties. Results of the VEEPL evaluation will also be presented, to the extent that they are available. In addition to presentations by program staff and contractors, there will be multiple opportunities for discussion between program participants and their input will be included in the project evaluation. *GEF support is required for TA in processing project outputs into forms appropriate for broader dissemination, and in the development of the workshop program.*

RISK AND SUSTAINABILITY

Project Risks

63. There are a range of specific risks associated with the successful completion of the project including:

Risk	Mitigating Actions	Level of Risk
Institutional: The present complex institutional framework relating to the administration of public lighting in Vietnam is a challenge to VEEPL project progress.	Special attention will be given to building institutional relationships and support for VEEPL activities at the various agencies that will be involved. To minimize complexity the number of stakeholders has been limited to the main actors. VAST, with its central position of high regard in the GOV that makes it a good home for VEEPL and maximizes the chance of obtaining active support from other ministries.	Medium to High
Credit availability: Local financing for EEL is not available to public lighting projects.	Project will carry out activities that will help facilitate the creation of funding windows that will be funded by multi-, and bi-lateral development agencies, particularly SIDA.	Medium to High

Risk	Mitigating Actions	Level of Risk
Market: Market for public lighting in Vietnam will fail to respond to the benefits (financial and performance) associated with energy efficient public lighting.	Project includes a significant, sophisticated information dissemination component. In addition, product quality certification and labeling program will be implemented to encourage organizations to promote efficient lighting. Furthermore, demonstration schemes will be conducted to showcase the effectiveness and efficiency of energy efficient public lighting. Raising the expectations of the public lighting officials in cities and towns and at relevant GOV ministries, as to public lighting performance and life-cycle costs is one of the primary objectives of VEEPL.	Moderate
Technology: Local manufacturers will not be able to develop products that meet quality and performance levels set by international markets.	All technologies to be used in the VEEPL project are mature and proven. Lighting products suitable to the local manufacture capacities and sufficient capacity building will be promoted.	Low
Macro-economic: Decline or collapse of the Vietnamese economy, or a change in government priorities about energy efficiency if other conflicting needs arise.	The Vietnamese economy appears to be in a period of stable growth and the GoV commitment to energy efficiency has been consistent and growing.	Low
Policy and Regulatory: Proposed policies and regulations may not be enforced. Lighting product efficiency labels and certified products will be counterfeited.	Raising awareness on the positive impacts of efficient public lighting is among the major activities of the project. Various measures will be taken in concert with the lighting industry to protect the VEEPL program identity and to enforce trademarks, etc	Low

Sustainability

- 64. The financial costs and benefits of the public the public lighting efficiency projects to be pursued under VEEPL are such that, once the existing market barriers are removed, many of the activities should be “self-replicating”. That is, once the basic proof of concept has been shown, and the economic and lighting performance of the technology demonstrated, there would be attractive investments for commercial entities.
- 65. VEEPL also fosters sustainability by formulating, issuing and enforcing policies and regulations on public lighting, including data reporting, standard and lighting fee recovery. Such policies will be formulated in a way to encourage the private sector to promote energy efficiency, not limited to public lighting. These policies will remain effective even after project end. In addition,

enhanced participation by the private sector into EE&EC activities through a variety of project activities will contribute to a sustainable energy efficient lighting market.

66. Innovative financial mechanisms proposed in this project such as expenditure distribution and lighting fee collection will be implemented in the demonstration sites. Success in these mechanisms will attract investment from private companies in public lighting systems and the private companies can recover the capital by installments. The project will also encourage contribution from communities. These will ensure financial sustainability.
67. The technical support that will be provided will help local lighting product manufacturers improve their capability in manufacturing quality EE lighting products. In addition, along with the upgraded national testing laboratory and the labeling program, the technical support provided will enhance the confidence of designers, investors and end-users to utilize local manufactured lighting products, thereby increasing the potentials of enlarging the local market for lighting products, which has been small due to the poor quality of local products and the high price of imported items. These will support a sustainable market.
68. Various efforts will be made to convince cities and towns to integrate public lighting into their development plans. Once integrated, public lighting will draw continuous attention from municipal authorities, contributing to sustainability. In addition, consultant service providers with upgraded capacity will become more active in linking cities and towns with manufacturers, contributing to an increased demand in efficient public lighting and facilitating a sustainable market for EE lighting products.

STAKEHOLDER PARTICIPATION AND IMPLEMENTATION ARRANGEMENTS

Stakeholders Participation

69. Consultations were made with a large number of stakeholders in formulating this project brief through workshops. These stakeholders represent a broad range of organizations from the government, NGOs and the private sector that are either actively or potentially involved in energy efficient public lighting in Vietnam.

Table 1: Stakeholders Role in VEEPL

Institution	Role in VEEPL
Vietnamese Academy of Science and Technology (VAST)	VAST is the Executing Agency of VEEPL and leads the Project Advisory Board and Technical Working Group. It will participate mainly in the technical support programs including: administering certification and labeling, transferring technology, upgrading laboratory and developing waste disposal program.
Ministry of Construction (MoC)	MoC is a member of Project Advisory Board and Technical Working Group. It will be responsible mainly for EE public lighting policy development program including activities of development of EE public lighting policy and regulations; updating lighting standards. It will partly participate in information dissemination program of the project thought activities of monitoring, evaluation and awarding; and establishment of the National PL Information System

Institution	Role in VEEPL
Ministry of Finance (MoF)	MoF is a member of Project Advisory Board and Technical Working Group. It will participate in the financing and demonstration programs particularly in activities concerning the development and application of EEPL financing policy/schemes and establishment of EC Fund.
Ministry of Science and Technology (MoST)	MoST is a member of Project Advisory Board and Technical Working Group. It will participate in technical support program including activities of development and issuing of EE lighting equipment standards, labeling and upgrading its testing facility.
Ministry of Industry (MoI)	MoI is a member of Project Advisory Board and Technical Working Group. It will participate in the technical support program particularly in activities related to coordinating the implementation of DSM and VEEPL projects in the field of lighting and supporting the local lighting manufacturers in improving their product quality.
Ministry of Natural Resources and Environment (MoNRE)	MoNRE is a member of Project Advisory Board and Technical Working Group. It is mainly responsible for Vietnam GEF operational focal point. It will participate in preparing and submitting Endorsement Letter to GEF NY and in monitoring and evaluation of the project implementation process
Ministry of Planning and Investment (MPI)	MPI is a member of Project Advisory Board and Technical Working Group. It is mainly responsible for the final appraisal of the project and submission to the GoV for implementation approval.
Ministry of Education and Training (MoET)	MoET will participate in some activities of the project technical support program such as technology transfer, EE lighting training and upgrading testing facilities. MoET will participate in developing lighting standards for schools.
Ministry of Health (MoH)	MoH will participate in the development of lighting standards and regulations for schools and hospitals.
VTV2	VTV2 will participate mainly in EE/EC and EE lighting information dissemination and awareness raising program.
Local Lighting Product Manufacturers	These manufacturers will participate in technology transfer activities of the project technical support program.
Local Governments	The host demonstration cities/towns will participate mainly in the implementation of EE lighting system demonstration program and the financing program.
Non-Government Organizations	NGOs will be involved in the public awareness campaign and information dissemination activities of the project. Potential NGOs include VSCPA and VULA,
Other related organizations	These organizations will participate in providing comments and consultation during the project implementation via workshops and consultation conferences.

IMPLEMENTATION ARRANGEMENT

70. An Advisory Board chaired by a VAST Vice President will be created. This will provide policy and technical advice to the project and will consist of representatives from the relevant

departments of MoC, MPI, MoST, MoI, MoF, MoNRE, GEF Focal Point and UNDP. The Board meets twice a year, one at the sixth month and the other at the end of each year, to discuss the progress of the project and provide future guidance. The meeting at the end of each year is the Tripartite Meeting (TPR).

71. The VAST is the designated executing agency for the proposed VEEPL Project. UNDP Vietnam and the UNDP-GEF Coordinator for Climate Change (Asia-Pacific) will undertake the GEF oversight for the project. VAST will be responsible to UNDP for the achievement of the project objectives, for all project reporting, including the submission of work plans and financial reports. As executing agency, VAST will ensure the delivery of the project outputs and the judicious use of the project resources. The project will be executed in accordance with UNDP National Execution (NEX) Procedures.
72. A Technical Working Group (TWG) will be established to provide overall guidance and approval of key program activities including fund commitments and co-financing arrangements. The TWG will consist of UNDP, VAST, senior representatives from the relevant departments of VAST, MoC, MPI, MoST, MoI, MoF, MoNRE, the public lighting companies, lighting R&D institutions and the lighting industry associations. The TWG will meet regularly during the project implementation.
73. VAST will create a Project Management Office (PMO) responsible for the overall operational and financial management and reporting of the UNDP-GEF funds in accordance with the rule and regulations for nationally executed project (Fig. 3). The PMO will manage day-to-day operations of the project, and will be based at the VAST. It will be comprised of a National Project Director (NPD), who works part-time for the project and will be appointed by the Government as in-kind contribution; a Project Manager, two National Experts (policy & technology and finance), two project assistants and an accountant. In addition, a number of subcontractors and international experts will support the PMO as and when needed to undertake the project activities.

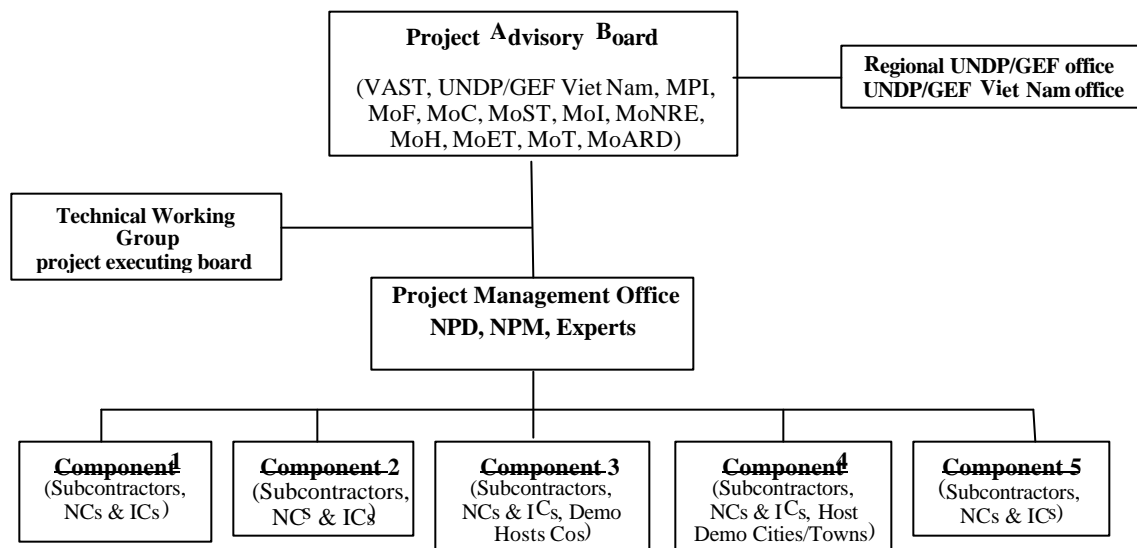


Fig 3: Proposed VEEPL Project Implementation Arrangement

74. The PMO will be responsible for the overall operational and financial management in accordance with financial rules and regulations imposed by UNDP/GEF for nationally executed projects. It will prepare quarterly progress reports, which are to be submitted to UNDP Vietnam. It will hold quarterly meetings with UNDP 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 Advisory Group at least two weeks before the annual TPR meeting. At the end of the project, the PMO produces the terminal report, which is to be submitted to the Advisory Group at least two weeks before the Terminal TPR meeting.
75. VEEPL has been developed to complement the WB/GEF DSM/EE and UNDP-GEF PECSME. There is no overlap among them. In Figure 3, MoI and MoST (the executing agencies of DSM/EE and PECSME) are present in the VEEPL Project Advisory Board and Technical Working Group. Hence, the coordination among the DSM/EE, PECSME and VEEPL will be accomplished easily via these Board and Group.
76. 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 2004. It will operate for a period of 5 years concluding on 31 July 2008. Annex D shows the tentative schedule of project activities. A detailed project implementation plan will be formulated after the GEF's approval of this Project Brief.

INCREMENTAL COSTS, PROJECT FINANCING AND SCHEDULE

77. The total estimated project cost is US\$ 15,318,000 (excluding PDF-B grant). In addition to the US\$ 3,000,000 GEF funding request, the GOV and the private sector will provide a total of US\$ 12,318,000. Contributions from government agencies amount to US\$ 1,408,000 (cash and in-kind contributions). Local lighting product manufacturers contribute US\$ 2,790,000, while local government units (cities/towns) will provide US\$ 8,120,000. The project budget distribution is as follows: US\$ 589,300 for enhancement of EEL policy development; US\$ 4,373,500 for institutional and technical support; US\$ 313,100 for public lighting project assistance; US\$ 8,887,600 for EE public lighting demonstrations; and US\$ 1,154,500 for consumer education and information dissemination.
78. The GEF contribution will be utilized for the provision of technical assistance in the various barrier removal activities (US\$ 3,000,000). The baseline contributions from the government agencies (VAST, MOC, IMS, HUT, IET, VTV2 and QUATEST1) are mainly that portion of their budgetary allocation for EC&EE specifically on lighting systems during the duration of the VEEPL implementation. This amounts to US\$ 600,000 cash and US\$ 808,000 in-kind contributions for a total of US\$ 1,408,000. The cash contribution of US\$ 600,000 is from VTV2 (government TV company), and is allocated for consumer education and information dissemination. The in-kind government contribution will be used for the review and updating of policies, standards and guidelines (US\$ 90,000), technical support program (US\$ 600,000), and project management (US\$ 118,000).
79. Other contributions from the government will come from several cities/towns that will host the EE public lighting system demonstrations. The baseline contributions (cash and in-kind) from these cities/towns are from their budget allocations for public lighting (i.e., new installations and upgrading of lighting systems in government buildings and streets).

80. Budget contribution from the private sector will be allocated to capacity building on the use, application and manufacturing of EE lighting systems and it amounts to US\$ 2,790,000. This does not include yet the expected investments by other manufacturers who are targeted to replicate manufacturing upgrades to produce of EEL products. Five local lighting product manufacturers: (1) lamp ballasts (Viettronics Dong Da and Vinakip); (2) lamp luminaries (Hapulico and Vietnam Schreder); and (3) lamps (Dien Quang Lamp) are contributing baseline funds (total of US\$ 2,790,000) for product research and improvement of production lines towards increase production of EEL systems.
81. The following table provides overall provisional costing for the implementation of the full project activities. This does not include the PDF-B costs (GEF + co-financing) of US\$ 374,900.

Table 2: Estimated Project Budget (US\$)

Components	Baseline	GEF	Total	% Share
1: Public lighting policy development	114,300	495,000	609,300	4.0
2: Public lighting technical support	3,416,500	957,000	4,373,500	28.6
3: Public lighting financing	13,100	300,000	313,100 ⁸	2.0
4: Public lighting system demonstration	8,147,600	720,000	8,867,600	57.9
5: Information dissemination and awareness raising	626,500	528,000	1,154,500	7.5
Total	12,318,000	3,000,000	15,318,000	100.0

82. The total GEF contribution is \$3,339,900 if the PDF-B funds are included. The project duration is 5 years. The proposed implementation schedule is included in Annex G.

MONITORING, EVALUATION AND DISSEMINATION

83. The project will be monitored and evaluated following UNDP-GEF rules and procedures. The Executing Agency will be required to prepare quarterly and annual work plans, budgets and progress reports and to submit to UNDP Vietnam. The Quarterly Progress Report (QPRs) would provide a brief summary of the status of input procurement and output delivery, explain variances from the work plan and present work plans for each successive quarter for review and endorsement. The QPRs will include financial statements and the work plan for the subsequent quarter. The PMO will also prepare and submit a combined annual project and project implementation review reports (APR/PIR) to UNDP. The APR/PIR report would provide a more in-depth summary of work-in-progress, measuring performance against both implementation and impact indicators. It will be submitted to the Advisory Board, which would gather at the annual TPR meeting to evaluate previous performances and provide guidance for coming activities. Any adjustments in project approach will be reported to the Advisory Board who will evaluate and approve the adjustments recommended. A terminal report would be completed prior to the completion of the project detailing achievements and lessons learned. The PMO is required to

⁸ This does not include the funds (US\$ 5 to 10 million) that will be secured for the ECF. Such funds are considered future leveraged co-financing, hence are not yet included in the financial plan of the proposed VEEPL project.

hold an annual TPR meeting, which invites the members of the Advisory Board and any other stakeholders to report the progress of the project towards the targets. The APR's must be submitted to the participants at least two weeks before the TPR.

84. The PMO will undertake continuous self-monitoring. The Project Framework Design (Annex B) states all the success indicators or objectively verifiable indicators for each activity that will be carried out under this project. These indicators are parameters that have to be monitored by the PMO under this project. The annual growth in the market share of EE lamps in the public sector, in particular, provides a clear indication of the realization of the project's purpose. As such, this is one parameter that has to be monitored and evaluated during the course of project implementation. Surveys will be conducted during the first quarter of the third year (mid-term) and the second quarter of the fifth year (final term) of the project to track the current status of the EEL market. The success indicators or objectively verifiable indicators for each objective and activity in the PFD will be monitored and evaluated during the course of project implementation. The extent by which the GEF developmental goal is achieved will be evaluated from the monitored results. The annual target values for the indicators will be agreed upon during project document finalization.
85. The project will be subject to three mandatory independent evaluations. The first evaluation will be conducted during the third quarter of year 2 followed by the second evaluation in the second quarter of year 4 and the final evaluation at the completion of the project. UNDP may at its discretion, schedule additional independent evaluations if deemed necessary. Upon completion of each evaluation, the PMO organizes an Advisory Group meeting to discuss the results of the evaluation and to determine ways to implement suggestions presented by the evaluation.
86. The project will coordinate with all the project partners, particularly those implementing parallel projects whose results feed in, or are integral parts, of the VEEPL project. The continuous monitoring and evaluation of the project sites, even after completion of the project period, will bring sustainability of the project with desired benefits in the long run. VAST will also carry out monitoring and evaluation of all the demonstration sites. The evaluation report will be uploaded to the project website for widespread dissemination.

List of Annexes

Annex A	Incremental Cost Analysis
Annex B	Project Planning Matrix (Log Frame)
Annex C	GEF Focal Point Endorsement Letter
Annex D	STAP Review & Response to STAP Review
Annex E	Barriers to the Widespread Adoption of Energy Efficient Public Lighting in Vietnam
Annex F	Greenhouse Gas Emissions Calculation For Baseline And Alternative Scenarios
Annex G	Project Schedule of Activities

Annex A

Incremental Cost Analysis

Broad Development Goals

1. The Vietnam Energy Efficient Public Lighting (VEEPL) project was conceived to improve the capacity of Vietnam to make policy, develop financial solutions, plan, design, develop and implement energy efficient (EE) public lighting projects in both urban and rural areas. VEEPL is in line with the poverty reduction and growth strategy and EC&E objectives of the Government of Vietnam for the next 10 years. It will not only contribute to economic growth and poverty reduction, but also help the national electric utility, Electricity Vietnam (EVN) to meet increasing demand for electricity from public utilities including public lighting.
2. This project seeks GEF's support to ensure that a cumulative GHG emissions reduction of about 568 kTons CO₂ from Vietnam's electricity sector by 2013 is realized through the utilization of EE lighting technology.

Baseline Activities

3. The baseline conditions for this project reflect what the Government of Vietnam (GOV) would do without GEF support. Under such conditions, the local governments (cities/towns) will still be using energy inefficient public lighting systems. Efforts to transform the lighting products market will remain hampered by several barriers/problems and issues that have persisted and will continuously prevent the widespread implementation of EE lighting technology in Vietnam. In a business-as-usual scenario, Vietnam would not be able to effectively promote EE lighting in the public sector despite a number of ongoing and planned related EC&EE activities of some government agencies, some of which are supported by international lending institutions such as the ADB and the WB.
4. The GOV recognizes the advantages of utilizing EE lighting technology to reduce electricity consumption, and at same time is aware of the environmental benefits that result from the use of such climate-friendly technology. Some of the ongoing and soon to be implemented activities of government institutions (e.g., VAST, MoC, MoI, MoST, MARD), private companies (e.g., HAPULICO), and international lending institutions (e.g., ADB, WB) could complement and support the activities of the proposed VEEPL project. These ongoing and planned baseline activities are estimated to collectively cost about US\$ 12,318,000.

Global Environment Objectives

5. The global environment objective of the VEEPL Project is the reduction of the annual growth rate of GHG emissions from the country's electricity sector through the removal of the persistent barriers to the development and widespread applications of EE lighting technology in public lighting systems. The proposed project's main strategy is to enhance the capacity of the relevant stakeholders in the public lighting area in Vietnam in removing persistent policy, institutional, financial, information and technical barriers to EE lighting technology development. As this capacity building will be carried out in a sustainable manner, the country would be able to address effectively the barrier removal tasks and mitigate the recurrence of such barriers in the future. The Project has been designed to be consistent with GEF Operational #5 on "Removal Of Barriers To Energy Efficiency And Energy Conservation".

GEF Alternative

6. There have been studies and technology focused demonstration projects that were carried out in the country and lessons learned from these have pointed out the need to address the national institutional, financial and technical capacity building in public lighting sector as an effective way of enhancing the development and widespread application of EE lighting technology. The private sector has expressed interest in advancing the development of EE lighting projects. Because barriers exist, the large saving potential of EE lighting systems may not be realized. Currently important policies on public lighting such as the electricity tariff, financial investment, that will encourage people to make use the EE lighting technology, are non - existent. The GEF support for the proposed initiative will be instrumental in assisting Vietnam to develop and nation wide apply EE lighting technology. Total cost of the proposed GEF alternative, which is the VEEPL project, is US\$ 15,318,000. Of this, the GEF is requested to provide US\$ 3,000,000 as the incremental cost required to remove barriers to the development and application of EE lighting technology in the country.
7. Given the steady pace of technological development in public lighting, many developing countries offer potentially attractive commercial investments in public lighting efficiency improvements. However, these opportunities often remain unexploited due to the types of persistent barriers to energy efficient lighting (EEL) technology development and applications in Vietnam as described in Annex E. As shown in Table A2, the estimated internal rate of return (IRR) of the collective EEL initiatives identified in the public sector is 150%. Considering the associated barrier removal activities that will be carried out under the VEEPL, the IRR is 124%. The fact that an opportunity with this level of IRR has not been yet realized underlines the strength of the existing barriers to EEL in Vietnam's public sector. It is expected that once these barriers are removed, the EEL initiatives promoted under the VEEPL will be essentially "self-replicating" as commercial interests on EEL in public lighting are enhanced.
8. The proposed VEEPL Project is comprised of five (5) components that will address persistent barriers to EEL in the public sector in Vietnam in an integrated manner. The first component will address the remaining policy/regulatory and institutional barriers to EE lighting technology development. The second component will provide technical assistance to local stakeholders and help build their capacity to design, operate, maintain and manage EE lighting standard and national testing laboratory upgrading as well as in developing and implementing of the technology transfer program for local product manufacturers. The third component will involve the design and implementation of appropriate financing schemes to facilitate development and application of EE lighting projects. The fourth component is a demonstration program that will involve the showcasing of technical and economic feasible reality of the proposed projects including the financing schemes. The last component will address the information and advocacy problems/issues of EE lighting technology development and application.

Component 1: Public Lighting Policy Development

9. This project component will involve activities intended to enhance the capacity of the stakeholders (e.g., government policy makers) in coming up with appropriate, proactive and integrated plans and policies that will facilitate the conducive climate for EE lighting development in the country. This project component will involve the implementation of incremental activities that will enhance the capability of government and corporate decision

makers in coming up with policies and plans that will promote EE lighting, (development and utilization). This additional public lighting policy and planning capacity enhancement activities of the VEEPL Project will cost US\$ 495,000 to implement. This budget is in addition to the cost involved in the implementation of the usual activities that are carried out in the area of public lighting planning and policy making in the country, which is characterized by, among others, lacking of government policy and accompanying implementing rules and regulations on the utilization of EE public lighting systems and limited capability of the local government in making integration of public lighting plans into development planning. The budget for these usual planning and policy -making activities in the country (baseline cost) amounts to US\$ 114,300. The total cost of this project component is US\$ 609,300.

Component 2: Public Lighting Technical Support Program

10. Presently and as projected in the next 5 years, the utilization of EE public lighting systems in the country will remain much to be desired. Although there is a recognized need to implement the EE lighting technology for reducing of the energy consumption and environment protection, there is no such EE lighting standards as well as product quality testing measures at the industry level. Local lighting system manufacturers, developers, suppliers, managers will still carry out activities to somehow improve their products and services, but these have to be supplemented with EE lighting technology extension/support programs. Under this project component, technical support will be provided to the public lighting industry to improve product and system quality and efficiency. The total estimated cost for such incremental improvements and technical support is US\$ 957,000. The budget allocation for the parallel projects on product quality and equipment manufacturing technology enhancement for the next 5 years that will be carried out by the private sector partners (local lighting product manufacturers) of the VEEPL is considered as part of the baseline cost for this component. The baseline cost for this component is estimated at US\$ 3,416,500. The improvements in local lighting system manufacturing that will be supported under this component are based on findings from the PDF-B exercise. The total cost of this project component is US\$ 4,373,500.

Component 3: Public Lighting Financing Program

11. This program will address the barriers that prevent the implementation of viable public lighting projects. This component will involve activities that would assist and facilitate the establishment of an energy conservation fund, which SIDA (and possibly other donor agencies) will be funding to provide loans to eligible applications including: (1) large end-users (public lighting contractors and companies, hotels, hospitals, schools and garment-textile companies; (2) local manufacturers who can produce EE lighting products; (3) High volume importers of EE lighting products; and, (4) lighting engineering companies as well as energy service companies who can provide energy efficient lighting products for their customers.
12. The VEEPL will help set up an energy conservation fund (ECF), which will support the investments for EC&EE projects such as those on EE public lighting system and production of EE lighting products. Under this project component, energy service companies, public lighting companies and project consultants trained by the VEEPL will be assisted in developing and designing bankable projects on public lighting that would comply with the requirements of the relevant funding agency (e.g., the EC Fund that will be funded by SIDA). Training will be provided for staff of commercial banks and of the EC fund in order to facilitate them in evaluating bankable projects for efficient lighting. In the baseline scenario, the GOV will

continue to develop and implement public lighting projects with a “new installation and replacement of equipment”. In the proposed alternative scenario, the GOV will be carrying out an EE lighting system demonstration program that will integrate planned public lighting projects to showcase the design, development, and facilitation of the implementation of sustainable EE public lighting projects. The financing schemes that will be created will be used to support the design, implementation and sustainable operation of EE public lighting projects. The baseline cost for the program comes up to US\$ 13,100. The GEF portion, which will be for the required technical assistance is US\$ 300,000. The total cost of this project component is US\$ 313,100. Note that the monies for the ECF are not included in the budget for Component 3. This is considered future leveraged co-financing, hence are not yet included in the financial plan of the proposed VEEPL project.

Component 4: Public Lighting System Demonstration Program

13. This project component will address the barriers concerning the lack of knowledge on energy efficiency and energy conservation techniques and technologies as well as the limitation of demonstration program in the field of energy in general, and public lighting, in particular. The demonstration program will allow checking the techno-economic viability, design, development, financing and sustainable operation and maintenance of EE public lighting systems. In the baseline scenario all activities of upgrading and improving the lighting system are as usual, mainly using IE lighting equipment; investment in public lighting systems is very small and there is no financial resource mobilization except the local budget. This project component will involve the implementation of incremental activities that will improve the awareness of the public lighting managers of all levels from central to the local and community on the EE lighting technology and products as well as EC&E in public lighting from designing to implementing, operating and maintaining the lighting system. The estimated 5-year cost for baseline activities for this project component amounts to US\$ 8,147,600. The estimated incremental cost is US\$ 720,000. This project component will cost US\$ 8,867,600 to implement.

Component 5: Information Dissemination and Awareness Raising

14. The present public lighting information and promotion activities in the country are non-coordinated and information and data concerning to public lighting lie in many different agencies in unorganized formats that are not readily useful. The VEEPL Project will be carried out on the base of these ongoing activities. The budget for these baseline information and promotion activities in the 5 years is about US\$ 626,500, and this project component will involve additional activities that will enhance such baseline activities. The additional activities, which require US\$ 528,000 to implement under this component will, among others promote increased awareness and interest among investors and developers in both private and public sectors to undertake EE lighting projects. The project component cost is US\$ 1,154,500.

Incremental Cost Matrix and Project Indicative Budget

15. Table A-1 shows the incremental cost matrix. The baseline and alternative courses are presented together with the costs of achieving them.
16. The indicative budget for each project component is as follows:

Components	Baseline	GEF	Total	% Share
1: Public lighting policy development	114,300	495,000	609,300	4.0
2: Public lighting technical support	3,416,500	957,000	4,373,500	28.6
3: Public lighting financing	13,100	300,000	313,100	2.0
4: Public lighting system demonstration	8,147,600	720,000	8,867,600	57.9
5: Information dissemination and awareness raising	626,500	528,000	1,154,500	7.5
Total	12,318,000	3,000,000	15,318,000	100.0

17. The following shows the breakdown of the baseline cost contributors for the full project (i.e., excluding US\$ 65,000 co-financing for the PDF-B exercise):

Baseline Contributors	Amount, US\$		Total
	Cash	In-Kind	
Government Agencies			
VAST	--	118,000	118,000
MOC	--	90,000	90,000
IMS	--	250,000	250,000
HUT	--	130,000	130,000
IET	--	100,000	100,000
VTV-2	600,000	--	600,000
QUATEST1	--	120,000	120,000
Local Governments (Cities/Towns)			
Ho Chi Minh City	6,829,000	--	6,829,000
Quy Nhon	300,000	--	300,000
Hue	140,000	--	140,000
Vinh	60,000	--	60,000
Ha Tinh	200,000	--	200,000
Tuy Hoa	40,000	--	40,000
Quang Ngai	--	551,000	551,000
Private Sector (Lighting Product Manufacturers)			
Hapulico Co.	600,000	50,000	650,000
Vietnam Schreder Co.	600,000	40,000	640,000
Vietronics Dong Da Co.	600,000	--	600,000
Dien Quang Lamp Co.	600,000	--	600,000
Vinakip Co.	300,000	--	300,000
TOTAL	10,869,000	1,149,000	12,318,000

18. The following shows the distribution of the baseline costs for the full project by component:

Fund Contributors	Type	Components				
		1	2	3	4	5
VAST	Cash	--	--	--	--	--
	In-Kind	24,300	26,500	13,100	27,600	26,500

Fund Contributors	Type	Components				
		1	2	3	4	5
MOC	Cash	--	--	--	--	--
	In-Kind	90,000	--	--	--	--
IMS	Cash	--	--	--	--	--
	In-Kind	--	250,000	--	--	--
HUT	Cash	--	--	--	--	--
	In-Kind	--	130,000	--	--	--
IET	Cash	--	--	--	--	--
	In-Kind	--	100,000	--	--	--
VTV-2	Cash	--	--	--	---	600,000
	In-Kind	--	--	--	--	--
QUATEST-1	Cash	--	--	--	--	--
	In-Kind	--	120,000	--	--	--
Total GOV Agencies		114,300	626,500	13,100	27,600	626,500
Ho Chi Minh City	Cash	--	--	--	6,829,000	--
	In-Kind	--	--	--	--	--
Quy Nhon	Cash	--	--	--	300,000	--
	In-Kind	--	--	--	--	--
Hue	Cash	--	--	--	140,000	--
	In-Kind	--	--	--	--	--
Vinh	Cash	--	--	--	60,000	--
	In-Kind	--	--	--	--	--
Ha Tinh	Cash	--	--	--	200,000	--
	In-Kind	--	--	--	--	--
Tuy Hoa	Cash	--	--	--	40,000	--
	In-Kind	--	--	--	--	--
Quang Ngai	Cash	--	--	--	--	--
	In-Kind	--	--	--	551,000	--
Total Local Governments		--	--	--	8,120,000	--
Hapulico Co.	Cash	--	600,000	--	--	--
	In-Kind	--	50,000	--	--	--
Vietnam Schreder Co.	Cash	--	600,000	--	--	--
	In-Kind	--	40,000	--	--	--
Vietronics Dong Da Co.	Cash	--	600,000	--	--	--
	In-Kind	--	--	--	--	--
Dien Quang Lamp Co.	Cash	--	600,000	--	--	--
	In-Kind	--	--	--	--	--
Vinakip Co.	Cash	--	--	--	--	--
	In-Kind	--	300,000	--	--	--
Total Lighting Product Manufacturers		--	2,790,000	--	--	--
TOTAL		114,300	3,416,500	13,100	8,147,600	626,500

Table A1: Incremental Cost Matrix

Components	Baseline	Alternative	Incremental
<p>Component 1: Public lighting policy development</p>	<p>Business-as-Usual:</p> <p>No energy efficient (EE) public lighting policies formulation and implementation; guidelines, efficiency standards on lighting energy use are limited and although slowly progressing with respect to variety of emerging EE lighting products available in the market.</p>	<p>Proposed Situation:</p> <p>Policies and guidelines are in-place or updated to enhance promotion and use of EE lighting in the public sector.</p>	<p>Additional Features:</p> <p>Comprehensive national policy study and declaration of a national policy on public lighting to come up with a lighting; development and enforcement of public lighting regulations, and integration of public lighting into local development planning.</p>
	<p>Domestic Benefits:</p> <p>EE lighting systems in the public sector will make some gains.</p>	<p>Domestic Benefits:</p> <p>Increased use of EE lighting systems leading to energy savings and decrease in power generating capacities from fossil fuel.</p>	<p>Domestic Benefits:</p> <p>Public sector in local governments becomes pro-active in EE lighting standards development and in EE lighting use and application.</p>
	<p>Global Benefits:</p> <p>None.</p>	<p>Global Benefits:</p> <p>Vietnam develops a strong national profile on EE lighting product utilization.</p>	<p>Global Benefits:</p> <p>Reduced GHG emissions.</p>
	<p>Cost: US\$ 114,300</p>	<p>Costs: US\$ 589,300 (Baseline Cost + Incremental Cost)</p>	<p>Cost: US\$ 475,000</p>

Components	Baseline	Alternative	Incremental
Component 2: Public lighting technical support	<p>Business-as-Usual:</p> <p>Lighting product testing capabilities are inadequate; no monitoring of EE lighting products in the market as to their compliance to product standards; Local manufacturers continue to produce less efficient ballasts and fixtures due to uncompetitive and imperfect market conditions.</p>	<p>Proposed Situation:</p> <p>Upgraded capacity for lighting product testing. Consumers are informed on the status of EE lighting products in the market - compliance to standards and their proper application.</p> <p>Local lighting manufacturers are given support to design, manufacture and sell affordable EE lighting products program</p>	<p>Additional Features:</p> <p>Technical capacity building for lighting energy standards and labeling, as well as on EE design, operation and maintenance of lighting systems; monitoring of lighting products quality; provision of technical assistance to the local lighting manufacturers; upgrade of national lighting product testing capabilities; and development of a sustainable lighting research and development program</p>
	<p>Domestic Benefits:</p> <p>Moderate use of EE lighting products with poor application and limited demand for local EE lighting products.</p>	<p>Domestic Benefits:</p> <p>Expertise on EE lighting systems application is developed. Increased cost and energy savings from proper use of EE lighting in the public sector, leading to widespread utilization thus more energy savings. Reduction of other pollutant emissions due to reduced use of fossil fuel.</p>	<p>Domestic Benefits:</p> <p>Timely and effective testing of EE lighting products. Increased use of EE lighting products.</p>
	<p>Global Benefits:</p> <p>GHG emissions reduce marginally.</p>	<p>Global Benefits:</p> <p>Improved competency can be transferred internationally.</p>	<p>Global Benefits:</p> <p>GHG emission reduction</p>

Components	Baseline	Alternative	Incremental
	Cost: US\$ 3,416,500	Costs: US\$ 4,373,500 (Baseline Cost + Incremental Cost)	Cost: US\$ 957,000
Component 3: Public lighting financing	Business-as-Usual Non-sustainable financial support for EC&EE projects (e.g., EE lighting) from the government. Limited financing from the financial sector for EC&EE projects	Proposed Situation: Innovative financing schemes are available from financing institutions and energy service companies Gain support of local development banks and multilateral and bilateral development assistance groups	Additional Features: Promotion of EE lighting to financial sector; technical capacity building on EE lighting for financial sector; development of innovative financing schemes for EE lighting projects; and implementation of appropriate financing schemes.
	Domestic Benefits: Limited EE lighting financing opportunities are available.	Domestic Benefits: Improved capacity to buy EE lighting products by the public sector.	Domestic Benefits: Development and promotion of innovative financing schemes for EE lighting projects
	Global Benefits: None	Global Benefits: Creation of investment opportunities.	Global Benefits: Reduced GHG emissions.
	Cost: US\$ 13,100	Cost: US\$ 313,100 (Baseline Cost + Incremental Cost)	Cost: US\$ 300,000
Component 4: Public lighting system demonstration	Business-as-Usual: Limited upgrade of public lighting systems; EE lighting systems not used in public lighting for lack of sample projects	Proposed Situation: Selected cities/towns carry out public lighting system upgrades using EE lighting; Information on these upgrades are used as bases for similar projects in other cities/towns	Additional Features: Design and implementation of demonstration schemes on energy efficient public lighting systems in streets, schools and hospitals in selected cities/towns

Components	Baseline	Alternative	Incremental
	<p>Domestic Benefits:</p> <p>Marginal, aside from the usual safety and convenience from the maintenance/upgrade of lighting systems.</p>	<p>Domestic Benefits:</p> <p>Better and energy conserving public lighting systems installed in selected cities/towns</p>	<p>Domestic Benefits:</p> <p>Demonstration of the application and benefits of EE lighting systems in the public sector. Energy savings in public lighting</p>
	<p>Global Benefits:</p> <p>None</p>	<p>Global Benefits:</p> <p>Promotion of the energy-saving and GHG emissions reduction benefits of EE lighting systems</p>	<p>Global Benefits:</p> <p>Reduced GHG emissions</p>
	<p>Cost: US\$ 8,147,600</p>	<p>Costs: US\$ 8,887,600 (Baseline Cost + Incremental Cost)</p>	<p>Cost: US\$ 740,000</p>
<p>Component 5: Information dissemination and awareness raising</p>	<p>Business-as-Usual:</p> <p>The government provides information on EE lighting as part of its support to the application of energy efficient technologies and energy efficiency industries through the ECCs and its ongoing EC&EE programs.</p>	<p>Proposed Situation:</p> <p>Enhanced EE lighting system information gathering and dissemination to local governments and support to the local lighting service industry</p>	<p>Additional Features:</p> <p>Establishment of a public lighting data facility; VEEPL identify and branding; capacity building in the local lighting engineering and consultancy service industry; public lighting performance rating and recognition; and, establishment of a public lighting information center (PLIC)</p>

Components	Baseline	Alternative	Incremental
	<p>Domestic Benefits:</p> <p>Relevant government agencies (e.g., VAST, ECCs) continue limited promotion of EE lighting with other EC&EE programs. Information on EE lighting is collected independently by interested parties and will be hard to access.</p>	<p>Domestic Benefits:</p> <p>Effective information delivery system established in the local governments and local lighting manufacturing and service industries.</p>	<p>Domestic Benefits:</p> <p>Readily available information on EE lighting. Regular monitoring of lighting energy consumption in the public sector.</p>
	<p>Global Benefits:</p> <p>None</p>	<p>Global Benefits:</p> <p>Access to investment and development information</p>	<p>Global Benefits:</p> <p>GHG emission reduction</p>
	<p>Cost: US\$ 626,500</p>	<p>Costs: US\$ 1,154,500 (Baseline Cost + Incremental Cost)</p>	<p>Cost: US\$ 528,000</p>
TOTAL COST	US\$ 12,318,000	US\$ 15,318,000	US\$ 3,000,000

Table A-2

ENERGY EFFICIENT LIGHTING IN THE PUBLIC SECTOR												
ECONOMIC FEASIBILITY ANALYSIS												
Electricity Cost = \$0.03/kWh @ 50% of EVN tariff for electricity for street lighting												
Average T&D Losses = 14.5%												
Value of avoided GHG emissions = \$ 3.00/ton CO ₂ e												
Cost of generating capacity avoided through efficient public lighting = \$ 573/kW												
Total Cost of GOV interventions on energy efficient public lighting = \$ 1.408 million												
Total Cost of Private Sector and Local Government interventions on energy efficient public lighting = \$ 10.910 million												
Total Cost of GEF-funded barrier removal activities to facilitate EE public lighting = \$ 3.000 million												
CASE A: EE Lighting Initiatives in the Public Sector (No Barriers)												
Year	Project Costs GoV	Project Costs Co-Funding	GWh savings	kW savings	GHG savings (kTon CO ₂)	Value of kWh Savings	Value of kW demand savings	Value of avoided GHG emissions	Costs	Benefits	Difference	
2005	\$281,600	\$1,091,000	0	0	0	\$0	\$0	\$0	\$1,372,600	\$0	-\$1,372,600	
2006	\$281,600	\$1,091,000	8.4	136	4.2	\$275,088	\$77,928	\$12,600	\$1,372,600	\$365,616	-\$1,006,984	
2007	\$281,600	\$1,091,000	17.1	4,270	8.5	\$560,000	\$2,446,710	\$25,500	\$1,372,600	\$3,032,210	\$1,659,610	
2008	\$281,600	\$1,091,000	54.6	14,698	27	\$1,788,070	\$8,421,954	\$81,000	\$1,372,600	\$10,291,024	\$8,918,424	
2009	\$281,600	\$1,091,000	94.1	25,758	46.5	\$3,081,637	\$14,759,334	\$139,500	\$1,372,600	\$17,980,471	\$16,607,871	
2010	\$0	\$1,091,000	135.9	37,511	67.2	\$4,450,526	\$21,493,803	\$201,600	\$1,091,000	\$26,145,929	\$25,054,929	
2011	\$0	\$1,091,000	180.3	50,025	89.2	\$5,904,561	\$28,664,325	\$267,600	\$1,091,000	\$34,836,486	\$33,745,486	
2012	\$0	\$1,091,000	227.9	63,467	112.7	\$7,463,392	\$36,366,591	\$338,100	\$1,091,000	\$44,168,083	\$43,077,083	
2013	\$0	\$1,091,000	278.5	77,822	137.7	\$9,120,468	\$44,592,006	\$413,100	\$1,091,000	\$54,125,574	\$53,034,574	
2014	\$0	\$1,091,000	323.7	90,972	160	\$10,600,702	\$52,126,956	\$480,000	\$1,091,000	\$63,207,658	\$62,116,658	
										Internal Rate of Return	150%	
CASE B: EE Lighting Initiatives in the Public Sector + Barrier Removal Activities												
Year	Project Costs GEF	Project Costs GoV	Project Costs Co-Funding	GWh savings	kW savings	GHG savings (kTon CO ₂)	Value of kWh Savings	Value of kW demand savings	Value of avoided GHG emissions	Costs	Benefits	Difference
2005	\$375,000	\$281,600	\$1,091,000	0	0	0	\$0	\$0	\$0	\$1,747,600	\$0	-\$1,747,600
2006	\$750,000	\$281,600	\$1,091,000	8.4	136	4.2	\$275,088	\$77,928	\$12,600	\$2,122,600	\$365,616	-\$1,756,984
2007	\$750,000	\$281,600	\$1,091,000	17.1	4,270	8.5	\$560,000	\$2,446,710	\$25,500	\$2,122,600	\$3,032,210	\$909,610
2008	\$750,000	\$281,600	\$1,091,000	54.6	14,698	27	\$1,788,070	\$8,421,954	\$81,000	\$2,122,600	\$10,291,024	\$8,168,424
2009	\$375,000	\$281,600	\$1,091,000	94.1	25,758	46.5	\$3,081,637	\$14,759,334	\$139,500	\$1,747,600	\$17,980,471	\$16,232,871
2010	\$0	\$0	\$1,091,000	135.9	37,511	67.2	\$4,450,526	\$21,493,803	\$201,600	\$1,091,000	\$26,145,929	\$25,054,929
2011	\$0	\$0	\$1,091,000	180.3	50,025	89.2	\$5,904,561	\$28,664,325	\$267,600	\$1,091,000	\$34,836,486	\$33,745,486
2012	\$0	\$0	\$1,091,000	227.9	63,467	112.7	\$7,463,392	\$36,366,591	\$338,100	\$1,091,000	\$44,168,083	\$43,077,083
2013	\$0	\$0	\$1,091,000	278.5	77,822	137.7	\$9,120,468	\$44,592,006	\$413,100	\$1,091,000	\$54,125,574	\$53,034,574
2014	\$0	\$0	\$1,091,000	323.7	90,972	160	\$10,600,702	\$52,126,956	\$480,000	\$1,091,000	\$63,207,658	\$62,116,658
										Internal Rate of Return	124%	

Economic Feasibility Analysis

The analysis of the cost and benefits of energy efficient lighting (EEL) initiatives consider, among others, the avoided cost for electricity generation in Vietnam, the avoided cost of energy (electricity) saved from the utilization of EEL systems in public lighting, and cost of avoided GHG emissions.

Because electricity demand in Vietnam is currently at the limits of available capacity, we assume that the avoided cost of capacity is the cost of the installation of new generation. Commonly quoted figures for the cost of new generation capacity in Vietnam are as follows:

Hydro Power Plants	US\$~ 1,000/KW
Coal Fired Thermal Power Plants	US\$~ 800 – 900/KW
Gas Turbine Power Plants	US\$~ 300-600/KW.

For the purposes of estimating avoided costs, lower assumptions for the cost of new generation yield more conservative results. It is assumed that electricity savings generated from the use of EEL in public lighting, as facilitated due to the VEEPL project would replace primarily gas turbine plants operating at system peak in the early evening.

The estimated avoided energy costs (including transmission and distribution) are based on the mix of fuels used for electricity generation in Vietnam, and is assumed to be roughly 50% of the tariff. The current Electricite' du Vietnam (EVN) tariff for public lighting is US\$ 0.056/kWh. Although it is known that this tariff currently reflects some degree of subsidization, a lower avoided cost assumption yields a more conservative estimate of the internal rate of return (IRR).

As shown in Table A2, assuming there are no barriers to remove/eliminate in the EEL technology development and utilization, the IRR of the collective EEL initiatives identified in the VEEPL project is 150%. Considering the barrier removal activities as proposed in the VEEPL, the estimated IRR is 124%. The fact that an opportunity with this level of IRR has not been yet realized underlines the influence of the existing barriers to EE public lighting in Vietnam.

Annex B
Project Planning Matrix (Log Frame)

Objectives	Indicators & Targets	Means of Verification	Critical Assumptions
Project Goal:			
Reduction of greenhouse gas (GHG) emissions from fossil fuel-based power generation in Vietnam	Cumulative GHG emissions reduction equivalent to 568 kTons of CO ₂ by year 2013 ⁹ .	Summary evaluation reports of the lighting energy consumption reports submitted by cities/towns to MoC.	Cities/towns comply with rules and regulations on the periodic lighting energy consumption reporting.
Project Purpose:			
Improvement of lighting energy utilization efficiency through the removal of barriers to the widespread application of energy efficient lighting systems in the public sector in Vietnam	Annual lighting energy savings of 324 GWh by year 2013 ¹⁰ .	* Lighting electricity bills of cities/towns as reported in the lighting energy consumption reports * Reports on energy auditing in public lighting	Lighting companies will be able to make the lighting electricity consumption reports of cities/ towns.
	Average overall 20 % improvement in the efficiency of public lighting systems in 86 cities/towns by 2013.	* Summary evaluation reports of the lighting energy consumption reports submitted by cities/towns to MoC * Reports on energy auditing in public lighting * Annual reports from lighting companies	* Cities/towns comply with rules and regulations on the periodic lighting energy consumption reporting * Cities/towns can get moneys from different sources for improving their public lighting systems.
Project Outcomes and Activities:			
Component No. 1. Public Lighting Policy Development			

⁹ Average CO₂ emissions reduction is about 99 kTons per year (2009-2013). Emission factor is 0.43 kg CO₂/kWh, which is a pro-rated average based on the power generation mix in the country.

¹⁰ Average annual lighting energy savings of about 229 GWh per year (2009-2013)

Objectives		Indicators & Targets	Means of Verification	Critical Assumptions
1. Strengthened and improved policy and regulatory framework to encourage feasible EE public lighting projects.		Government policy and accompanying implementing rules and regulations on the utilization of EE public lighting systems is established by the end of the project	National Lighting Advisory Committee, Documentations of the public lighting policy; opportunities for energy efficiency improvements in public lighting; economic and technical tools to support rational public lighting investments; public lighting regulations development and enforcement; Public lighting plans in city/town development plans; Revised Public Lighting Policy;	The GOV implements all activities relevant to EE public lighting technology development and geared towards the achievement of the country's EC&EE objectives
1.1	Create National Lighting Advisory Committee	An operational national lighting advisory committee that would work on the promotion of widespread utilization and commercialization of EE lighting systems is established starting Year 1.	Minutes of meeting, list of participants who have agreed to join as members	Lighting stakeholders in Vietnam will be interested in joining such a group and will be willing to put some time and energy into it.
1.2	Comprehensive policy study on public lighting	Findings of policy reviews and proposals regarding public lighting policies completed and submitted to MoC, MoF by start of Year 2 Recommendations of study report are used in public lighting policy making starting mid-Year 2.	Study report Documentation of policies formulated and enforced	State agencies involved in public lighting work support the study and will seriously consider the proposals for the EC&EE in public lighting and other related issues.
1.3	Evaluation of opportunities for energy efficiency improvements in public lighting	At least 5 design of new or expanded EE public lighting systems projected completed each year starting Year 2 At least 3 EE public lighting projects developed are financed and implemented each year starting Year 3	Documentation of proposed projects Documentation of implemented projects	Local government units and the private sector are interested and committed to develop and implement EE public lighting projects.

Objectives		Indicators & Targets	Means of Verification	Critical Assumptions
1.4	Develop economic and technical tools to support rational public lighting investments	<p>“Energy Efficient Public Lighting in Vietnam” resource book published in Year 2.</p> <p>A total of at least 5 technical personnel from at least 8 cities and towns trained on the use of the resource book by end Year 2.</p> <p>At least 10 cities/towns are utilizing the resource book in their public lighting programs starting Year 3.</p>	<p>Published resource book</p> <p>Registrations at training courses Training course materials</p> <p>Designs of public lighting programs of cities based on the resource book</p>	Local government units and the private sector are interested and committed to develop and implement EE public lighting projects.
1.5	Public lighting regulations development and enforcement	<p>Public lighting implementing rules and regulations (IRR) completed by start of Year 2</p> <p>Consultation meetings on IRR effective enforcement with relevant stakeholders and legislators conducted by end Year 2</p> <p>Approval and enforcement of IRR by mid-Year 3</p>	<p>Documentation of IRR design</p> <p>Minutes of consultation meetings</p> <p>Official approved documentation of the IRR</p>	The relevant government agencies will support the development of IRR for the public lighting policy
1.6	Integration of public lighting plans in city/town development planning	<p>Capacity building on integration of public lighting plans in city/town development planning completed by end Year 2</p> <p>15 cities/towns integrate public lighting plans into the city/town development planning by the end of Year 3</p>	<p>Documentation of evaluation report and recommendations</p> <p>List of the cities/towns having integrated public lighting development plans Documentation of the integrated public lighting development plans</p>	<p>* The relevant government agencies and local authorities support the study and seriously consider the proposals</p> <p>* The relevant local government institutions will be able to integrate the plans</p>

Objectives		Indicators & Targets	Means of Verification	Critical Assumptions
1.7	Develop Local Public lighting Policy	<p>At least 10 proposals of new public lighting policy developed by Year 1</p> <p>Consultation meetings with relevant stakeholders and legislative members conducted by the end Year 2</p> <p>Evaluation of the proposed public lighting policy including their impacts to other related EC&EE policies of the country given by the end Year 1 and every year thereafter</p> <p>Relevant revisions on public lighting policy are made and submitted to MoC and MoF for approval by beginning Year 3</p>	<p>Documentation of proposed public lighting policy</p> <p>Minutes of consultation meetings</p> <p>Evaluation report</p> <p>Documentation of revised policies</p>	The government agencies will pay more attention to public lighting development of the country
1.8	Public lighting regulations monitoring and evaluation	<p>Findings of the reports on regulation enforcement of the cities/towns completed by the end Year 2</p> <p>Evaluation of regulation enforcement and recommendations on the regulation revisions completed by mid-Year 3</p> <p>80% relevant stakeholders complying the IRR by the end of Year 3</p>	<p>Documentation of reports on regulation enforcement</p> <p>Documentation of regulation impact analysis and recommendations for revisions/ modifications.</p> <p>Results of survey of stakeholders.</p>	<p>* Public lighting regulation impact assessment is a regular activity of the MoC</p> <p>* The relevant state agencies will seriously consider the evaluation and recommendations</p>
1.9	Review of Public Lighting Policy	<p>Findings of policy review and evaluation and recommendations on policy revisions completed by end Year 4.</p> <p>Revised EE public lighting policy approved by MoC/MoF by mid Year5</p>	<p>Documentation of the review and evaluation report, and proposed recommendations.</p> <p>Documentation of revised policy and policy implementing guidelines.</p>	Impact analysis of public lighting policy (policy review) is a regular activity of the state relevant agencies and public lighting units

Objectives		Indicators & Targets	Means of Verification	Critical Assumptions
Component No. 2: Public Lighting Technical Support Program				
2. Established potentials and requirements for the application of EE public lighting systems, as well as the support provisions for such initiatives.		<p>Assessment of the needs and potentials for EE public lighting system applications are completed and provisions for support are in place by MoC by the end of the project.</p> <p>Local lighting product manufacturers and suppliers commit 5% of their gross revenues each year to support EE public lighting technology development starting Year 3.</p>	<p>Lighting energy standards, Documentation of technical assistance Vietnamese lighting manufacturers; networking with international lighting industry, Upgraded national lighting testing facility; Technical capacity building for local lighting system service providers; Operational public lighting technical development program; Documentation of the financing scheme support the follow up program,</p>	<p>The MoC and local lighting product manufacturers and suppliers are interested in developing the local lighting services and consultancy industry, including the manufacture of EE lighting system equipment and components for domestic consumption or even for the export market.</p>
2.1	Technical capacity building on lighting energy standards	Upgrading 4 lighting standards for streets, hospitals, schools and post - offices completed and issued by MoC by the end Year 1	Documentation of published standards	The MoC supports the upgrading and will be able to fulfill this task
2.2	Provision of technical assistance to Vietnamese lighting manufacturers	<p>A group of experts on technology transfer established by Year 2.</p> <p>Designs of EE lighting products completed and transferred to manufacturers by Year 3.</p> <p>A training courses on product quality testing for manufacturers conducted by early Year 3.</p> <p>EE lighting products manufactured and sold starting Year 3 and every year thereafter</p>	<p>Documentation of technology transfer program.</p> <p>Documentation of designs.</p> <p>Materials of training courses.</p> <p>Sales data of EE lighting products manufactured and sold</p>	<p>The local lighting product manufacturers support the program, and willing to invest in manufacturing new products</p>

Objectives		Indicators & Targets	Means of Verification	Critical Assumptions
2.3	EEL Technology Transfer	<p>Technology transfer group (TTG) within the IMS and the HUT established by end Year 1.</p> <p>TTG provides technical services on energy efficient design of lighting products to local lighting product manufacturers starting Year 2.</p> <p>About 50% of the local lighting product manufacturers are utilizing the EEL design software and are designing EEL products by Year 2.</p>	<p>Documentation on the establishment of the TTG</p> <p>Technical reports prepared by the TTG</p> <p>Purchase of the software, and documentation of the EEL product designs</p>	Local lighting products manufacturing industry supports the TTG
2.4	Networking with the international lighting industry	About 50% of local lamp manufacturers participating in International lighting industry forum on public lighting in Vietnam annually starting Year 2.	Proceedings of forum discussions VEEPL promotional materials distributed among members of international lighting industry	International lighting manufacturers will find the potential markets in Vietnam sufficiently compelling to attend.
2.5	Upgrading of national lighting testing capabilities	<p>4 performance standards for CFLs, electronic ballasts, low-loss magnetic ballasts and automatic lighting controls developed by end Year 2.</p> <p>National Testing Laboratory upgraded by the end Year 2.</p> <p>A quarterly lighting product testing report will be made starting Year 3.</p> <p>CFLs and electronic ballasts certificated and labeled starting later half of Year 3 and every year thereafter.</p>	<p>Documentation of performance standards.</p> <p>Report on the laboratory facility upgrading.</p> <p>Documentation of testing reports</p> <p>Label design and number of complying manufacturers.</p>	<p>* The relevant state institutions support the laboratory upgrading, seriously consider the developed standards and adopt their applications</p> <p>* Manufacturers will be willing to participate in product certification and labeling program</p>

Objectives		Indicators & Targets	Means of Verification	Critical Assumptions
2.6	Assessment of the capabilities of local lighting system service providers	<p>20 biggest local lighting system service providers assessed by the end Year 1</p> <p>Recommendations on the capacity building for the local lighting system service providers in performing technical and maintenance services for lighting systems prepared and submitted to MoC by the mid-Year 2</p>	<p>Evaluation report including their annual performance reports.</p> <p>Documentation of proposed recommendations</p>	State agencies and firms relating to the public lighting work support the evaluation report and will seriously consider the recommendations
2.7	Technical capacity building on the EE design, operation and maintenance of lighting systems	<p>Programs on training courses, study tours, workshops and training materials prepared by mid-Year 1</p> <p>22 training courses and study tours & 8 workshops organized and conducted during 5 years starting Year 2</p> <p>Certification program for lighting system service providers designed and implemented by the end Year 2</p> <p>About 25% of trainees trained each year are implementing EE design and maintenance of lighting systems starting Year 3.</p>	<p>Documentation of the programs and training materials and workshop proceedings</p> <p>Documentation of training course and study tour reports</p> <p>Documentation of number of certified lighting service providers.</p> <p>Results of post training surveys</p>	The relevant institutions accept the need for EC&EE development in public lighting systems
2.8	Public lighting sustainable technical development program	<p>Design of sustainable national program of EE public lighting completed by mid-Year 4.</p> <p>Financing scheme is in place for supporting the follow up program by start of Year 5.</p>	<p>Documentation of national program</p> <p>Documentation of proposed replication projects</p>	Local lighting product manufacturers and suppliers express interest and financial support

Objectives		Indicators & Targets	Means of Verification	Critical Assumptions
Component No. 3. Public Lighting Financing Program				
3. Government, financial/banking and private sectors, are providing financial assistance to the development and implementation of EE public lighting system projects.		Financing assistance programs for EE public lighting system projects are established and availed of by project developers, and the financing & banking sectors are providing financing to such projects by Year 3.	Financial sector projects on EE/EC particularly on EE public lighting systems; Documentation of public lighting financing schemes; Establishment of energy conservation fund	The financing sector and the private sector is interested in investing in EE public lighting in cities/towns.
3.1	Promotion of EE public lighting to financial sector	A workshop conducted and a brochure printed by the end of Year 1. 50% targeted financial sector personnel expressed interest to support project by mid Year 2.	Workshop proceedings, and VEEPL brochure. Results of post-training surveys	Media and promotional campaigns are properly designed and targeted
3.2	Capacity building EE/EC for financial sector	3 training courses conducted during the first 2 years. 50% of targeted financial institutions commit to support EE public lighting projects by end Year 2	Training course materials and training evaluation report Commitment letters from interested financing institutions.	EC/EE in lighting system will attract relevant target group
3.3	Comprehensive study of public lighting financing schemes	Study findings and recommendations regarding applicable appropriate financing schemes completed by mid Year 2 Proposed mechanics of innovative financing schemes prepared by Year 3	Documentation of study report	All financing stakeholders support the study and will seriously consider the recommendations for the financing schemes
3.4	Technical assistance in the establishment of energy conservation fund	Requirements of funding agencies complied with by mid Year 2 EC fund established by donors by end Year 2. EC fund implementing guidelines and	Documentation of relevant reports on the establishment of EC fund Documentation of establishment of EC fund Documentation of EC fund	Donors (e.g., SIDA) will proceed with its plan to provide funding in concert with VEEPL assistance

Objectives		Indicators & Targets	Means of Verification	Critical Assumptions
		regulations approved by the mid Year 3.	guidelines and regulations.	
Component No. 4. Public Lighting System Demonstration Program				
4. Continuous promotion and support for the development and application of EE public lighting systems.		The government commits 15% of the annual tax revenues from local lighting product manufacturers and suppliers for lighting products and systems technology development starting Year 3.	Documentation of the design and implementation of feasible public lighting demonstration schemes; Documentation of monitoring and performance review of demonstration program; Documentation of budget allocations from national and local governments.	Local lighting product manufacturers are interested in the manufacture of EE lighting system equipment and components for domestic consumption or even for the export market.
4.1	Review of technical and economic feasibility of demonstration schemes	Findings of review of proposed feasibility (technical and economic) analyses on demonstration scheme implementation completed by the end Year 1	Documentation of review and evaluation report	The host local authorities and stakeholders support the study and recommendations will be seriously considered
4.2	Baseline data information on the demonstration sites	Findings of survey reports on baseline data and information of public lighting systems as well as socio-economic conditions in the three demo project sites completed by mid-Year 2.	Documentation of reports Energy audit reports	The baseline information and data gathered are relevant and reliable.
4.3	Specific demonstration scheme implementation barrier removal activities	Written agreements of recommended stakeholders obtained by mid Year 2. Verified and confirmed availability of financing for demo projects by mid-Year 2 Favorable lighting tariff prices for the demo cities is confirmed and special	Documentation of agreements. Documentation of market surveys in the host demonstration cities Documentation of any financial assistance arrangement Documentation of the signed special pricing arrangement between the demo cities, MoC and the power	The relevant stakeholders will willingly cooperate in demo implementation A capable demo project management unit (LPMU) is in place in the demonstration sites.

Objectives		Indicators & Targets	Means of Verification	Critical Assumptions
		pricing arrangement with power company is secured by end Year 2.	company.	
4.4	Implementation of demonstration programs	<p>EE public lighting basic design completed by mid Year 2.</p> <p>Comprehensive technical and economic feasibility evaluations completed by end Year 2.</p> <p>Detailed engineering designs completed and approved by MoC and consultants by start Year 3.</p> <p>Operation of demo sites starting mid-Year 3</p>	<p>Documentations of the approved basic engineering designs.</p> <p>Documentations of the completed and reviewed technical and economic feasibility reports.</p> <p>Documentations of the approved detailed engineering designs and lighting system equipment specs.</p> <p>Documentation of the installation and operation of the demo projects.</p>	The local governments and community in the demo city/town support the demo program and lighting fee collection.
4.5	Monitoring and performance review of demonstration program.	<p>Quarterly monitoring and evaluation reports prepared and submitted to MoC starting Year 4.</p> <p>At least 85% lighting fee collection efficiency annually starting Year 4</p>	<p>Documentation of evaluation reports</p> <p>Documentation of public lighting fee collections.</p>	The LPMU staff will be capable to make monitoring and evaluation reports
4.6	Review of demonstration results and recommendations	<p>Documented comments about the successful operation of the demonstration program by end of project.</p> <p>Information included in Public Lighting Data Facility by Year 4 and accessed by project developers and EE public lighting users.</p> <p>Replication of EE public lighting projects in at least 5 additional cities/towns starting mid-Year 4.</p>	<p>Documentation of each technical and economic performance evaluation report submitted to MoC.</p> <p>Number of access to Public Lighting Data Facility</p> <p>Documentation on the additional EE public lighting projects.</p>	EC/EE in public lighting will attract relevant target group to utilize EE/EC best practices

Objectives		Indicators & Targets	Means of Verification	Critical Assumptions
Component No. 5. Information Dissemination and Awareness Raising				
5. Adequate, affordable, accessible and up-to-date information services, continuing education, and awareness improvement on the application of EE public lighting systems.		A sustainable and continuously evolving program of providing EE public lighting technology information services, continuing education, and awareness enhancement, covering the design and applications of EE lighting systems is established & implemented by the MoC and cities/towns by Year 3.	Public lighting data facility; VEEPL brand; Efficient public lighting promotional campaigns; Documentation of the public lighting performance rating system; Establishment of a National Public Lighting Information Center	The relevant government institutions and target groups will be interested in participating and cooperating in the design, development and implementation of the activities under this project component.
5.1	Public lighting data facility	Information on public lighting installation is gathered from cities and towns all over Vietnam starting Year 1.	Report on database contents	The relevant government offices tasked with gathering this information will do so, and will provide it to VEEPL.
5.2	VEEPL Identity and Branding	VEEPL identity and branding materials (such as a logo) prepared and disseminated by Year 2	Review of VEEPL identity and branding plan	All stakeholders will recognize the importance of having a recognizable, central theme to VEEPL
5.3	Efficient public lighting promotional campaign	A program of awareness raising and promotion of EE lighting is in place by the end Year 1 and carried out every year thereafter 80% of the stakeholders/target groups understand the VEEPL project by mid Year 1	Documentation on the program Documentation of survey results	Media and promotional campaign program is properly designed and targeted
5.4	Public lighting performance rating system	Guidelines for the rating program prepared by end Year 2 Rating program started by mid-Year 3; and annual ratings and awards given starting Year 4	Documentation on the guidelines Documentation on the ratings and awards	Relevant government agencies support the program

Objectives		Indicators & Targets	Means of Verification	Critical Assumptions
5.5	Provision of information to the Vietnamese lighting industry	Manufacturers successfully use VEEPL marketing materials to sell their EE lighting products starting Year 3.	Increased sales from participating manufacturers of qualifying products.	Manufacturers will adopt VEEPL marketing materials and use them effectively.
		<p>Long term training program on lighting engineering and energy consulting for relevant stakeholders developed and started mid-Year 2</p> <p>At least 3 local lighting engineering and energy consulting companies are registered as providers of public lighting services starting Year 3</p> <p>Institutional and regulatory requirements for the industry are defined beginning mid-Year 3</p>	<p>Documentation of training program and reports</p> <p>Company profiles of the public lighting service providers</p> <p>Documentation on institutional and regulatory requirements for the public lighting industry.</p>	The Government will give more support to the public lighting development
5.6	VEEPL program components output distribution	Information on VEEPL outputs are available to interested parties at most cities and towns in Vietnam by end Year 5	Mailing list of parties who have received VEEPL materials, list of parties requesting VEEPL materials	Successful implementation of VEEPL activities, generating interest in EE public lighting throughout Vietnam
5.7	Establishment of a National Public Lighting Information Center (PLIC)	<p>PLIC with its mechanism for info exchange set up by Year 2.</p> <p>Request for information by other organizations (local and abroad) are served starting Year 2.</p> <p>Half yearly newsletters for public lighting information exchange published by the end of Year 2 and every year thereafter.</p>	<p>Working schedules and attendance profiles of PLIC</p> <p>Documentation on the information service & requests and receipt</p> <p>The published newsletter</p>	<p>* MoC agrees to PLIGC establishment</p> <p>* Links with public lighting - related agencies, NGOs, and private sector in the country and abroad are established.</p>

Annex C
GEF Focal Point Endorsement Letter

GEF VIETNAM FOCAL POINT

83 Nguyen Chi Thanh St., Ha Noi, Vietnam
Tel. 844.7734986 - Fax. 844.7734245

9 February 2004

From : GEF Vietnam

To : Mr. Frank Pinto
GEF Executive Coordinator
UNDP, New York, USA
Fax. 1212-906-6998

CC : Mr. Manuel L. Soriano
GEF Regional Coordinator - Climate Change
Regional Bureau for Asia and the Pacific,
UNDP, New York, USA.
Fax. 6032-091-2870

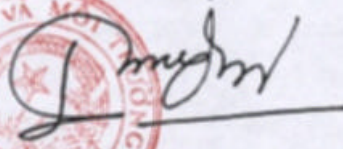
Subject: GEF Vietnam's Endorsement for the Project on "Vietnam Energy Efficient Public Lighting".

Dear Mr. Frank Pinto,

On behalf of the GEF Vietnam - Global Environment Facility of the Socialist Republic of Vietnam, I would like to confirm that we fully support this project titled "*Vietnam Energy Efficient Public Lighting*".

It is expected that the Project Brief Document would be approved as soon as possible, thus can facilitate the full implementing phase.

Yours Sincerely,



Pham Khoi Nguyen
GEF Vietnam Chairman
Senior Vice Minister
Ministry of Natural Resources and Environment
VIETNAM

Annex D
STAP Review & Response to STAP Review

A. STAP REVIEWER'S COMMENTS ON VEEPL DRAFT PROJECT BRIEF

A Review of Project Brief
Vietnam: Energy Efficient Lighting

Jayant A. Sathaye

1. Introduction

The proposed project is to develop and exploit the energy savings potential of public lighting systems in Vietnam. Public lighting accounted for only 291 GWh of Vietnam's 2001 electricity consumption, but it is expected to grow several-fold to 1624 GWh by 2013. Efficient public lighting has the potential to limit this growth by 20% to 1300 GWh. Hydro electricity accounts for about half the electricity generation in Vietnam. As a result, the CO₂ reduction is 0.43 kg CO₂ per kWh of avoided generation. The project is thus expected to reduce 0.568 million cumulative tons of CO₂ between 2004 and 2013.

The main intent of the project is to remove several barriers to the spread of efficient public lighting in Vietnam. These barriers include lack of information, technology, and financing for public lighting. The project proposal envisages spending \$ 3 million of GEF funds under Operational Programme # 5, which will be matched by \$ 1.4 million of government, \$2.79 million of private sector, and \$8.12 million of local government funds. The project duration is five years.

Following is a review of the Project Brief covering the items noted in the STAP Terms of Reference for technical reviews of project proposals. Detailed comments are attached.

2. Scientific and technical soundness of the project, and identification of global environmental benefits

The project as proposed is technically sound. The project will save electricity, and reduce consequent GHG emissions, through improved public lighting, which has the potential to improve public finances, build technical capacity of local manufacturers that produce efficient lighting systems, and involve banks and other agencies in energy efficiency ventures in Vietnam. The project will benefit the global environment because of the avoided generation of electricity from power plants that use fossil fuels. This should also help to reduce local air pollution in neighboring areas. The project brief needs to calculate and demonstrate, however, that in the absence of barriers the project would have a net positive benefit and a positive rate of return.

3. Project fit to GEF goals and other guidance

The project is proposed as a barriers-removal project under the appropriate Operational Programme No. 5. This programme is intended to reduce barriers for projects that are presumed to be cost-effective but whose implementation is hampered by information, institutional, social, contractual, etc. barriers. In order to establish a project's cost effectiveness, an incremental cost analysis is done from a national or societal perspective. The Project Brief provides such an analysis, and allocates about \$

3.0 million of GEF funds for the removal of barriers to the implementation of such projects. The remaining amount, about \$12.3 million, will be provided as baseline funding by the government.

4. Project replicability and sustainability

In order to ensure project replicability and sustainability a successful demonstration of both the technical and institutional aspects of the project is needed. Component # 4 of the Brief has highlighted how a technical demonstration of the project will be performed. It needs to provide more information on the institutional and financing aspects. Items 4a through 4g highlight the various aspects of the demonstration. It would be useful to add another component that would clearly highlight the role of financing agencies in the demonstration. Will they fund the demonstrations? What criteria will be used to judge their successful participation? How will their participation be demonstrated to local agencies in other cities? These items should be noted here and on Annex pages C-8 through C-10.

In addition to the above, the Brief needs to include an activity for the development of an action plan that would detail ways by which the project demonstrations would be translated into a broader set of similar activities nationwide, and within the region. This will require the involvement of all stakeholders from the very beginning of the project in order to ensure that the responsibilities and risks to all concerned are understood and accepted by them.

The demonstration projects will have to be formulated such as to ensure the transparent and ready availability of data and project results to the other public lighting entities, including site visits by stakeholders in other areas. The information will have to include both financial and technical data so that other project developers can be convinced of the viability of the project's soundness. The Brief needs to explicitly note that demonstration project owners would be willing to share such information.

Monitoring and evaluation of project activities will play a key role in ensuring that the project's GHG benefits are accurately accounted for and reported to GEF. The project brief needs to pay more attention to this topic and allocate resources explicitly for this purpose in its budget.

5. Other environmental effects

The Brief makes no mention of local environmental benefits and needs to address this topic. Saving electricity through public lighting efficiency improvements will not only reduce greenhouse gases but will also help in the reduction of other local pollutants from power plants. The Project Brief needs to note these impacts, if any.

6. Involvement of stakeholders

As noted in the Brief, there are several international donors and local stakeholders who are working on energy efficiency in Vietnam. The Brief notes ways in which GEF would collaborate with the major actors. Continued cooperation in this regard will be essential in order to ensure that the baseline funding identified by the project is secure, and remains in place as the project is implemented. Private industry and government letters of endorsement in support of the project should be included with the document.

7. Summary

Improving electricity efficiency in public lighting is a sound idea. It can have significant global benefits. As noted in the Brief, various barriers prevent the adoption of technology in Vietnam. The project design is well suited to the removal of barriers noted in the Brief, since it will address technical and institutional barriers, develop and provide information on technologies suitable for public lighting. It needs to pay more attention to the demonstration of financing and the development of an action plan for continued expansion of public lighting technologies and services after the end of the project. The lighting industry, the utility companies, and several local and national government agencies are the primary stakeholders in the project. These stakeholders will provide 80% of the financial support to cover the baseline cost of the project. The involvement of multiple stakeholders, the significant baseline funding, the strong support of the lighting industry, and the significant GHG benefits provide a strong basis for incremental GEF support for the project.

Detailed Comments:

Page 6: What % of electricity is saved in 2013?

Page 12: Poor availability and lack of local production of energy efficient technologies should be noted as barriers. Also, can these be imported if needed, and are there import tariffs that act as barriers to their transfer from abroad?

Page 13: Figure 1 shows 2004 consumption almost 500 GWh, but on page 6 it says 291 GWh. Is the Figure 1 value correct?

Page 20: paragraph c. typo – ... provision of TA...

Page 22: Paragraph b. How will GEF accomplish this transfer of technology? Will GEF funds be used to facilitate the purchase of licenses and patents? Has the PDF identified potential manufacturers willing to share technology?

Page 22: Paragraph c. What is the added value of international networking? Don't existing conferences etc. already accomplish this?

Page 28: Paragraph d. It would be good use of the demonstration projects to establish benchmarks that other public lighting projects could emulate to achieve. Benchmarks should be specific to each application and potential technologies.

Page 28: paragraph c. typo – ... activities delivered through...

Page 30: Technology: Are imports of lighting technologies allowed? What will be their role with respect to their local manufacture?

Page 31: Table 1. Please note the role that each stakeholder will play in VEEPL not only in EE lighting.

Page 33: paragraph 72. typo – It is comprised of a National ...

Page 34: Figure 3 shows an implementation arrangement. Please show and explain in text how this project will coordinate with the World Bank and other bilateral activities on energy efficiency.

Page 36: paragraph 83. typo – ... if deemed necessary ...

Annex:

A: Incremental cost analysis: The document needs to demonstrate that the project has net positive benefits, and that the barriers noted in the main document are preventing its implementation. This demonstration should be done through a calculation of the net present value of benefits and the internal rate of return.

A-6 and A-7: What is the baseline cash amount contributed by each stakeholder to be used for in

each component?

C-5: What is the mean of verification to match the success indicator --- local lighting product manufacturers and suppliers commit 5% of their gross This seems like a large amount whose use needs to be carefully allocated and monitored to ensure sustainability of the project benefits.

C-9: As in the C-5 case above, what is the success indicator for 15% of annual tax revenues from local lighting manufacturers etc.

Private and government letters of endorsement: None. The document should include letters supporting the project and indicating each stockholder's role in the project.

B. RESPONSE TO STAP REVIEWER'S COMMENTS

1. General Comments

Issues/Comments	Response	Reference
<p>Scientific and technical soundness of the project, and identification of global environmental benefits - The project brief needs to calculate and demonstrate, however, that in the absence of barriers the project would have a net positive benefit and a positive rate of return.</p>	<p>The IRR analysis is shown in Annex A. If there are no barriers, the collective projects that were identified under VEEPL will have an IRR of 150%. Considering the cost for barrier removal activities, the overall IRR is 124%.</p>	<p>Annex A: Table A-2.</p>
<p>Project replicability and sustainability - In order to ensure project replicability and sustainability a successful demonstration of both the technical and institutional aspects of the project is needed.</p>	<p>The financial costs and benefits of the public lighting efficiency projects to be pursued under VEEPL are such that, once the existing market barriers are removed, many of the activities should be "self-replicating".</p>	<p>Project Brief: Paragraph 64</p>
<p>Project replicability and sustainability - Component # 4 of the Brief has highlighted how a technical demonstration of the project will be performed. It needs to provide more information on the institutional and financing aspects. Items 4a through 4g highlight the various aspects of the demonstration. It would be useful to add another component that would clearly highlight the role of financing agencies in the demonstration. Will they fund the demonstrations? What criteria will be used to judge their successful participation? How will their</p>	<p>The cities/towns participating in demonstration projects will provide co-financing to the VEEPL in: (1) providing the baseline information on the demonstration sites; (2) facilitating activities for demonstration project implementation; and (3) installing new EE public lighting system and replacing IE lighting equipment with EE ones.</p> <p>The criteria for judging the successful participation of the cities/towns is the number of EE lighting equipment newly installed and replaced based on the annual energy consumption reports of the cities/towns.</p>	<p>Project Brief: Paragraphs 60.c and 77 Annex A: Paragraph 12</p>

Issues/Comments	Response	Reference
<p>participation be demonstrated to local agencies in other cities? These items should be noted here and on Annex pages C-8 through C-10.</p>		
<p>Project replicability and sustainability - The Brief needs to include an activity for the development of an action plan that would detail ways by which the project demonstrations would be translated into a broader set of similar activities nationwide, and within the region. This will require the involvement of all stakeholders from the very beginning of the project in order to ensure that the responsibilities and risks to all concerned are understood and accepted by them.</p>	<p>The following have been suggested as part of such action plan:</p> <ul style="list-style-type: none"> • Definition of a role for the VEEPL advisory board and other stakeholders in reviewing the demonstration project, and disseminating its results. • Definition of a dataset to be collected from each demonstration project participant at different points during implementation, and a schedule for data collection • The production of an overall demonstration project summary report as well as individual case studies, including project costs, benefits and lessons learned. • A plan for dissemination of the demonstration project case studies and some kind of follow through by relevant government ministries to encourage uptake of successful VEEPL practices by other cities and towns. • Generation of new regulations governing expenditures on public lighting based on VEEPL demonstration project information. 	<p>Project Brief: paragraph 60.f</p>
<p>Project replicability and sustainability - The demonstration projects will have to be formulated such as to ensure the transparent and ready availability of data and project results to the other public lighting entities, including site visits by stakeholders in other areas. The information will have to include both financial and technical data so that other project developers can be convinced of the viability of the project's soundness. The Brief needs to explicitly note that demonstration project owners would be willing to share such information.</p>	<p>During the PDF-B exercise, the VEEPL project development team has adequately explained to the demo project hosts, aside from the benefits that they can derive from participating in the project, their responsibilities. The willingness to share necessary data information of the demonstration cities/towns, which is the most important requirement from these hosts, is expressed in their letters of commitment.</p>	<p>Project Brief: Paragraph 60.c</p>
<p>Project replicability and sustainability - Monitoring and evaluation of project activities will</p>	<p>The VEEPL's GHG emission reduction benefits are estimated based on the projects electricity savings benefits.</p>	<p>Project Brief: Paragraphs</p>

Issues/Comments	Response	Reference
<p>play a key role in ensuring that the project’s GHG benefits are accurately accounted for and reported to GEF. The project brief needs to pay more attention to this topic and allocate resources explicitly for this purpose in its budget.</p>	<p>Electricity savings will be carefully and accurately tracked through the energy consumption reports that will be regularly submitted by the cities and towns (Paragraphs 62.a and 62.d).</p> <p>All the project components have allocations for the monitoring and evaluation (M&E) of the activities, and note that M&E is central to all project activities.</p> <p>Calculating the actual impact of VEEPL on the emissions of GHG from the Vietnamese power sector would require a sophisticated system dispatch analysis. This would be extremely costly and beyond the scope of this proposed project. Therefore the GHG emissions reductions will be estimated based on the reported energy consumption in the public sector compared to the “business-as-usual” projections of energy utilization in sector without the VEEPL.</p>	<p>54.h, 60.e, 60.g, 62.a, and 62.d. Annex B: Items 1.8, 4.5, 4.7, 5.1 and 5.4</p>
<p>Other environmental effects - The Brief makes no mention of local environmental benefits and needs to address this topic. Saving electricity through public lighting efficiency improvements will not only reduce greenhouse gases but will also help in the reduction of other local pollutants from power plants. The Project Brief needs to note these impacts, if any.</p>	<p>Local environmental benefits in Vietnam from the avoided consumption of electricity include avoidance of a range of pollutants typically associated with thermal power generation such as Sulfur dioxide (SO₂) and Nitrogen oxides (NO_x). Additional environmental benefits may included the reduction of thermal pollution of rivers and streams by discharge from thermal power plants, and a reduction in environmental damage associated with the transport of fossil fuels to power plants.</p>	<p>Project Brief: Paragraph 49.g</p>
<p>Involvement of stakeholders - The Brief notes ways in which GEF would collaborate with the major actors. Continued cooperation in this regard will be essential in order to ensure that the baseline funding identified by the project is secure, and remains in place as the project is implemented. Private industry and government letters of endorsement in support of the project should be included with the document.</p>	<p>Agreed. The co-financing commitment letters are all available as well as the country’s GEF OFP’s letter of endorsement.</p>	<p>Letters of Commitment Annex C. GEF Focal Point Endorsement Letter</p>

2. Detailed Comments

Issues/Comments	Responses	Reference
Page 6: What % of electricity is saved in 2013?	20% of electricity is saved in 2013 (about 324GWh).	Paragraph 7
Page 12: Poor availability and lack of local production of energy efficient technologies should be noted as barriers. Also, can these be imported if needed, and are there import tariffs that act as barriers to their transfer from abroad?	Agree. The high import tax (20% - 40%) and high cost of transaction are among the barriers to EE lighting technology transfer from abroad.	Paragraph 41.f
Page 13: Figure 1 shows 2004 consumption almost 500 GWh, but on page 6 it says 291 GWh. Is the Figure 1 value correct?	The 2004 consumption of almost 500 GWh in Figure 1 is correct. On page 6 it says 291 GWh for 2001 year but not for 2004.	Fig. 1
Page 20: paragraph c. typo – ... <i>provision of TA...</i>	Corrected	Paragraph 54.c
Page 22: Paragraph b. How will GEF accomplish this transfer of technology? Will GEF funds be used to facilitate the purchase of licenses and patents? Has the PDF identified potential manufacturers willing to share technology?	GEF funds will not be used for purchase of licenses and patents. GEF funds will support in accomplishing the technology transfer as follows: (1) Support Institute of Materials Science (IMS) and Hanoi University of Technology (HUT) in capacity building on technology transfer. The technology transfer group (TTG) on ballast, luminaire and lighting design will be set up at IMS and HUT. The experts of this group will be trained in appropriate countries to learn about how the energy efficient design of ballasts for fluorescent and high pressure sodium lamps, and in developing software for lighting and luminaire design. The TTG will develop the software in Vietnamese for ballast, luminaire and lighting designs that are compatible with local technical capacities and local lighting products; (2) Support the TTG in compiling a users manual and guideline of the developed software in Vietnamese for widespread application; and, (3) Support the TTG in organizing the training courses at HUT for local lighting product manufacturers. Some lighting manufacturers can request the TTG to develop their own application the design for new products with their trademark.	Paragraph 55.b and c
	During the PDF-B exercise, the project development team had identified some	Paragraph 55.c

Issues/Comments	Responses	Reference
	international lighting manufacturers, which are willing to share technology. These are: (1) Lighting Technologies Inc. (USA) for lighting design software; (2) International Rectifier Company (USA) for ballast design software; (3) Philips semiconductor Singapore for ballast design; and, (4) Optical & Photometric Technology (Australia) for testing equipment.	
Page 22: Paragraph c. What is the added value of international networking? Don't existing conferences etc. already accomplish this?	Most of the EC&EE technical conferences held in the country are for the local audience. In order to widen the knowledge of local lamp manufacturers and prospective users about EE lighting, international networking (e.g., through international conferences) will be necessary to also initiate business partnerships.	Paragraph 55.d
Page 28: Paragraph d. It would be good use of the demonstration projects to establish benchmarks that other public lighting projects could emulate to achieve. Benchmarks should be specific to each application and potential technologies.	Agree with these comments. We should consider this matter while having integrated the STAP Reviewer's comments into Project Brief.	Paragraph 60.f
Page 28: paragraph c. typo – ... activities delivered through...	Corrected	Paragraph 62 c
Page 30: Technology: Are imports of lighting technologies allowed? What will be their role with respect to their local manufacture?	Import of lighting technologies into Vietnam is allowed. At present, Rang Dong Lamp Company and Dien Quang Lamp Company have imported some EE lamp manufacturing technologies, e.g., CFL production (machinery, know-how, raw materials, etc.). For other lighting products, for example, ballast, luminaire, the local manufactures have the necessary equipment for production. But they lack capacity on: (1) the design of new products which comply with EE standards and norms; and, (2) Product testing capacity on Minimum Energy Performance Standards. These are some of the reasons why VEEPL will also involve development of software for ballast, luminaire, lighting design and capacity building for product testing for local lighting product manufacturers.	Paragraphs 55.b and 55.c
Page 31: Table 1. Please note the role that each stakeholder will play in VEEPL not only in EE lighting.	Table 1 was revised to show the specific roles of the stakeholders in the VEEPL	Table 1: Stakeholders Role in VEEPL

Issues/Comments	Responses	Reference
<u>Page 33</u> : paragraph 72. typo – It is comprised of a National ...	Corrected.	Page 33; Para 72
<u>Page 34</u> : Figure 3 shows an implementation arrangement. Please show and explain in text how this project will coordinate with the World Bank and other bilateral activities on energy efficiency.	VEEPL has been developed to complement the WB/GEF DSM/EE and UNDP-GEF PECSME. There is no overlap among them. In Fig. 3, MoI and MoST (the executing agencies of DSM/EE and PECSME) are present in the VEEPL Project Advisory Board and Technical Working Group. Hence, the coordination among the DSM/EE, PECSME and VEEPL will be accomplished easily via these Board and Group.	Paragraphs 74 & 75
<u>Page 36</u> : paragraph 83. typo – ... if deemed necessary ...	Corrected.	Paragraph 85
<u>Annex: A: Incremental cost analysis</u> : The document needs to demonstrate that the project has net positive benefits, and that the barriers noted in the main document are preventing its implementation. This demonstration should be done through a calculation of the net present value of benefits and the internal rate of return.	IRR Analysis spreadsheet added in Annex A	Annex A: Table A-2
A-6 and A-7: What is the baseline cash amount contributed by each stakeholder to be used for in each component?	The baseline cash amount contributed by each stakeholder for each component of the project is summarized in a table in Annex A (Paragraph 17)	Annex A: Paragraph 17.
C-5: What is the mean of verification to match the success indicator --- local lighting product manufacturers and suppliers commit 5% of their gross This seems like a large amount whose use needs to be carefully allocated and monitored to ensure sustainability of the project benefits.	The operational public lighting sustainable technical development program is the MOV for this indicator. The design of such program will incorporate the proper accounting and monitoring of funds that will be contributed by the lighting manufacturers. Furthermore, the documentation of the financing scheme that will support the follow up program by start of Year 5, as well as the documentation of the program itself is the MOV for this indicator. These are added in Item 2 of the project log frame (Annex B).	Annex B: Item 2
C-9: As in the C-5 case above, what is the success indicator for 15% of annual tax revenues from local lighting manufacturers etc.	The 15% of annual tax revenues is already the success indicator. Perhaps the question is what is the MOV for this SI. MOV is documentation of budget allocations from national and local governments. This has been added in Item 4 of the project log frame (Annex B).	Annex B: Item 4

Issues/Comments	Responses	Reference
<p><u>Private and government letters of endorsement</u>: None. The document should include letters supporting the project and indicating each stakeholder's role in the project.</p>	<p>The Letters of Commitment will be annexed to the Brief. The LOE from the GEF national OFP is in Annex C.</p>	<p>Annex C – GEF OFP Letter of Endorsement</p> <p>Various co-financing commitment letters</p>

Annex E

Barriers to the Widespread Adoption of Energy Efficient Public Lighting in Vietnam

Existing Barriers

Although there is a growing demand in using EE equipment in street lighting and public service facilities such as schools and health service centers in municipalities and provinces, there are several major barriers why EE lighting technology has not been introduced at a large scale in Vietnam.

Findings from assessment of current status of public lighting in Vietnam have indicated numerous of difficulties/barriers hampering the implementation and development of energy efficient lighting equipment and technology in public sector for the whole country. Collectively, the barriers listed below may be referred to as any of the contributing factors or problems getting in the way of efforts to promote energy efficient lighting to flourish. There is an active interplay of informational, institutional, policy, technical, financial and marketing problems that impedes the development of energy efficient lighting in the country.

A. Barriers for Lighting Equipment Manufacturers

At present, the Vietnam lighting equipment manufacturers could not develop their EE lighting products because of following barriers:

- Lack of Vietnamese standards on EE lighting equipment for them to follow up in making their products;
- Lack of local producer design capability for EE lighting equipment (ballasts, luminaries, controlling boxes and other accessories);
- Lack of specialized testing laboratory in the factories for testing product quality as well as testing inputs and production process;
- Lack of technicians qualified for product quality testing for EE lighting equipment (bulbs, ballasts, luminaries, controlling boxes and other accessories);
- Lack of reliable international and local information available to manufacturers about EE lighting equipment/technology and lighting in general;
- Lack of capital for technology innovation and upgrading the production line and budget for development of new EE lighting prototypes;
- Lack of capacity in developing proposals on EE lighting equipment production for getting the grant from Government funds and other financial sources;
- Lack of training courses on EE lighting equipment/technology for the factory management boards and technical cadre;
- Lack of market of EE lighting products.

B. Barriers for the Lighting Companies

The local Lighting companies are responsible for management, operation and maintenance of local public lighting system. At present, these units have been hindered in development of EE lighting by following barriers:

- Lack of awareness of management boards and technical staff on EE lighting equipment and technology, hence perception of benefits of energy cost savings when using high efficiency lighting equipment has been limited;
- Lack of capacity in energy auditing for public lighting system, shortage of capacity in assessing the energy saving potential of the system and missing of measures for energy savings;
- Lack of capacity in developing proposals on upgrading lighting system;
- Lack of finance for new EE lighting system installation and replacement of energy inefficiency ones; and,
- Existing municipal administrative mechanism and accounting system do not provide incentives for the lighting companies to invest in EE equipment installation and save energy and money.

C. Barriers for the State Management Agencies in public lighting

- Shortage of effective State management mechanism for lighting, in general, and public lighting, in particular
- MoC lacks the units to be responsible for: (1) management for public lighting energy consumption reporting and monitoring; (2) establishing and managing Vietnam public lighting database; (3) setting up, managing and operating information exchange system (regional and local); (4) carrying out information dissemination campaigns on EE lighting; and (5)- undertaking activities on rating of public lighting performance. The functional departments of MoC lack knowledge on EE lighting technology and has very low capacity in appraising/approving EE lighting standards and norms;
- MoF lacks knowledge and capacity in appraising and approving the EE lighting projects. The existing financial mechanism has been very old, not suitable with the development trend of EE lighting because there has been no financial encouragement for electricity savings implemented;
- MPI lacks awareness on advantages of EE lighting technology so there has been no separated public lighting development plan approved; There is no clearance financial policy for public lighting set up and implemented;
- MoI lacks capacity in compiling/ appraising/approving EE lighting equipment standards;
- MoNRE lacks knowledge on EE lighting technology and awareness on its global and local environmental benefits. There is no department of MoNRE taking the responsibilities for energy saving and conservation as well as the product waste disposals;
- Ministry of Health lacks knowledge on EE lighting technology and capacity in drafting EE lighting standards for schools and health service centers.
- Ministry of Training and Education lacks coordination with the Ministry of Health in drafting EE lighting standards for schools.
- Lack of capacity to evaluate technical, financial and economic feasibility of the lighting projects at central level

D. Barriers for the Local Governments

- Lack of awareness of EE lighting equipment and technology, hence perception of benefits of energy cost savings when using high efficiency lighting equipment has been limited;
- There are many emergent issues should be solved in the framework of the localities, therefore with their low awareness on EE lighting benefits, they could not take the EE lighting matter into account. Because of this, the local budget allocated for EE lighting system installation and upgrading is always very little in comparison with other infrastructure subjects;

- Lack of capacity to evaluate technical, financial and economic feasibility of the lighting projects at local level.

E. Barriers for the institutes and universities related to lighting

- Lack of standard laboratory for researching, testing all lighting product parameters, assessing/certificating the lighting product quality and labeling;
- Lack of experienced and qualified staffs in the field of testing/assessing/certificating EE lighting product quality;
- Lack of awareness of importance and necessity of lighting, hence this subject is only one supplemental subject in the universities (in HUT, HUA, HUC); there is no specialty in lighting established in almost universities.
- Lack of training courses on EE lighting equipment and technology;
- Lack of textbooks, handbooks, materials on lighting for use;
- Lack of standard classroom on lighting for experimental class hours at universities;
- Shortage of effective activities in coordinating with the State functional agencies in drafting, appraising and approval of Vietnam standards on EE lighting and EE lighting equipment;

F. Barriers for the users of public lighting systems

The major end users of public lighting include lighting companies, schools and health service centers. At present, these consumers have to face with many difficulties in implementation EE lighting. These difficulties compose of:

- Lack of reliable information available for consumers to choose the EE lighting products; There are no recommendations on lighting products sold in the market and no products certified and labeled by prestige testing institution/labs present in the local market;
- Lack of awareness of school and hospital management boards on EE lighting equipment and technology, hence perception of benefits of energy cost savings when using high efficiency lighting equipment has been limited; In almost designs for upgrading the lighting systems of the schools and health service centers, the main lighting devices used are inefficient because of low investment.
- Lack of confidence on EE lighting product; There are a lot of lighting products from different foreign (China, Thailand, Germany, England...) and local companies with EE lighting trade-marks sold in the local market. But the quality of these products is very low, their lifetime is short and not according to the their advertisements.

Barrier Grouping

All the above-mentioned barriers could be classified into 6 major groups including:

- Lack of energy consumption reporting and monitoring* - No systematic reporting and monitoring mechanism for energy consumption exists, which has led to limited understanding of energy consumption patterns by cities and towns. This limited understanding and a lack of baseline data have hindered the formulation of effective policies, laws and regulations.
- Low awareness on energy efficiency* - Due to lack of comprehensive information dissemination campaigns on energy efficiency and its positive impact, many people including policy makers,

lighting system service providers, manufactures and end-users are simply not aware of energy efficient for public lighting and its impacts.

- c. *Lack of comprehensive policies for public lighting* - Efficient public lighting is relatively a new concept; thus, very few policies, law, regulations and standards exist on public lighting. In addition, a lack of monitoring and reporting systems on energy-consumption patterns and of regulations on enforcement of existing regulations have hindered the formulation of effective policies and regulations and enforcement of regulations.
- d. *Lack of budget for public lighting* - Costs for installations, operations and maintenance of public lighting facilities come from state budgets. However, often-sufficient budget for installations, operations and maintenance for public lighting does not exist due to a lack of attention to the sector, which has led to the current inadequate public lighting systems.
- e. *Low capacity of personnel in the public lighting sector* - Those who are involved in design, production, operation and maintenance of public lighting such as policy makers, manufactures of lighting systems, energy service companies and government organizations have very limited capacity. Therefore, public lighting products available in Vietnam have been characterized by high-cost, low-quality, preventing the market for public lighting from growing.
- f. *Lack of financial schemes for efficient public lighting systems* - Since there is no effective financial schemes available, cities/towns, manufactures, energy service companies and other organizations have very limited capital available for promoting efficient public lighting, which have hindered comprehensive efforts for public lighting.

Annex F

Greenhouse Gas Emissions Calculation for Baseline And Alternative Scenarios

Public Lighting in Vietnam

Up to 2001, data for Public Lighting in Vietnam consist mainly of the reports by the Urban Environment Companies presented at the Conference on Public Lighting organized by the Department of Architectural Planning and Public Works, Ministry of Construction every 5 years. The most recent meeting was organized in 1995.

In the year 2001-2002, under the PDF-B exercise to design the VEEPL, Dong Duong Co. completed a survey on the current state of public lighting in Vietnam. Dong Duong Co. carried out energy auditing for street lighting in 5 cities and collected relevant data on the other cities. More than 40 cities submitted reports on their public lighting system to Dong Duong Co. These data and analysis have been used extensively in the research and reports on Public Lighting in Vietnam so far. Public Lighting infrastructure in Vietnam is far from developed, according to the data, only 70% of the roads are provided with lighting, in which 60% are still using low efficiency lamps, a high percentage having old, downgraded luminaires, resulting in low lighting quality.

Like other infrastructure sectors, being undeveloped, currently the public lighting sector is growing very fast. According to data submitted by the Urban Lighting Companies, the annual growth of street lighting was 20% in the period 1995-2000. This is also assumed as the annual growth rate for lighting of public buildings.

The VEEPL demand forecast for public lighting service is based on these data. In rural areas, Public Lighting is severely undeveloped. The lighting systems here are primitive and are built and managed by the local government without any provision for energy saving measures and planning. In public building like schools and hospitals, the quality of lighting is typically far from meeting standard requirements.

Demand Forecast on Public Lighting:

The following design assumptions are based on subcontractor reports:

- The growth in public lighting is 20 % per annum
- According to the baseline scenario (without the implementation of energy saving measures), the ratio of EE to Non EE lamps is about 1.
- According to the VEEPL scenario, (with the implementation of energy saving measures), after the Standards for Public Lighting is issued, all newly installed lamps are EE lamps

Other measures to improve efficiency:

- Old, low efficiency luminaires are replaced with new high efficiency luminaires,
- Automatic light control systems are used,
- Specialized software aids in the design of lighting system for maximum efficiency,
- New regulations influence the installation and maintenance of public lighting.

In VEEPL, only the impacts of the first two measures are considered as these can be clearly quantitatively evaluated.

The analysis also shows that the potential for energy saving, and thus greenhouse gases emission reduction, is significant. Table F-2 shows the projected lighting electricity consumption in the public sector. By experts' prediction, when all energy saving measures is implemented across the public sector, the energy savings would be 229 GWh and about 99 kTons CO₂ can be reduced annually.

Table F-1: Projected Lighting Electricity Consumption in the Public Sector

Year	Energy Usage (GWh)		Energy Savings (GWh)	
	Base Case	VEEPL Case	Annual	Cumulative
2004	444.6	444.6	0	
2005	514.2	505.8	8.4	8.4
2006	595.7	578.5	17.2	25.6
2007	683.6	629	54.6	80.2
2008	785.9	691.8	94.1	174.3
2009	905.3	769.3	136	310.3
2010	1044.7	864.4	180.3	490.6
2011	1207.9	980	227.9	718.5
2012	1399.2	1120.7	278.5	997
2013	1623.7	1300	323.7	1320.7

Based on the average power generation mix (which is assumed to be more or less constant in the next 10 years), the average CO₂ emission factor for electricity generated in Vietnam is 0.43 kg CO₂/kWh. This is mainly because 56% of the electricity is produced from hydro resources.

Table F-3 shows the estimated project CO₂ emissions from public sector lighting during the period 2004-2013.

Table F-2: Projected CO₂ Emissions from Public Sector Lighting

Year	CO ₂ Emissions (kTons)		CO ₂ Emissions Reduction (kTons)	
	Base Case	VEEPL Case	Annual	Cumulative
2004	191.178	191.2	0	
2005	221.106	217.5	3.6	3.6
2006	256.151	248.8	7.4	11.0
2007	293.948	270.5	23.5	34.5
2008	337.937	297.5	40.5	75.0
2009	389.279	330.8	58.5	133.4
2010	449.221	371.7	77.5	211.0
2011	519.397	421.4	98.0	309.0
2012	601.656	481.9	119.8	428.7
2013	698.191	559.0	139.2	567.9

Annex G

PROJECT SCHEDULE OF ACTIVITIES																					
No	Activity	Year 1				Year 2				Year 3				Year 4				Year 5			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Component 1: Public Lighting Policy Development																					
1.1	Create National Lighting Advisory Committee	■	■																		
1.2	Execute comprehensive national policy study on public lighting		■	■	■																
1.3	Evaluation of opportunities for energy efficiency improvements in public lighting			■	■	■	■	■													
1.4	Development economic and technical tools to support rational public lighting investments			■	■	■	■	■													
1.5	Development and help enforce public lighting regulations				■	■	■	■	■	■											
1.6	Integrate public lighting into local development planning					■	■	■	■	■	■										
1.7	Develop local lighting policy			■	■	■	■	■	■												
1.8	Public lighting regulations monitoring and evaluation							■	■	■	■	■									
Component 2: Public Technical Support Program																					
2.1	Technical capacity building for lighting energy standards and labeling		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
2.2	Provide technical assistance to the local lighting manufacturers					■	■	■	■	■	■	■	■	■	■	■	■	■	■		
2.3	EEL technology transfer																				
2.3	Establish communications with the lighting industry			■	■																
2.4	Upgrade national lighting product testing capabilities					■	■	■	■	■											
2.5	Assessment of capabilities of existing lighting system service					■	■	■	■	■											
2.6	Technical capacity building on EE design and operation and maintenance of lighting systems		■	■	■	■	■	■	■												
2.7	Public lighting sustainable technical development program																				
Component 3: Lighting Financing Program																					
3.1	Promotion of EE public lighting to financial sector			■	■	■	■	■	■												
3.2	Capacity building EE/EC for financial sector					■	■	■	■	■	■										
3.3	Comprehensive study of public lighting financing schemes					■	■	■	■	■	■										
3.4	Technical assistance in the establishment of energy conservation fund							■	■	■	■	■									
Component 4: Public Lighting System Demonstration Program																					
4.1	Review of technical and economic feasibility of demonstration schemes			■	■																
4.2	Baseline data information on the demonstration sites					■	■	■	■	■											
4.3	Specific demonstration scheme implementation barrier removal activities					■	■	■	■	■											
4.4	Implementation of demonstration programs					■	■	■	■	■	■										
4.5	Monitoring and performance review of participating cities																				
4.6	Review of demonstration results and recommendation																				
4.7	Review of Public Lighting Policy																				
Component 5: Information Dissemination and Awareness Raising																					
5.1	Public lighting data facility		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
5.2	VEEPL identify and branding					■	■	■	■	■	■	■	■	■	■	■	■	■	■		
5.3	Efficient public lighting promotional campaign					■	■	■	■	■	■	■	■	■	■	■	■	■	■		
5.4	Public lighting performance rating system					■	■	■	■	■	■	■	■	■	■	■	■	■	■		
5.5	Provision of information to the Vietnamese lighting industry					■	■	■	■	■	■	■	■	■	■	■	■	■	■		
5.6	VEEPL program components output distribution																				
5.7	Public lighting information center (PLIC)					■	■	■	■	■	■	■	■	■	■	■	■	■	■		
<div style="display: flex; justify-content: space-between; align-items: center;"> ■ = Project activities → = Follow-up activities </div>																					