

PROJECT BRIEF

1. IDENTIFIERS

PROJECT NUMBER: CPR/00/G3X
PROJECT NAME: **China: Barrier Removal for Efficient Lighting Products and Systems**
DURATION: 4 years
IMPLEMENTING AGENCY: United Nations Development Programme (UNDP)
EXECUTING AGENCY: Government of China, SETC/Department of Resources Conservation and Comprehensive Utilization (DRC)
REQUESTING COUNTRY: China
ELIGIBILITY: UNFCCC Ratified January 5, 1993
GEF FOCAL AREA: Climate Change
GEF PROGRAMMING FRAMEWORK: Operational Program #5 Removal of Barriers to Energy Efficiency and Energy Conservation

2. **SUMMARY:** The goal of the project is to address identified market barriers by broadening the China Green Lights start-up efforts into a major national effort. A more specific goal of this project is to save energy and protect the environment by reducing lighting energy use in China in 2010 by 10% relative to a constant efficiency scenario. A secondary goal is to increase exports of efficient, quality lighting products in order to bring down GHG emissions in China and help reduce energy use and GHG emissions worldwide. Specific objectives for the project include: Upgrade the quality of Chinese lighting products; increase consumer awareness of, and comfort with, efficient lighting products; make quality, efficient lighting products more affordable to consumers; increase sales of efficient lighting products and services; establish a vibrant, self-sustaining market in efficient lighting products and services and associated supporting policies and services, in order to sustain and expand upon the gains achieved during the project period; and, regularly monitor, evaluate and refine project activities in pursuit of the above objectives

3. COSTS AND FINANCING (MILLION US\$):

GEF:	-Project	8.136
	SUB-TOTAL GEF	8.136

CO-FINANCING:

-Other International	0.560
-Government	10.550
-Private	6.955
Sub-Total Co-financing	18.065

TOTAL PROJECT COSTS:	26.201
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4. ASSOCIATED FINANCING (MILLION US\$):

UNDP (1997 TRAC GRANT)	0.997
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5. OPERATION FOCAL POINT ENDORSEMENT:

Name:	Yang Jinlin	Title: GEF Operational Focal Point
Organization:	Ministry of Finance	Date: December 15, 1999

6. **IMPLEMENTING AGENCY CONTACT:**
Dr. Nandita Mongia, GEF Regional Coordinator for Climate Change, UNDP, Regional Bureau for Asia and the Pacific, fax 212-906-5825

BACKGROUND AND CONTEXT

LIGHTING SECTORS IN CHINA

1. Lighting accounts for approximately 13% of electric energy use in China, and both lighting use and general electric usage have been growing at double digit rates for most of the past decade. This growth in electricity consumption is a major factor in China's growing greenhouse gas emissions; China is already the second largest emitter of greenhouse gases in the world, albeit relatively low in per capita emissions. As China develops, per capita emissions are likely to grow, increasing China's total emissions. Moreover, approximately 75% of China's new electricity capacity is coal based, contributing a disproportionate share to global carbon and other pollutant emissions.

2. Lighting is one of the fastest growing electric end-uses in China, having grown at a rate of 15% annually for much of the 1990's. Lighting use is growing very rapidly with the growth of more international style commercial buildings and greater residential usage with higher income levels. Over the next decade, lighting energy use is projected to continue growing rapidly. Additionally, as lighting energy use grows, this creates more heat within spaces that needs to be removed by air-conditioning, also a fast growing end-use. During the past decade, lighting energy use has grown from approximately 44 TWh in 1988 to 152 TWh in 1998, while overall electricity consumption has grown from 545 TWh to 1167 TWh during the same period.

3. China's lighting industry is one of the largest in the world. China is the world's number one producer of lamps, lighting fixtures, and some other categories of lighting equipment. In 1998, China produced nearly 6 billion lamps, approximately 175 million ballasts, and more than 1 billion luminaires (fixtures). Chinese lighting equipment is exported all over the world, and about one third of the world's compact fluorescent lamps are made in China. As such, actions in China to improve quality and reduce prices of efficient lighting equipment and systems will have global consequences.

4. The widespread use of more efficient lighting technologies can reduce lighting energy use by approximately 40%. A large portion of this potential is in the substitution of compact fluorescent lamps (CFLs) for incandescent lamps. Other major contributions would come from use of advanced fluorescent tubes and ballasts, and replacement of older blended and mercury vapor lamps with newer generations of high-intensity discharge (HID) lights such as high-pressure sodium and metal halide lamps.

PREVIOUS AND ONGOING PROJECTS

5. The Chinese government has recognized the potential energy, environmental and economic benefits of promoting more efficient lighting equipment and systems, and in 1996 initiated the China Green Lights Program making it a key energy saving project of the Ninth Five-Year plan. The Green Lights Program, under the direction of the State Economic and Trade Commission (SETC), has the following goals: 1) Increasing consumer awareness of the economic and environmental benefits of energy efficient lighting systems, 2) Working with manufacturers to increase quality and market share for efficient products, and 3) developing new mechanisms and programs to promote efficient lighting products and systems. Activities under the China Green Lights Program are discussed in Annex K.

6. In 1996, UNDP awarded a \$1 million TRAC grant for Capacity Development for China Green Lights. This project was intended to introduce market mechanisms to increase the demand for energy efficient lighting in China, and to build consumer awareness and confidence in and address

the barriers to the use of energy efficient lighting. The results of the project's activities since 1996 include: 1) significant awareness of green lighting issues, 2) support from the Chinese government to energy-efficient lighting product manufacturers, 3) increased manufacturing capacity of efficient lighting products, and 4) increased market share of energy-efficient lighting products. A summary of the results of this project are included in Annex L.

7. Efficient lighting activities are also supported by other multilateral sponsored activities, including the China Energy Conservation Project funded by the World Bank and the GEF. In that project, the government has worked to establish three pilot Energy Management Companies (EMCs), based on the international energy services company model where efficiency projects are paid for through a performance based mechanism. In these cases, a private company (the EMC) invests in efficiency improvements in an enterprise, and is then repaid through a portion of the savings from the improvements. The pilot EMCs have each identified and implemented several lighting improvement projects. The project also includes a component to develop and disseminate "Best Practices" case studies, and while the emphasis will be on industrial process motor and boiler systems, a few lighting projects will be included.

8. The Chinese government has made significant investment in increasing the production capacity for energy efficient lighting equipment. From 1996 to 1998, SETC oversaw a special fund for efficient lighting manufacturers which disbursed 220 million Yuan (US\$ 27 million) in discounted loans for renovation of equipment with the aim of improving product quality. Additionally, the government granted 4 million Yuan (US\$ 486,000) to support marketing and new product development by energy-efficient lighting product manufacturers. Provincial governments have also supported manufacturers for product improvements at a level more significant than the central government.

9. The Chinese government has also started to develop minimum energy efficiency standards for lighting products. Such mandatory standards, if implemented, would eliminate least efficient lighting products from the Chinese market, and thus would raise the average efficiency of Chinese lighting products. With assistance from the US Environmental Protection Agency and the Lawrence Berkeley National Laboratory, China's State Bureau of Quality and Technical Supervision is currently developing minimum energy efficiency standards for fluorescent ballasts. It is expected that this standard will be finalized and implemented in 2000.

10. In December 1999 UNDESA completed a draft evaluation of China Green Lights Program activities to date. This draft evaluation concludes that the program has been successful in overcoming a number of barriers to efficient lighting in China, but that significant work remains to be done. The UNDESA review provides several recommendations on ways to increase the program's impact, particularly: (1) undertaking pilot government mass purchase programs; (2) implementing a labeling program; and (3) adopting mandatory energy efficiency standards. Each of these recommended elements are major activities in the proposed project.

11. The National People's Congress passed the Energy Conservation Law in 1997, after almost a decade of debate and revision. The Energy Conservation Law requires relevant agencies to formulate implementing regulations to promote energy efficient products. As the coordinating agency for national economy as well as energy conservation, the State Economic and Trade Commission has established the Center for Energy Conservation Products Certification in 1999 to promote a voluntary labeling program that recognizes the most energy-efficient products. The

Center has developed certification procedures and identified compact fluorescent lamps as one of the first candidates upon which energy conservation certification will be applied.

BARRIER TO WIDESPREAD USE OF EFFICIENT LIGHTING IN CHINA

12. As a result of China Green Lights activities and global interest in efficient lighting products, production and use of CFLs in China has skyrocketed in the 1990s. Following slow but steady growth from 3 million CFLs sold in 1990 up to 9 million in 1995, the sales figures in 1996 jumped to 15 million. An even higher jump occurred in 1997 to 37 million CFLs sold. In 1998, the pace of growth has slowed somewhat, in large part due to Asian economic problems, but even still, 40-52 million CFLs were sold in China (estimates vary depending on source). The 1200% CFL growth rate in China from 1990 to 1997 occurred during a time of global growth in CFL sales, where global sales grew from 83 million in 1990 to 356 million in 1997. Similar though less dramatic sales increases in China also occurred for other efficient lighting products such as T8 fluorescent lamps, electronic ballasts, and efficient HID lamps. Most of the growth in efficient lighting product sales has been in the commercial sector; other sectors, particularly residential, have had lagging sales due to quality and cost-effectiveness concerns.

13. The electric power industry in China has been undergoing significant reform in the past decade. In order to meet the rapidly growing need for new capacity, the power sector has attracted substantial new investment that has required the gradual removal of price subsidies and trends toward full market liberalization of electricity prices. The average electricity prices in China in 1999 for the residential and commercial sectors are approximately 0.5 and 0.8Yuan per kWh (US\$0.06 and 0.010 per kWh) respectively (though prices vary quite widely around the country). At these prices, the economics of more efficient lighting products and systems are quite compelling, with the typical payback for a reasonable quality CFL (costing 30 Yuan) being approximately 0.3 years for commercial applications (assuming 45 Watt savings and 2500 hours/year of operation) and 1.7 years for home use (assuming 29 Watt savings and 1200 hours/year of operation). However, due to the higher first cost of the more efficient equipment and concerns about the lifetime of the products, many customers are wary of spending more up front to achieve the life cycle savings.

14. As the sales of CFLs have skyrocketed, prices have dropped dramatically. In 1994, a typical CFL available in China was sold for around 40 Yuan; in 1999 retail sales prices have dropped to as low as 5 Yuan for the same size lamp (although a recent survey of stores in four cities indicates that average prices are around 25 Yuan). The price drops have created significant problems, though, as manufacturers try to undercut each others prices, and quality suffers as adequate quality control and product consistency cannot be maintained at the very low prices now charged. As such, there are inferior quality products flooding the market, and consumers now have a perception that, with these lower quality products that do not last as long as rated, efficient lighting products (e.g., CFLs and electronic ballasts) may save energy but will not save them money. For example, a recent survey of commercial and industrial customers in four cities found that approximately 30% were unhappy with CFLs, electronic ballasts, and high-pressure sodium and metal halide lamps they have recently purchased due to quality problems and short product life.

15. While sales have increased and prices have dropped, many barriers still remain. These barriers include:

- a) confusing market conditions, such that consumers can not distinguish between high- and low-quality products;
- b) poor product quality, in part due to poor quality of raw materials and components used in the manufacture of many efficient lighting products;

- c) lack of information about the use of, and benefits of, higher quality efficient products, particularly in the residential, industrial, and government sectors;
- d) lack of financing in some sectors for more efficient options that have lower life-cycle costs, but higher first costs.

16. With the funds from the UNDP grant exhausted, the Green Lights Program Office has scaled back activities, and momentum will be lost unless new sources of support are secured. The Green Lights Program Office is not able to operate many of the activities that had begun during the past several years, though a small grant from the China Sustainable Energy Program (funded by the Packard Foundation and administered by the Energy Foundation) is allowing for some baseline study work and development of a bulk procurement pilot.

17. Intervention is desperately needed to support quality control activities, information dissemination on finding and using quality products, and innovative financing for products with high initial costs but lifecycle cost savings. While the market for efficient lighting products has grown dramatically in the past decade, there is now strong potential for serious market souring due to quality problems and perceptions that efficient lighting products are not good investments for people with limited disposable income. The problems caused by poor quality products flooding the market may result in longer periods of time to overcome negative perceptions by consumers who have had bad experiences with efficient lighting products.

RATIONALE AND OBJECTIVE (ALTERNATIVE)

18. The growth in China's lighting use, combined with growing lighting-related emissions levels, warrant all potential actions to minimize energy demand growth and resulting greenhouse gas emissions. The Chinese government has taken responsible actions to effect lighting energy use, but incremental activities have been identified which need additional support to most fully capture the energy efficiency potential in lighting. Intervention is needed to support quality control, information dissemination, and market development activities. The menu of activities described in this project will build a broad, sustainable base for an efficient lighting market within China, and overtime, have impacts beyond the Chinese borders.

19. Intervention will have far-reaching, global effects. Chinese CFLs are sold all over the world; in 1998, approximately 100 million CFLs were exported from China. However, quality problems are limiting export sales as problems with past and current products make international customers leery of Chinese CFLs. If these quality issues can be addressed, international sales of lower priced CFLs will soar, and China will see both a growing domestic market as well as a huge, environmentally attractive export market for higher quality, lower cost products.

20. This project is consistent with Operational Programme #5 of the GEF Operational Strategy, Removing Barriers to Improved Energy Efficiency and Conservation. This project builds upon the findings of the GEF-supported Issues and Options in GHG Control in China. One of the conclusions of this report was that lighting efficiency is considered low, and the use of more efficient equipment could yield major energy savings for the economy and reduce future carbon emissions.

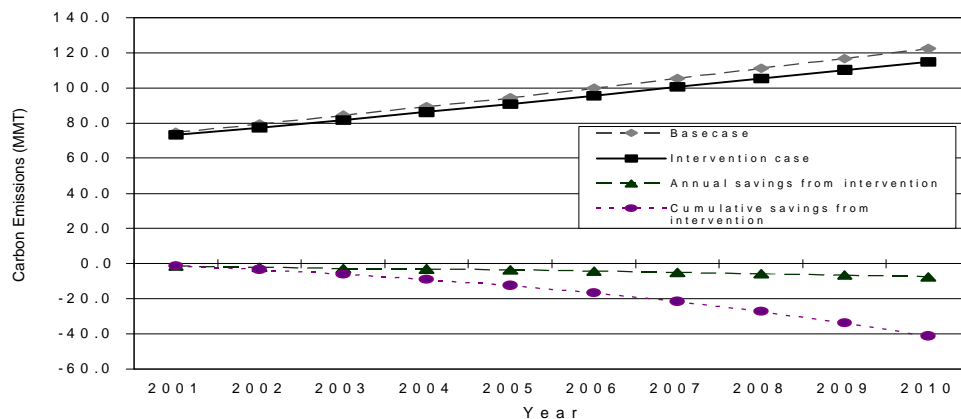
21. Efficient lighting has also been identified as a very cost effective measure in the China country report of the Asian Least-Cost Greenhouse Gas Abatement Strategy being executed by the Asian Development Bank in close collaboration with UNDP. In that report, abatement potential of 10.8 Mt-C was found, with one of the lowest abatement costs of all technologies studied.

22. The goal of the project is to address the market barriers identified above by broadening the China Green Lights start-up efforts into a major national effort. Many of the lessons learned through the pilot activities, both positive and negative, will prove to be very useful as activities are expanded throughout the country. A more specific goal of this project is to save energy and protect the environment by reducing lighting energy use in China in 2010 by 10% relative to a constant efficiency scenario. A secondary goal is to increase exports of efficient, quality lighting products in order to aid the Chinese economy and help to reduce energy use and GHG emissions worldwide.

23. Specific objectives for the project include:

- a) Put mechanism in place to upgrade the quality of Chinese lighting products;
- b) Increase consumer awareness of, and comfort with, efficient lighting products;
- c) Make quality, efficient lighting products more affordable to consumers.
- d) Increase sales of efficient lighting products and services.
- e) Establish a vibrant, self-sustaining market in efficient lighting products and services and associated supporting policies and services, in order to sustain and expand upon the gains achieved during the project period.
- f) Regularly monitor, evaluate and refine project activities in pursuit of the above objectives.

24. While the goal above is to reduce lighting energy use by 10% relative to a constant efficiency scenario, the project will also save a substantial amount of energy (and associated emissions reductions) relative to current market trends. As noted above, the Chinese market for efficient lighting products has been growing in recent years. But, many barriers serve to slow adoption of efficient lighting technologies. This project, by removing and reducing many of these barriers, will accelerate use of efficient lighting technologies and practices, providing for significantly higher market shares than if the China Green Lights Program were to end today. As part of the preparation of this Brief, scenarios were developed as to the likely market penetration of different efficient lighting technologies under two scenarios – a no further intervention scenario and a continued China Green Lights scenario as outlined in this brief. Details of these two scenarios are provided in Annex H. Savings, by year, are shown graphically in the figure below. Overall, by 2010, the difference between these two scenarios (i.e., the net savings attributable to continued intervention) is 18,715 million kWh and 7.5 MMT of carbon emissions.



[24.25.](#)

Figure 1. Chinese Carbon Emissions Attributable to Lighting

26. The net savings attributable to the project can also be presented in tabular form, as shown in Table 1 below.

Table 1. GHG Emissions Reductions Attributable to the Project

Cumulative energy savings over 2001-2010 period	103,277 million kWh
Warming avoided	41.3 MMT carbon equivalent 135,700,000 ton CO2 equivalent
Annual energy savings (2010)	18,715 million kWh
Annual global warming equivalent avoided (2010)	7.5 MMT carbon equivalent 24,640,000 ton CO2 equivalent

26. In 1998 the GEF Council endorsed the International Finance Corporation's Efficient Lighting Initiative (ELI), which is a US\$ 15.2 million multi-faceted effort to accelerate the growth of markets for energy efficient lighting technologies in seven selected GEF-eligible recipient countries. This China efficient lighting barrier removal project differs from ELI in two ways. First, China's markets, both consumers and the lighting industry, dwarf the ELI countries. China's population of 1.2 billion people is more than six times the population of the seven ELI countries combined, and the lighting industry of the ELI countries together is significantly smaller than that in China alone. Second, while ELI focuses on stimulating private investment, there has already been an explosion of private investment in the lighting industry in China. Instead, the barriers in China are more institutional, and this project is designed to specifically overcome those institutional barriers.

27. At the completion of this four-year project, it is expected that there will be a significant reduction in the barriers noted above. Specifically: there will be much greater awareness of, and confidence in, efficient lighting products; there will be higher quality energy-efficient products available; these products will occupy a larger share of the overall market; and product testing, certification, standards and other supporting activities will be in place to maintain the market share and quality of efficient lighting products.

PROJECT ACTIVITIES AND EXPECTED RESULTS

28. To support the objectives listed above, there will be ten major activities. Table 2 below shows how the different activities map into the project's objectives.

Table 2. Relationship of Proposed Activities to Project Objectives

Objective:	Standards	Certification & Labeling	Market Aggregation	Quality & Technology	Consumer Education	Financing Programs	Mechanisms to Sustain	Project Reporting	Program Evaluation	Program Support
Upgrade the quality of Chinese lighting products	x	x	x	x						
Increase awareness of efficient lighting products		x			x					
Make quality, efficient lighting products more affordable			x		x	x				
Increase sales of efficient lighting products and services	x	x	x	x	x	x	x		x	x
Establish a self-sustaining efficient lighting market	x	x					x			
Monitor, evaluate and refine project activities								x	x	x

29. The first objective for this project is to **UPGRADE THE QUALITY OF CHINESE LIGHTING PRODUCTS**. In order to address this objective, four activities will be undertaken: standards; certification and labeling; mass market aggregation activities, and; improving quality and technology level of key raw materials and components. A brief summary of the rationale for each of these activities follows, along with information describing some of the activities within that component, and then a summary of the results or outcomes for the component. More detailed activity plans for each component of the different activities are contained in Annex E.

30. **Standards:** The standards component of the project is designed to establish test procedures and voluntary standards that support certification, labeling, and promotion activities. In addition, the standards component will establish an efficiency floor for lighting products and design, helping to lock in some of the market share gains achieved through other project activities. The standards component consists of two primary activities: developing product efficiency standards for six different product categories, and developing lighting efficiency standards for building design. The product efficiency standards will cover six common lighting products, including CFLs, fluorescent tubes, HID lamps, and ballasts serving these lamps. The lighting design efficiency standards will cover the most common building types in China, including hospitals, schools, residential and industrial buildings, and street lighting.

31. The work to develop the standards will include assembling relevant existing standards for review, developing and reviewing the work, soliciting comments on draft standards from various stakeholder groups, submitting standards to relevant government agencies for enactment, and developing and implementing monitoring and enforcement plans. The standards component will also include several workshops to develop policies and other approaches for enforcing the standards. Development of a well thought out plan to enforce the efficiency and quality standards will result in

stronger consumer confidence toward energy efficient lighting products. The development of standards, combined with product certification and labeling (discussed below) will substantially overcome the barriers of the confusing market conditions, and differentiate the better quality products from poor ones.

32. **Certification and Labeling:** The certification and labeling component is designed to provide an easy way for consumers to identify quality, efficient lighting products. This component consists of improving consistency between test laboratories and developing a certification and endorsement label for energy efficient products. The labeled products would be all of those for which product efficiency standards are developed, plus fluorescent lamp ballasts. This work will be closely coordinated with other certification and labeling activities in China, as discussed in Annex F. This component of work will have a strong effect on changing the current confusing market conditions and allow consumers to understand the value of the better quality products, and provide a clear way to identify high quality efficient products.

33. Work is necessary to improve the consistency between different test laboratories, as it is now possible to get significantly different efficiency and product quality test results depending upon which laboratory tests the products. This activity would compare test results between different national testing laboratories, compare results and procedures with international testing laboratories, upgrade equipment and conduct training where needed, and improve the testing capabilities of manufacturers through training. To develop the certification and endorsement labels, certification procedures will be developed, manufacturers will be trained on requirements and procedures, selected products will be certified to meet the efficiency standards, and periodic testing will be done to maintain quality control and avoid fraudulent use of the certification labels. An active enforcement mechanism will be established to be sure that there is no misuse (e.g., forgery) of the certification labels.

34. Improve quality and technology level of key lighting products as well as key raw materials and components. The project will work with lighting equipment and raw material/component suppliers to improve product quality and make use of modern product designs and production processes. In working with lighting equipment manufacturers, the project will emphasize fluorescent and high-intensity discharge technology including compact fluorescent lamps, electronic ballasts, high-pressure sodium lamps and metal halide lamps. Manufacturers of better quality products will be identified through product testing (in the testing and certification activity of this project) and these manufacturers offered financing and other assistance (through SETC's Energy Efficiency in the Lighting Industry Special Loan Program) to improve and expand their product offerings and production capacity.

35. The current status of some key material and component inputs to common efficient lighting products in China is such that production processes often fail due to inferior input raw materials and components, and the final product quality often suffers. The technology level of some raw material and components needed for efficient lighting production is well below international levels. Through this task, areas of improvement in the raw material and components that affect the quality of final products will be identified. Some of the material/component problems are poor quality phosphors, glass material problems that lead to cloudiness and inconsistent light output through the tubes, glass tube quality and uniformity issues such that junctions between tubes and fittings fail, and poor quality electronic components for ballasts all result in premature failure of efficient lighting products.

36. In this component of the project, surveys of suppliers to efficient lighting equipment manufacturers would be done, and then detailed process assessments of input quality issues would be made by both domestic and international experts to determine where the raw material and component problems are most prevalent. They would then identify methods to overcome these problems, and develop a priority list of technology retrofit projects. It is expected that at the end of this task, most of the major raw material and component input quality problems to Chinese efficient lighting manufacturers would be identified, and methodologies of mitigating such problems publicized. A few of the technology retrofit projects will then be implemented under this task with funding from manufacturers and the Chinese government, and others will be presented to lighting industry associations and manufacturers for future implementation. As a result, it is expected that there would be a more complete chain of suppliers from raw materials through finished efficient lighting products available, at a lower cost but significantly higher quality than exists at the present time. This activity will have a direct effect on overcoming the barrier of poor product quality.

37. Market aggregation activities. Mass, or bulk, purchase activities, can cause market aggregation where large consumer groups are organized to establish market pull in support of desired efforts. The intent of these efforts will be to help “kick start” the domestic Chinese market for quality, efficient lighting products. As noted above, implementing pilot mass-purchase programs was one of the priority recommendations of the UNDESA review of the China Green Lights program. In this project, mass purchase activities will be organized to aggregate large purchases of high quality energy-efficient lighting products, to create demand for the quality levels that will result in consumer satisfaction yet still provide cost effective energy savings. Through the market aggregation, large buying groups, with order sizes that will attract the attention of major manufacturers, will be put out to bid, but with relatively stringent quality assurance requirements. For example, a city might organize an order for 2 million CFLs for all of its public buildings and its residents. A condition of the bid would be a guarantee of a minimum lifetime or quality level for the lamps, and a money-back or replacement guarantee for any products that don’t meet the established criteria. While the prices for these lamps may be slightly higher than what consumers would otherwise find, the reliability of the lamps should be significantly better, which should create demand for more high efficiency products. The government is just starting to develop new procurement approaches for government purchases, and this project component will work with those new emerging procurement processes.

38. Work in this activity will include research on potential policies and measures to encourage setting up national and provincial bulk purchase systems; identifying, and then coordinating with, potential purchaser groups; and finally, demonstration bulk procurements, which will include incentives linked to performance (number of lamps sold) in some residential procurements to overcome higher residential consumer costs for the better quality products promoted through the mass purchase (incentives will not be used for procurements by commercial, institutional and institutional customers). Following the project, systems will be in place for more market aggregation and bulk purchase activities to take place on a wide scale. These market aggregation activities will both aid in providing consumers with information on the better quality and value efficient products to purchase, and aid in lowering the higher first cost.

39. The second objective for the project is to increase consumer awareness of, and comfort with, efficient lighting products. In order to address this objective, there will be significant consumer education and information dissemination and training for professionals. Activities will include: developing consumer education media promotion plans; mass media promotion; retail promotions;

preparing educational publications for the public; developing and maintaining a Green Lights web page; professional training, and; workshops for large end-users. A brief summary of the rationale for, activities under, and expected outcomes of these activities follow. More detailed plans for these activities are contained in Annex E.

40. Consumer education and information dissemination and training for professionals will address many of the information barriers that currently exist and that restrict the wider use of efficient lighting technologies. As noted above, lack of information about efficient lighting options and the ability to distinguish high from low quality products is a key barrier, particularly in residential, industrial and government sectors. These three sectors will be a special target for consumer education activities. Professionals who work in these sectors will be targeted for training activities. Credible consumer training and education, and wide dissemination of energy and cost savings potential can overcome these barriers.

41. In the education, information dissemination and training component, research will be done on potential low cost mass media campaigns such as public service announcements and cooperative advertising, then information dissemination will be widely done to educate consumers, including development and distribution of publications (including brochures, case studies and pattern books). The media work is particularly important for reaching consumers in rural areas and small towns. Additionally, an internet web page including product and program information will be developed and maintained, and substantial training for lighting and building design professionals, as well as large energy end-users, will be developed and conducted on a wide scale. As a result of these activities, it is expected that end-users will be significantly more aware of opportunities to improve lighting energy efficiency, and the benefits of doing so. In addition, many lighting professionals will be better trained to provide services to end-users.

42. The third objective is to make quality, efficient lighting products more affordable to consumers. The primary activity to address this objective will be financing programs, consisting of two sub-activities: utility-based programs; and promoting development of ESCo financing for lighting projects. In addition to these activities, the market aggregation and consumer education and promotion activities discussed above are intended to increase demand for efficient lighting technologies, leading to economies of scale and price reductions, making efficient technologies more affordable to consumers. A brief summary of the rationale for, activities under, and expected outcomes of the financing activities follow. More detailed plans for this activity and its sub-activities are contained in Annex E.

43. Financing programs. High initial costs of efficient lighting products, which have lower life-cycle costs, are a major barrier to the adoption of efficient lighting technologies by end-users, particularly in the residential and government/institutional sectors. Experience around the world has shown that financial incentives and financing programs (such as rebates and financing through utilities and financing through energy service companies) are effective at addressing this barrier. This project will promote two types of innovative financing – utility financing and Energy Management Companies (EMC's).

44. Electric distribution utilities are in a unique position to deliver energy efficiency information and technology to their customers by virtue of their role of providing energy services. They can also implement innovative financing schemes to help overcome consumer resistance to the higher initial cost of efficient lighting products. While there are currently significant complications to utility involvement in promoting efficient lighting in China due to restructuring of the utility sector, the

temporary slowdown in electric sales growth, and a current electricity-supply surplus in some regions, this is a temporary situation. There are strong successful examples around the world of utility based programs having impact in working with customers to deliver energy efficiency (as in the GEF/IFC Ilumex project and the GEF/World Bank Thai DSM project). This potential clearly exists in China. Utilities would also have strong incentive to participate in such financing programs for efficient lighting products, since they, if structured properly, could generate additional revenue for the utilities, help to defer costly and uncertain long-term investments in generation assets, and increase customer satisfaction and loyalty in the competitive environment. However, these benefits are not immediately apparent to Chinese utilities who generally lack experience in running these types of programs. The initial pilot programs undertaken as part of the GEF project will be used to demonstrate the benefits of these programmes to utilities.

45. In this project component, existing utility program information and results, both domestic and international, will be reviewed, in coordination with the State Power Corporation's National DSM (demand-side management) Center. Innovative new programs will then be designed, including leasing and tariff-based initiatives, which will be piloted in selected municipalities and results disseminated for wider program activity. Incentives will be used only in the residential sector (since this sector is the hardest to reach). Incentive funds will come partially from the GEF and partially from utility and local government contributions. Use of GEF money for incentives will be scaled so that only limited funds are available for initial incentive activities, and release of subsequent incentive funds will be contingent on specified quantity and fund matching targets. The scale of these pilot programs is relatively small; however, their replication potential is tremendous in China. This work will be coordinated with on-going efforts by the Energy Foundation to promote utility energy efficiency programs as part of utility restructuring in China. If the Energy Foundation effort is successful, it will offer a major route for replicating the pilot projects funded by GEF.

46. There is currently a major GEF/World Bank project in China to support and promote the development of Energy Management Companies in China (discussed previously in paragraph 10 of this Brief). The EMC project is about to enter its second phase which will further expand the pool of EMCs working in China. Lighting projects are a limited business area of the current EMCs, and are likely to be a component of future EMC activity. Because EMC's are addressed through an existing GEF project, this China Green Lights program will only undertake limited activity in this area, to complement it.

47. Specifically, the China Green Lights program will help publicize successful EMC lighting projects, and will assist several Chinese EMC's to develop a product line to undertake lighting design projects (nearly all current EMC lighting projects are simple lamp replacements). It will also encourage and assist lighting product manufacturers to offer financing to their customers, including conventional financing as well as innovative financing approaches used by EMC's. Additionally, the project will work with lighting manufacturers and others, such as installation contractors, to develop service products, including ongoing maintenance of building lighting systems and other commercial building services. Firms will be selected for assistance based on their level of interest and on their ability, as assessed by project staff, to successfully implement these services. The expected results of these activities will be increased on-going lighting project financing by Chinese EMC's and lighting product manufacturers, and potential new market entrants providing comprehensive lighting management and maintenance services (including financing). The EMC project is administered by the same department of SETC as the China Green Lights Program, so coordination between these

two programs is strong. Further details on the relationship between the EMC project and Green Lights are in Annex F.

48. The fourth objective, increase sales of efficient lighting products and services, will be addressed by all of the activities discussed above. As product quality improves, and as consumers can more readily identify efficient quality products (through the certification and labeling program) consumers should be more willing to purchase efficient products. Consumer education, information dissemination and training activities will educate consumers about efficient lighting products and their benefits, helping to increase sales. Utility and EMC programs will help finance lighting upgrades, thereby contributing to sales. And as sales increase, product prices should come down, spurring further sales increases.

49. The fifth objective is to establish a vibrant, self-sustaining market in efficient lighting products and services and associated supporting policies and services. This objective will be addressed by initiating a specific activity focussing to improve mechanisms that sustain key project activities. In addition, many of the other project activities discussed above will address this objective including on-going testing, certification, labeling, market aggregation and financing programs as well as on-going efforts by manufacturers to improve and promote their products.

50. Improve mechanisms to sustain key project activities. As noted above, many project activities are designed to be self-sustaining. Other project activities may or may not be sustained, depending on follow-up efforts. In order to ensure that key activities will be sustained, a specific project task will be to identify project activities that need to be sustained, and to develop and implement a plan for sustaining these activities. In some cases government agencies [are likely](#) to sustain activities as part of their on-going governmental functions. For example, agencies responsible for standards, labeling and certification are likely to continue those activities; the only real question is developing on-going sources of financing. Likewise, assuming government bulk-purchase programs are as successful in China as they are in many other countries, there is an excellent chance local and provincial governments will continue these programs after GEF-supported pilots end. In other cases, the lighting industry, working at the individual firm level or through its trade association may be able to sustain some key activities. Many professional and public education efforts may fall into this category as well as efforts to maintain and improve product quality. Lighting-related energy management companies are also likely to continue their activities without much further help. On the other hand, depending on the progress of electric utility restructuring in China, strategies for continuing utility financing programs may need to be developed. In developing approaches for sustaining project activities, international and domestic experience will be reviewed and a detailed recommended action plan developed. Implementation of this action plan will begin in the final years of this project, so that by the time GEF financing runs out, most, if not all, key activities are self-sustaining.

51. The sixth, and final objective is to regularly monitor, evaluate and refine project activities in pursuit of the other objectives. In order to achieve this objective, the following activities will be undertaken: project reporting; program evaluation; and program support. A brief summary of the rationale for, activities under, and expected outcomes of these activities are discussed below. More detailed plans for these activities are contained in Annex E.

52. Project reporting. On an annual basis, the PMO will prepare a report that documents project activities, progress, problems, and steps being taken to address problems. In addition, periodic

special reports will be prepared as results are obtained from major activities. Reports will be distributed to energy management agencies, project funders, and other interested parties. These reports will be complemented by other independent reports coming out of the project evaluation component (discussed below). Furthermore, project accomplishments will be promoted to the general public and lighting professionals as part of consumer and professional education and information dissemination activities (discussed above).

53. Program evaluation. As noted later in this brief, continuous project monitoring and evaluation are key to maximizing the benefits of the project, and measuring project success. Activities will include periodic market surveys of lighting manufacturers, wholesalers and retailers, and lighting users (including urban and rural users), to track progress in the market. Evaluations will also be conducted of the various program activities to learn about opportunities for improvement.

54. Program support activities. Given the size of this effort, it is necessary to have some program support activities to manage the project and monitor project implementation. The prime task is establishing a project management office (PMO) to administer and coordinate the project and assist with many of the project activities. Further details on the Project Management Office are discussed in paragraph 59 below. In addition, this activity will support preparation of the detailed project documents, building from the activity plan in Annex E.

RISKS AND SUSTAINABILITY

55. Specific risks include technology risk, market risk, and macro-economic risk. The viability of the utility or ESCO financing schemes may also be considered as a risky part of the project. Technology risks would include products not performing as expected or promised through the project. This project is specifically designed, though, to overcome this risk which already exists in the Chinese marketplace, and has limited the further growth in efficient lighting markets there. Market risk is the situation whereby consumers are already so concerned about the quality and value of efficient lighting products that they are unwilling to purchase and try them again due to past bad experiences. Several of the project components, including the mass purchases and utility programs, are specifically designed to overcome this risk. Macro-economic risk is the potential decline or collapse of the Chinese economy, or a change in government priorities toward energy efficiency if other conflicting needs arise. While the innovative financing scheme is a potential risk, the potential benefits /opportunities from moving with utilities in generating new revenue sources outweigh this risk. The potential benefits if the DSM type activities are successful are huge and most of the same arrangements that are being made in this project are similar to those applicable to the IFC efficient lighting projects. They are focussing on, and apparently having success with utility schemes. The fact that the SETC is in charge of the China ESCO and the China Green lights project will improve coordination and reduce potential risk associated to ESCO financing schemes. SETC oversees ESCO development in China and has endorsed the idea and thinks speciality lighting ESCOs make a lot of sense in the Chinese context. As a starter the three EMCs have all considered lighting retrofit as a key part of their project portfolio and SETC has encouraged collaboration between EMCs and the GL projects.

56. There is also some risk that consumers will not be willing to pay the slightly higher prices for quality products. While it is anticipated that the incremental cost for the better quality efficient products will become significantly smaller than the present differential between low and high quality models, consumers may still make lowest first cost decisions. This is not always the case, though, and there are other examples in China (such as refrigerators) where consumers have demonstrated a

willingness to pay more for higher quality, and the better quality manufacturers have become the largest players in the market.

57. This project's components are generally designed to be inherently sustainable by design: they are primarily market building activities, such as information dissemination and overcoming quality problems, which will result in stronger, lasting markets for efficient lighting products. The fact that there is little reliance on product incentives (other than a small amount to jump-start some of the bulk purchase efforts) means that there are no activities that will not continue when the project ends. Furthermore, many of the project activities are designed to continue after the GEF project ends including product testing, certification, labeling, and continued refinement of standards. In particular, with efficiency standards in place, the minimum efficiency floor will have been raised, regardless of whether activities continue. Furthermore, a specific activity in the project is to research, develop and implement a plan for continuing key project activities after GEF funds run out using government agencies, the China Association of the Lighting Industry, and other appropriate organizations.

STAKEHOLDER PARTICIPATION AND IMPLEMENTATION ARRANGEMENTS

STAKEHOLDER PARTICIPATION

58. The Green Lights Program (GLP) has a high priority among China's energy-conservation activities. The program is listed as a key activity in China's Ninth Five-Year Plan (covering 1996-2000) and it is very likely to be included as a key activity in China's Tenth Five-Year Plan (decisions on this plan will be made in the fall of 2000). To ensure that the objectives of the program are achieved, a Leading Group of key officials and experts from various Chinese Ministries and Commissions, academia, industry and non-government organizations, has been organized. The Leading Group coordinates all the relevant government agencies work in the Program, provides policy guidance to the Program, and approves important working plans. The Leading Group is chaired by the Vice-chairman of the State Economic and Trade Commission (SETC), the lead body for energy conservation and GLP in China. The Group will engage provincial Governments and local communities in implementing the activities under GLP. The roles of the members of the GLP Leading Group and its advisors are summarized below.

59. The SETC is responsible for coordinating major Government-led economic initiatives in China. One such economic initiative is energy conservation, including technology renovation and replacement to upgrade technologies and processes. As a result, SETC has the lead responsibility in the coordination of the GLP. Under the Leading Group, a Program Office has been established, led by SETC. The program Office is responsible for annual working plans for the GLP. The Beijing Energy Efficiency Center (BECon) is the major technical supporting group to the office, and will provide a substantial role assisting SETC in implementation of this project. In addition, provincial and municipal governments around China have established corresponding Green Lights Program Offices, under the supervision of SETC, to assist in the implementation of local demonstration programs.

60. Other organizations involved in the Leading Group that will participate in the implementation of the project include (details on specific responsibilities of these organizations are listed in Annex G):

- a) State Development Planning Commission (SDPC)
- b) Ministry of Science and Technology (MOST)

- c) State Bureau of Quality and Technology Supervision (SBTS)
- d) Ministry of Construction (MOC).
- e) State Environmental Protection Agency (SEPA)
- f) China National Council of Light Industry (CNCLI)
- g) Ministry of Information Industry (MOII)
- h) Ministry of Agriculture (MOA)
- i) State Power Corporation (SPC)
- j) Chinese Academy of Sciences (CAS)
- k) China Energy Conservation Investment Corporation (CECIC).

61. In addition, the Leading Group receives advice and counseling from following organizations (again, details on specific responsibilities of these organizations are listed in Annex G):

- a) China Energy Conservation Association (CECA)
- b) Chinese Society of Lighting (CSL).
- c) China Lighting Association (CLA)
- d) China Certification Center for Energy Conservation Products (CECP)
- e) Local Energy Conservation Centers

IMPLEMENTATION ARRANGEMENTS

62. The project will be nationally executed by the Department of Resources Conservation and Comprehensive Utilization (DRC) of SETC. SETC will appoint a senior official as National Project Director. DRC will be responsible to GOC and UNDP for the achievement of project objectives, for all project reporting, including the submission of workplans and financial reports. The project will be executed fully in line with UNDP national execution procedures, as detailed in the China NEX Manual. DRC will take overall responsibility for tracking and dispensing UNDP/GEF funds.

63. SETC will establish a Project Management Office (PMO) for this project. The PMO will be headed by a part-time director who is a senior staff member of SETC. PMO will be staffed by several full-time personnel, some recruited by SETC and others by the project. The PMO will include a part-time international advisor. The PMO will be responsible for the day-to-day coordination and implementation of project activities.

64. Where beneficial, a Chinese Government project management agency and/or a UN technical agency will be identified by SETC and utilized to mobilize inputs (personnel, training, equipment, etc.) and to facilitate the preparation of financial and administrative reports. Administrative costs to cover this will be from the project budget. The details of this are to be determined prior to the finalization of the UNDP project document.

65. To oversee technical development of the project, SETC will establish a project advisory group consisting of MOF, UNDP, SETC and key members of the GLP Leading Group. This advisory group will meet when necessary, and will play a continuous role in guiding project activities and promoting project outputs.

66. We anticipate that the project will be divided into approximately three phases, with release of funds for the second and third phases contingent on achieving certain specified milestones for the first and second phases. These detailed milestones and budgets will be developed as part of the Project Documents and are likely to include several milestones per phase for each of the ten major

activities. As an illustration of how this will work, the table below lists some possible milestones for the first phase of the project covering an approximately 18 month period.

Activity	Possible Phase 1 Milestones
1. Standards	Issue one product standard; develop implementation/enforcement plan; issue draft of first building design standard
2. Certification & labeling	Finalize certification and labeling program for at least one product; issue report on recommendations for improving product testing
3. Quality & technology	Complete initial report on material and component quality issues and possible steps for addressing these issues.
4. Market aggregation	Mass purchase groups identified and detailed implementation plans prepared.
5. Consumer education	Website established; cooperative advertising plan finalized and advertising begins; curriculum for initial professional training courses developed and pilot begins.
6. Financing	Utility program designs complete; two case studies of EMC lighting projects completed; training program for lighting manufacturers/suppliers developed on how they can offer EMC services
7. Mechanisms to sustain	No phase 1 activities – work begins in phase 2
8. Program reporting	First year report completed and annual review meeting held
9. Evaluation	Detailed evaluation plan completed; year one tracking surveys completed
10. Program support	Project Management Office set-up and fully staffed.

67. Possible milestones for the second phase of the project, covering approximately the next 18 months of the project are listed in the table below:

Activity	Possible Phase 1 Milestones
1. Standards	Issue two more product standards; begin to implement

	enforcement plan; issue at least two final building design standard
2. Certification & labeling	Finalize certification and labeling program for at least two more products; product testing improved so that consistent results routinely obtained
3. Quality & technology	Complete at least three projects to improve quality of raw material and equipment, at least three additional projects underway
4. Market aggregation	Mass procurements implemented in the residential and institutional sectors totaling at least one million lamps.
5. Consumer education	Educational materials completed; at least 20 professional training workshops held; at least 10 workshops held for large users; cooperative advertising, local newspaper and PSA campaigns underway and have reached at least 50 million readers/viewers.
6. Financing	Utility pilot programs implemented and evaluations/case studies underway; companies in at least three cities offering financing for lighting projects using the EMC services model.
7. Mechanisms to sustain	Report on key activities to sustain efforts completed; draft action plan completed.
8. Program reporting	Second year report completed and annual review meeting held; third year report available in draft form.
9. Evaluation	Year two tracking surveys completed and year three surveys underway; evaluation reports completed on at least three project components.
10. Program support	Project Management Office functioning smoothly.

INCREMENTAL COSTS AND PROJECT FINANCING

68. The budget for the project and its different components is shown in Table 3 below (all amounts are in thousands of U.S. dollars):

Table 3: Indicative GEF Budget for Major Program Components

Table 3: Indicative GEF Budget for Major Program Components									
COMPONENT	Staff	Training	Equipment		Other	Travel	Costs:	TOTAL	
	Costs	Costs	Costs	Incentives	Costs	Domestic			Int'l
Standards									

Total Baseline Funds	\$50,000	\$300,000	\$30,000					\$380,000
Funds Requested from GEF	\$340,525	\$330,000	\$240,000			\$23,200	\$101,000	\$1,034,725
Funds Leveraged from Others	\$100,000							\$100,000
Estimated Funds Required	\$490,525	\$330,000	\$270,000			\$23,200	\$101,000	\$1,514,725
Certification and labeling								
Total Baseline Funds	\$160,000		\$450,000					\$610,000
Funds Requested from GEF	\$133,500	\$105,000	\$670,000			\$24,800	\$142,000	\$1,075,300
Funds Leveraged from Others								\$0
Estimated Funds Required	\$293,500	\$105,000	\$1,120,000			\$24,800	\$142,000	\$1,685,300
Improve Quality and Tech. Level of Key Lighting Equipment & Raw Materials								
Total Baseline Funds	\$300,000		\$9,200,000					\$9,500,000
Funds Requested from GEF	\$91,000	\$112,000				\$20,000	\$12,000	\$235,000
Funds Leveraged from Others			\$2,000,000					\$2,000,000
Estimated Funds Required	\$391,000	\$112,000	\$11,200,000			\$20,000	\$12,000	\$11,735,000
Organize Market Aggregation Activities								
Total Baseline Funds		\$115,000						\$115,000
Funds Requested from GEF	\$359,250	\$20,000	\$0	\$700,000	\$7,500	\$69,600	\$45,000	\$1,201,350
Funds Leveraged from Others	\$50,000							\$50,000
Estimated Funds Required	\$409,250	\$20,000	\$0	\$700,000	\$7,500	\$69,600	\$45,000	\$1,366,350
Consumer Education and Information Dissemination and Training Professionals Program								
Total Baseline Funds	\$200,000	\$375,000						\$575,000
Funds Requested from GEF	\$465,150	\$252,500	\$511,400			\$51,200	\$53,000	\$1,333,250
Funds Leveraged from Others		\$4,000,000						\$4,000,000
Estimated Funds Required	\$665,150	\$4,627,500	\$511,400			\$51,200	\$53,000	\$5,908,250
Financing Programs								
Total Baseline Funds								\$0
Funds Requested from GEF	\$236,875	\$102,000	\$0	\$400,000	\$100,000	\$38,400	\$53,000	\$930,275
Funds Leveraged from Others	\$50,000			\$300,000				\$350,000
Estimated Funds Required	\$286,875	\$102,000	\$0	\$700,000	\$100,000	\$38,400	\$53,000	\$1,280,275
Improve Mechanisms to Sustain Key Project Activities								
Total Baseline Funds								\$0
Funds Requested	\$94,600	\$290,000	\$0			\$20,000	\$20,000	\$424,600

from GEF								
Funds Leveraged from Others	\$50,000							\$50,000
Estimated Funds Required	\$144,600	\$290,000	\$0		\$20,000	\$20,000		\$474,600
Program Reporting								
Total Baseline Funds								\$0
Funds Requested from GEF	\$36,000	\$320,000						\$356,000
Funds Leveraged from Others								\$0
Estimated Funds Required	\$36,000	\$320,000	\$0			\$0		\$356,000
Evaluation								
Total Baseline Funds								\$0
Funds Requested from GEF	\$347,050	\$80,000	\$76,000		\$25,600	\$28,000		\$556,650
Funds Leveraged from Others	\$80,000							\$80,000
Estimated Funds Required	\$427,050	\$80,000	\$76,000		\$25,600	\$28,000		\$636,650
Program Support								
Total Baseline Funds		\$145,000						\$145,000
Funds Requested from GEF	\$577,800	\$25,000	\$310,000		\$32,000	\$44,000		\$988,800
Funds Leveraged from Others	\$110,000							\$110,000
Estimated Funds Required	\$687,800	\$25,000	\$310,000		\$32,000	\$44,000		\$1,243,800
SUMMARY								
Total Baseline Funds	\$710,000	\$935,000	\$9,680,000	\$0	\$0	\$0	\$0	\$11,325,000
Funds Requested from GEF	\$2,681,750	\$1,636,500	\$1,807,400	\$1,100,000	\$107,500	\$304,800	\$498,000	\$8,135,950
Funds Leveraged from Others	\$440,000	\$4,000,000	\$2,000,000	\$300,000	\$0	\$0	\$0	\$6,740,000
Total Funds Required	\$3,831,750	\$6,571,500	\$13,487,400	\$1,400,000	\$107,500	\$304,800	\$498,000	\$26,200,950
		Total Baseline Funds					43.2%	\$11,325,000
		Total GEF Funds					31.1%	\$8,135,950
		Total Leveraged Funds					25.7%	\$6,740,000
		Total Project Cost						\$26,200,950

69. The total estimated project cost is US\$ 26,200,950. In addition to the US\$ 8,135,950 GEF funding request, GOC will provide US\$1,550,000 in program expenses plus a US\$ 9 million loan and interest subsidy fund for modernization and expansion of production facilities for lighting equipment, components and raw materials. Chinese manufacturers will supply an additional US\$ 6,655,000 over the next four years, mostly to pay for cooperative advertising with the China Green Lights program. And Chinese utilities and local governments will be asked to contribute \$300,000 toward incentives in the utility pilot programs. The other international funds shown in the table above include support from the US Environmental Protection Agency and from the China Sustainable Energy Program funded by the Packard Foundation and administered by the Energy Foundation.

70. The contribution from GOC comes from estimated budgetary allocations on the national level for specific program components (such as Efficiency Standards, Certification and Labeling, Market Promotion, and Program Support. Potential matching funds from provincial and municipal governments are not included in these figures and would be over and above the amounts listed. The \$9,000,000 modernization loan fund is discussed in the paragraph below. The \$6,655,000 contribution from Chinese manufacturers includes only the most conservative cost estimates for Chinese manufacturers in participation of standards, certification, and labeling activities outlined here (a total of \$655,000) in addition to advertising of efficient lighting products (very conservatively estimated at \$1,000,000 per year for four years, [plus at least \\$2 million in investments to produce improved quality products and raw materials](#)). [We expect that](#) Chinese manufacturers will invest [much more](#) in new production facilities or facility upgrades over the next four years. However, at this stage of project development, it is difficult to estimate how much private investors and manufacturers will invest, so [for now we have only listed a very conservative estimate of](#) these funds.

71. As noted in paragraph 7 of this Brief, since 1996, SETC has operated a special funding program to finance the development of manufacturing capability for efficient lighting products, and has disbursed 220 million yuan (US \$ 27 million) in low-interest loans to Chinese manufacturers. Recently, the Investment Department of SETC has allocated additional funds to be loaned by Chinese banks to lighting equipment, component and material manufacturers to modernize production facilities, increase production quantities, and improve product quality. In addition, as part of this program, SETC writes-down the interest rate on selected loans that demonstrably improve product quality. The exact amount of loans and interest reductions has not been determined but will total at least 75 million Yuan (\$9 million) in support of the China Green Lights Program. [In part, the amount of money SETC provides will depend on need; if there is need for more than \\$9 million, there is a good chance SETC could provide some more money for facility improvements.](#)

72. In addition to funding listed above, the Energy Foundation of San Francisco is supporting preparation of the Project Brief and a pilot market aggregation program with a grant of US\$ 230,000. The US Environmental Protection Agency is also supporting the development of energy efficiency standard for fluorescent ballasts with a grant of US\$ 300,000 to Lawrence Berkeley National Laboratories. USEPA also provided several grants to the American Council for an Energy-Efficient Economy (totaling approximately \$30,000) in support of the China Green Lights Program including funding a series of surveys in China to assess the current status of the Chinese lighting market.

73. The total project incremental cost to be funded by GEF for all ten program components amounts to US\$ **8,135,950**. Almost all of the project incremental costs are direct program expenditures, with a small utility based leasing pilot program that is expected to at least partially recover costs. Table 4 describes the program cost by components in more detail.

74. A tentative schedule of activities to be finalised at the project document development phase is provided in Annex I.

Table 4: Cost Categories (in US Dollars)

Table 4: Cost Categories (in US Dollars)										
Activities	Baseline	Source	Leveraged Funds	Source	Type of Funds in Baseline and Leveraged Totals		Increment	Source	Activity Total	
					Cash	In-Kind				
					1	Standards				\$380,000
2	Certification and labeling	\$610,000	GOC and lighting manuf.	\$0		\$0	\$610,000	\$1,075,300	GEF	\$1,685,300
3	Improve Quality and Tech. Level of Key Lighting Equipment & Raw Materials	\$9,500,000	GOC including SETC Interest Subsidies; lighting manuf.	\$2,000,000	Lighting manuf.	\$9,200,000	\$300,000	\$235,000	GEF	\$11,735,000
4	Organize Market Aggregation Activities	\$50,000	GOC	\$115,000	Energy Foundati on in SF	\$115,000	\$50,000	\$1,201,350	GEF	\$1,366,350
5	Consumer Education and Information Dissemination and Training Professionals Program	\$500,000	GOC and lighting manuf.	\$4,075,000	Lighting manuf.	\$4,000,000	\$575,000	\$1,333,250	GEF	\$5,908,250
6	Financing Programs	\$0		\$350,000	GOC, utilities & provincia l gov'ts	\$0	\$50,000	\$930,275	GEF	\$1,280,275
7	Improve Mechanisms to Sustain Key Project Activities	\$0		\$50,000	GOC	\$0	\$50,000	\$424,600	GEF	\$474,600
8	Program Reporting	\$0				\$0	\$0	\$356,000		\$356,000
9	Evaluation	\$0		\$80,000	GOC	\$0	\$80,000	\$556,650	GEF	\$636,650
10	Program Support	\$110,000	GOC	\$145,000	EF, USEPA	\$145,000	\$110,000	\$988,800	GEF	\$1,243,800
										Grand Total:
Sub-Total										\$26,200,950
										GRAND TOTAL:
										\$26,200,950

Monitoring, Evaluation and Dissemination

75. UNDP will be responsible for monitoring and evaluation of the overall project. Annual reviews will be held consisting of UNDP, SETC, the Green Lights Project Management Office, and other appropriate invitees to review project progress. The Green Lights Project Management Office, with assistance from the Green Lights Leading Group, will monitor all of the activities under this grant on an on-going basis.

76. Evaluation of this project will consist of three major components. First, the Green Lights Project Management Office will regularly consult with lead implementers for each activity and people and organizations affected by particular activities to get their feedback on how specific activities are proceeding and what modifications may be needed. Second, on an annual basis, a series of surveys will be conducted to track the current status of the Chinese lighting market, including production, sales, prices and perceptions of particular products and practices. These surveys will include manufacturers, wholesalers, retailers, and residential, commercial and industrial end-users. A pilot set of surveys was conducted in 1999 with funding from the Energy Foundation and the U.S. Environmental Protection Agency and is included in Annex J. Third, independent evaluation reports will be commissioned for each of the six major project components as well as for the project as a whole. These evaluations will be conducted by independent Chinese evaluators with advice and assistance from international evaluation experts. In response to comments from the STAP reviewer and the GEF Secretariat, we have specifically added funds to conduct evaluation planning at the beginning of the project, to regularly track progress towards performance indicators during the project, and to increase the scope and distribution of the final report including substantial distribution of this report to international audiences so as to aid replication of this project in other countries.

77. Results of monitoring and evaluation efforts will be regularly reviewed by SETC, the Leading Group and the Green Lights Project Office and appropriate modifications made to project activities. In particular, annual project review meetings will be used to review evaluation and monitoring results from the past year and to develop appropriate plans for the next year. Given the dynamic nature of the Chinese lighting market, we anticipate that monitoring and evaluation results will lead to significant modifications to the project plan as described in this brief. These modifications will be made in consultation with the executing agency.

LIST OF ANNEXES:

- Annex A – Incremental Cost Analysis
- Annex B – Project Planning Matrix (Logical Framework)
- Annex C – Government Support Letter
- Annex D – STAP Review and Response

OPTIONAL ANNEXES

- Annex E – Detailed Activity Plan
- Annex F – Coordination with Other Related Activities in China

Annex G – Chinese Organizations Involved in the Green Lights Leading Group (Available with the Implementing Agency ‘I.A.’)

Annex H – Lighting Savings Scenarios

Annex I – Project Workplan

Annex J – Results of Baseline Surveys (Available with Implementing Agency ‘I.A.’)

Annex K - The China Green Lights Program: A Progress Report (Available with I.A.)

Annex L – Final Presentation on Implementation of UNDP TRAC Grant (Available with I.A.)

ANNEX A – INCREMENTAL COST

Broad Development Goal

The Government of China, specifically SETC and other concerned ministries, seek to meet the growing demand for electrical energy at the lowest cost and environmental damage. Given the forecasts of significant use of coal, and its resulting environmental effects, energy efficiency is a very high priority. Additionally, SETC views the efficient lighting manufacturing industry as a high growth potential industry for substantial increases in export of sustainable energy technology, achieving other government development goals of clean, high growth industrial employment.

Baseline

As described further in the brief, the baseline condition is continued growth of the efficient lighting markets in China, but with several barriers to realizing full economic potential. In the baseline scenario, the lighting industry will continue to grow, but the confusing market conditions, poor product quality, and lack of information and financing will severely limit the overall growth of the market. Consumers will grow wary of some efficient lighting technologies due to quality problems and early failures, and the confused market conditions will continue unabated.

Global Environmental Objectives

This project seeks to reduce greenhouse gas emissions by limiting the electric energy demand growth through more efficient lighting in China. The project will significantly cut the current, and projected future, waste of electric energy used by lighting systems in buildings. In addition to the impact in China, the project will have global spillover effects, as the immense Chinese lighting industry exports to most of the world, and the higher quality and reduced costs for products in China resulting from the project will have effects throughout the world.

GEF Alternative Scenario

The GEF supported alternative scenario has six objectives:

1. Upgrade the quality of Chinese lighting products;
2. Increase consumer awareness of, and comfort with, efficient lighting products;
3. Make quality, efficient lighting products more affordable to consumers.
4. Increase sales of efficient lighting products and services.
5. Establish a vibrant, self-sustaining market in efficient lighting products and services and associated supporting policies and services, in order to sustain and expand upon the gains achieved during the project period.
6. Regularly monitor, evaluate and refine project activities in pursuit of the above objectives.

These objectives will be accomplished through the activities shown in the attached incremental cost matrix. The intervention resulting from the GEF support will also leverage additional funds, as shown in the matrix. It is expected that as a result of the GEF support, there will be incremental investments by manufacturers and others in cooperative advertising with the Green Lights program, and other activities through trade associations and others.

Domestic Benefits

The project has substantial economic benefits through the economic benefits to consumers and the Chinese economy by the use of cost-effective, efficient lighting technologies. Additionally, there are significant local, regional and global environmental benefits due to the reduction in the need to generate the saved electricity. Finally, the project also strengthens a potentially vibrant manufacturing sector which can grow and thrive in China with substantial export markets and resulting economic benefit to the Chinese economy.

China Efficient Lighting: Incremental Costs and Benefits

Component	Baseline	Alternative	Increment
1. Standards	<p>Business as usual Some work will continue toward the development of appropriate energy efficiency standards, however, with the move toward a less regulated, market based economy and minimal budget for standards, the development of new standards and regulations will be slow</p> <p>Domestic Benefits Energy efficiency improves marginally.</p> <p>Global Benefits Energy efficiency improves marginally.</p>	<p>Proposed Situation New product and building energy efficiency standards are developed that result in better quality, more widely available and accepted products and new buildings.</p> <p>Domestic Benefits Better quality buildings and less pollution, more energy efficient products that meet higher efficiency and quality standards.</p> <p>Global Benefits Significant efficiency improvements in lighting end-use; Efficiency standards will have some consistency with international standards.</p>	<p>New features Coordinated product and building efficiency standards that result in significant energy savings</p> <p>Domestic Benefits Products and buildings approach international standards, with greater comfort and lower operating costs</p> <p>Global Benefits Substantial emissions reductions from better quality products and buildings</p>
Costs	US\$ 380,000	US\$ 1,514,725	US\$ 1,134,725
2. Certification & Labeling	<p>Business as usual Confusion in the marketplace as low quality products undercut high quality ones, and no way for consumers to understand differences</p> <p>Domestic Benefits Lowest cost</p> <p>Global Benefits None</p>	<p>Proposed Situation Development of product quality and efficiency certification and labels</p> <p>Domestic Benefits Substantially less confusion; ability for consumers to make informed choices about efficient products, and their economic benefits (with resulting economic benefit to the Chinese economy)</p> <p>Global Benefits Lower prices for quality lighting products globally due to availability and recognition of better quality, efficient products from China</p>	<p>New features A well defined certification and labeling program that will aid realization of expected energy savings and GHG emission reduction</p> <p>Domestic Benefits Policy support and coordinated efforts to manage product efficiency and quality expectations for consumers</p> <p>Global Benefits Reduced GHG emissions</p>
Costs	US\$ 610,000	US\$ 1,685,300	US\$ 1,075,300
3. Raw Materials & Components	<p>Business as usual Efficient products are of lower quality and consumers doubt the cost savings potential</p> <p>Domestic Benefits Absolute free market operation with no intervention</p> <p>Global Benefits None</p>	<p>Proposed Situation Research and international technology cooperation, improvement in the quality of key raw material and component inputs to efficient products</p> <p>Domestic Benefits Longer life and higher quality efficient products</p> <p>Global Benefits Lower cost, high quality efficient lighting products</p>	<p>New features Coordinated effort to overcome technology barriers that result in lower quality efficient lighting products</p> <p>Domestic Benefits Higher quality, longer life products</p> <p>Global Benefits Reduced GHG emissions</p>
Costs	US\$ 9,500,000	US\$ 11,735,000	US\$ 2,235,000

4. Market Aggregation	<p>Business as usual Fragmented market, consumers unable to identify high quality products, and manufacturers unable to capture market niches that are willing to pay for high quality products</p> <p>Domestic Benefits Absolute free market operation with no intervention</p> <p>Global Benefits None</p>	<p>Proposed Situation Organization of bulk purchases to assure high quality products and volume sales for those manufacturers that can meet certain specifications</p> <p>Domestic Benefits Overcome consumer objections regarding low quality, and differentiate the better manufacturers</p> <p>Global Benefits Experience for other countries to learn from; Chinese manufacturers familiar with bulk procurement and can participate in programs elsewhere</p>	<p>New features Development of policies and procedures to support efficient product market aggregation</p> <p>Domestic Benefits Lower prices for high quality equipment, with assurances to consumers; Healthier manufacturers and secure market shares for high quality products.</p> <p>Global Benefits Reduced GHG emissions.</p>
Costs	US\$ 50,000	US\$ 1,366,350	US\$ 1,316,350
5. Consumer Education & Information Dissemination	<p>Business as usual Scattered information, with confused consumers and other market players</p> <p>Domestic Benefits None</p> <p>Global Benefits None</p>	<p>Proposed Situation Widespread, coordinated education and promotion effort to train end-users and lighting professionals about the cost effective options available to save energy and money</p> <p>Domestic Benefits Better understanding and consumer awareness of different options</p> <p>Global Benefits More information about the better quality, low-cost Chinese products</p>	<p>New features Coordinated comprehensive training and education activities, limited media promotion, and other communications activities</p> <p>Domestic Benefits Widespread consumer awareness and confidence in efficient lighting products</p> <p>Global Benefits Lower prices and better information regarding efficient lighting options</p>
Costs	US\$ 500,000	US\$ 5,908,250	US\$ 5,408,250
6. Financing Programs	<p>Business as usual Limited, or no activities by utilities to promote efficiency</p> <p>Domestic Benefits None</p> <p>Global Benefits None</p>	<p>Proposed Situation Utilities coordinate energy efficient lighting product promotion, while earning new profits from this</p> <p>Domestic Benefits New profit stream for utilities during restructuring; new channel for consumers to procure efficient products</p> <p>Global Benefits Potential demonstration for other countries going through utility restructuring</p>	<p>New features Development and dissemination of innovative program approaches to work with the newly privatized utilities</p> <p>Domestic Benefits A new growth market for utilities and other players in the efficient lighting area</p> <p>Global Benefits Reduced GHG emissions; potential for replication elsewhere</p>
Costs	0	US\$ 1,280,275	US\$ 1,280,275

7. Mechanisms to sustain key activities	<p>Business as usual China Green Lights activities taper off due to lack of support</p> <p>Domestic Benefits None</p> <p>Global Benefits None</p>	<p>Proposed Situation Continuation and expansion of activities following project</p> <p>Domestic Benefits Economic benefits of cost effective energy savings, and reduced pollution</p> <p>Global Benefits Help to maintain and grow energy savings and resulting emissions reductions</p>	<p>New features Identify future activities and appropriate stakeholders for continued implementation</p> <p>Domestic Benefits Sustaining program momentum</p> <p>Global Benefits Lessons for other developing countries</p>
Costs	0	US\$ 474,600	US\$ 474,600
8. Program Reporting & Support	<p>Business as usual China Green Lights activities taper off due to lack of support</p> <p>Domestic Benefits None</p> <p>Global Benefits None</p>	<p>Proposed Situation Continuation and expansion of pilot activities; coordination of all activities listed above</p> <p>Domestic Benefits Coordinated program implementation</p> <p>Global Benefits Centralized point of contact for efficient lighting markets in China</p>	<p>New features Centralized and coordinated program management and support</p> <p>Domestic Benefits Sustaining program momentum</p> <p>Global Benefits Lessons for other developing countries</p>
Costs	US\$ 110,000	US\$ 1,599,800	US\$ 1,489,800
9. Monitoring & Evaluation	<p>Business as usual No organized monitoring</p> <p>Domestic Benefits None</p> <p>Global Benefits None</p>	<p>Proposed Situation Data compiled annually; Coordinated monitoring of program implementation activities</p> <p>Domestic Benefits Better tracking of program benefits, successful stories for replication, guidance for revising and refining program activities</p> <p>Global Benefits Lessons to be replicated in other countries</p>	<p>New features Coordinate monitoring of program implementation activities</p> <p>Domestic Benefits Better tracking of program benefits, successful stories for replication, guidance for revising and refining program activities</p> <p>Global Benefits Lessons to be replicated in other countries</p>
Costs	0	US\$ 636,650	US\$ 636,650
Total	US\$ 11,150,000	US\$ 26,200,950	US\$ 15,050,950
			Of which US\$ 8,135,950 is requested through GEF funds; remaining US\$6,915,000 to be leveraged through other funding sources as described in Table 4 in the brief

ANNEX B – LOGICAL FRAMEWORK APPROACH PROJECT PLANNING MATRIX

Project Strategy	Objectively Verifiable Indicators	Means of Verification	Critical Assumptions
<p>Development Goal:</p> <p>Promote the sustained use of energy-efficient lighting technologies and designs in all sectors of the Chinese economy leading to at least a 10% reduction in Chinese lighting energy use by 2010 below constant efficiency projections and resulting in substantial reductions in GHG emissions.</p> <p>A secondary goal is to increase exports of efficient quality lighting products, aiding the Chinese economy and helping to reduce energy use and GHG emissions worldwide.</p>	<ol style="list-style-type: none"> 1. Strong growth in sales of efficient lighting products. 2. Manufacturers and consumers happy with market changes and express plans to continue producing and purchasing efficient products. 3. Programs and policies put into place continue. 4. Analysis of lighting energy use at project completion is at least 4% below constant efficiency projections (on path for 10% reduction in 2010). 5. Exports of efficient lighting products exhibit strong growth. 	<ol style="list-style-type: none"> 1. Production, market share and export data from manufacturer, wholesaler and retailer surveys. 2. Attitude and purchase information from manufacturer, wholesaler, retailer and consumer surveys. 3. Government and other program implementers continue efforts after GEF project ends. 4. Alternative forecasts of Chinese lighting energy use. 	<ol style="list-style-type: none"> a. Proposed strategies will help Chinese-and export-markets for efficient lighting practices to grow. b. Positive manufacturer and consumer experiences with efficient products combined with likely post-GEF efforts will allow benefits to be sustained. c. Business-as-usual projections reasonable.
<p>Project Purpose:</p> <p>Reduce barriers impeding use of efficient technologies and designs, particularly lack of information on efficient alternatives and poor product quality, leading to:</p> <ol style="list-style-type: none"> 1. Improved product quality; 2. Increased awareness of and comfort with efficient technologies and designs; 3. Products more affordable 4. Increased sales of efficient products, 5. Establishment of minimum standards and codes. 	<ol style="list-style-type: none"> 1. Product quality improves such as average product life and lumen maintenance. 2. Increased consumer awareness and confidence in efficient lighting technologies and designs. 3. Quality products available at lower prices; financing available in selected markets 4. Increased market share of efficient products. 5. Standards and codes established and implemented. 	<ol style="list-style-type: none"> 1. Objective test data on product life, lumen maintenance, and other product characteristics. 2. Surveys of consumer practices and opinions. 3. Retail surveys, and evaluations of financing programs 4. Production and market share data from government sources and manufacturer, wholesaler, and retailer surveys. 5. Independent evaluation of project components including standard and code effort. 	<ol style="list-style-type: none"> a. Market for efficient products constrained by identified barriers. b. Reducing these barriers will allow market to grow relative to business-as-usual scenario. c. Evaluation activities to verify accomplishments and standard/code efforts will be properly implemented.

<p>Outputs and Activities:</p> <ol style="list-style-type: none"> 1. Product and design standards 2. High-quality products certified and labeling program 3. Improved raw materials and components 4. Market aggregation activities 5. Consumer education and information dissemination and training for professionals 6. Financing programs 7. Mechanisms to sustain key activities 8. Project reporting, Program evaluation & support 	<ol style="list-style-type: none"> 1. Standards issued and implemented. 2. Certification and labeling implemented. 3. Well received conference on problems and potential solutions; manufacturers undertake efforts to address specific problems identified. 4. Market aggregation activities result in substantial sales of quality products; procurements continue. 5. Knowledge increases and Green Lights program given some of the credit. 6. Programs successfully implemented and replicated. 7. Activities have plans & funding following project. 8. Evaluations and surveys completed. 	<ol style="list-style-type: none"> 1. Published standards; evaluation of standards program. 2. Certifications and labels issued; evaluation of certification and labeling program. 3. Evaluation of conference and follow-up activities. 4. Evaluation of market aggregation activities. 5. Surveys of consumers, designers, and other lighting industry participants; evaluation of market promotion and training activities. 6. Evaluation of utility program activities and documentation on follow-up efforts 7. Lack of need for follow on funding 8. Completed evaluations and surveys. 	<ol style="list-style-type: none"> a. Project budget sufficient to produce these outputs. b. Project managed well and activities successfully implemented.
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ANNEX C – GOVERNMENT LETTER OF ENDORSEMENT

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ANNEX D – STAP REVIEW AND RESPONSE

STAP REVIEW OF UNDP/GEF PROPOSAL ENTITLED: CHINA: BARRIER REMOVAL FOR EFFICIENT LIGHTING PRODUCTS AND SYSTEMS

Dr. Lars J Nilsson, Lund University, Sweden

Summary

The proposed project is very relevant and well motivated and justified. It has a balanced mix of activities to meet the stated objectives. The project meets essentially all relevant criteria and should be given highest priority for GEF funding. Two key suggestions for strengthening the project include: give earlier and greater attention to evaluation and consider other actors than utilities and EMC/ESCOs as suppliers of energy efficiency services.

1. Overall impressions

My overall impression of the proposed project is very good. Energy efficiency is a key low-cost strategy to reduce carbon emissions and other negative impacts from energy supply. But it is often overlooked for various reasons, for example, the difficulties of establishing base-lines and measuring the effects.

The project builds on the latest international experiences on energy efficiency policy combined with an understanding of Chinese conditions in a well balanced package of activities. Background reports [Annexes J and K] **10 and 11**), upon which the project proposal is partly based, have been prepared by leading experts in the field.

The project is well motivated and should be done. Minor suggestions and additions are found below.

2. Relevance and priority

The project is highly relevant, not least given the rapid developments in China, and there is a window of opportunity to push the market in the direction of higher energy efficiency at an early stage. China also appears to give high priority to energy efficiency.

3. Project approach

The project approach is appropriate, containing critical components such as standards to establish efficiency floor, labeling and certification to ensure quality and consumer information, and procurement programs and market development to stimulate diffusion of high efficiency technologies. A good exit strategy is also planned for.

One suggestion is to work more actively architects/engineering firms and installation contractors in addition to utilities and energy management/service companies (EMC/ESCOs). It could be more effective to develop and expand the business of firms that do engineering and installations of lighting systems into energy services/efficiency rather than create new companies (EMC/ESCO) or try to change the utility business.

I would strongly recommend that evaluation and particularly evaluation of the special programs is included from the 1st quarter in the 1st year. A plan for evaluation and monitoring should be included

in the first stages of project planning to facilitate data collection and continuous feedback and adjustments along the way. Mistakes will (and should) be made, and should be documented and learned from as well as the success-stories.

4. Objectives

The stated project objectives (see paragraph 28, 38, 43, 49, 50 and 52) are valid, could perhaps be more focused, and can be achieved. The first four are partly overlapping or redundant.

The proposal could have gone further in trying to specify and quantify goals or targets for the individual objectives and/or special programs/activities outlined in annex E E . On the other hand, it is not meaningful to go too far in level of detail at the project proposal stage

Minor clarification/correction: One overall goal is to reduce lighting energy use by 10% relative to constant efficiency (p 5 in proposal) or relative to business-as-usual [annex B]. Judging from [annex H8] it should read business-as-usual throughout.

As noted above, it is often more difficult to measure and verify the impact of energy efficiency programs relative to business-as-usual than that of, for example, energy supply projects. However, this should not discourage from efforts to improve energy efficiency.

5. Background and justification

Background and justification for the project is very solid. Leading experts have been involved in preparing background reports [annexes J9 and K10] and the project proposal builds on the experiences from an earlier China Green Lights Program with financial support from UNDP, among others. The China Green Lights Program is judged a success but much work remains. In my view, it would be appropriate to now step up the effort building on the experience and knowledge gained.

6. Critical analysis of the situation

The situation is well analyzed. However, difficulties involved in enforcing standards (standards compliance) are not discussed. The proposal lacks a discussion of the potential negative environmental effects from increasing the use of fluorescent lights. To my knowledge, mercury releases from discarded fluorescent lamps are small in comparison to mercury emissions from coal-based power production to power incandescent lamps. The issue probably deserves mentioning and the possibilities of recycling lamps could be analyzed.

7. Activities

The proposed activities are appropriate and logical. A large part of the project (with funding mostly from the Chinese government) aims at improving product quality and technology level in the lighting industry. It could be argued that such issues would be solved through customer focused efforts such as standards and labeling, i.e., if customers only buy high-quality products the poor quality producers will go out of business. In my view, however, working simultaneously with (and not against or next to) manufacturers in a project like this is necessary, not least to get them on-board.

In paragraph 33 it is stated that manufacturers of better quality products will be offered financing and other assistance. One could also consider the possibility of assisting the manufacturers of poor quality products.

Section 2.3 in [Annex E5], categorical label. This could perhaps be deleted. I am not convinced that categorical labels are suitable for lamps. It could be more interesting to develop (voluntary)

categorical standards or guidelines for lighting systems so that builders when contracting for a building can easily specify which efficiency class/category the lighting system should meet (e.g., class A: < 8 W/m² plus controls down to class F: < 30 W/m² no controls).

Transaction costs from contract negotiations, verification, etc., is a barrier for energy efficiency services. Developing standard contracts and procedures, perhaps building on efforts such as the North American Protocol for Measurement and Verification, is one activity that could be considered.

8. National priorities and community participation

Given the Chinese government involvement in this proposed project, and the previous one, plus the commitment to energy efficiency there is no reason to doubt that the project is consistent with national plans, policy, etc.

It is not clear to what extent the project will address the needs of the rural population. The activities appear to target primarily urban areas. This may well be, and probably is, a good strategy but this issue could be discussed in the proposal.

9. Institutional arrangements

The institutional arrangements seem appropriate. A number of relevant agencies and other organizations are involved and at a first glance it may seem too many and complicated. However, it is critical for the success of a project such as this that all key actors are brought together to pull in the same direction.

10. Time frame

The time frame is appropriate. As in every project of this kind, things will happen along the way which may require some changes.

11. Funding

Proposed GEF funding is nearly \$8 million out of a total of nearly \$24 million (although the total could be higher since some estimates are stated to be conservative). The GEF funding level seems appropriate considering the potential impact of the project and the total budget. However, I am not sufficiently familiar with salary levels or office rental costs in China to comment further on this. There is not sufficient detail in the budget (table 3) to give detailed comments (for example, why does point 7 in [annex E5] require \$250,000 for equipment?).

It should be noted in table 1 that unit abatement cost is based on the GEF funding?

There is a mistake in paragraph 68 or 69 concerning Chinese manufacturers contribution (\$4.65 million or \$5.65 million?).

12. Innovative features/replicability

The project involves both traditional policy measures such as standards and innovative approaches such as procurement. The project is unique, innovative and interesting in that it will combine a number of different activities to work "on all fronts". It could be a very powerful mix. The project, in whole or in part, can be replicated in other countries.

13. Sustainability

Efforts to facilitate that several activities are sustained after completion of GEF funding are included in the project. The success of, for example, standards and labeling will depend largely on Chinese government, lamp manufacturers, etc., commitment to sustain and enforce them. If project objectives are met, and they probably can be, it would in effect mean a transformation of the Chinese market for lighting. Once this transformation has taken place, and higher efficiency lighting becomes the "standard choice" or "business-as-usual" it is highly unlikely that the market would change back.

14. Development dimensions and rationale for GEF support

The rationale for GEF involvement is clear given the great potential for reducing environmental and other effects of power production. It is not clear to what extent the project will include rural development.

15. Additional comments or questions

The proposal could be more clear about which consumer groups/segments that will be the primary targets of efforts to increase awareness.

RESPONSE TO STAP REVIEW

1. The Reviewer's comments are very positive and have some constructive suggestions for improvement of the project. In this response, the two key suggestions presented in the Review Summary are addressed first, and then responses to other comments follow.
2. The suggestion for earlier and greater attention to evaluation is appropriate. In developing the project brief it was considered that there has recently been significant evaluation of the recently completed UNDP TRAC grant, which funded a large part of work to date in the China Green Lights Program. We have amended the project schedule to have evaluation activities begin at the beginning of the project, and will do additional evaluation planning as part of the Project Document development.
3. Regarding the suggestion of considering other actors than utilities and EMC/ESCOs as suppliers of energy efficiency services, we agree with the suggestion, and intend to work with all players in the lighting market chain, from manufacturers through to end-users, to overcome the barriers to greater lighting energy efficiency. The reason for the focus on EMC/ESCOs as providers is to leverage the large investments made by the World Bank (using GEF funds), the Asian Development Bank, and others in developing and promoting the EMC/ESCO concept to deliver energy efficiency. This has seemed the most rational delivery mechanism during the transition from China's former centrally planned, command and control economy (when the central government had more authority to dictate practices), to a market based economy. Incidentally, the World Bank EMC project includes a significant emphasis on reducing transaction costs, including development and use of measurement and verification protocols as discussed in section 7 of the reviewer's comments. The planned activities with utilities are to test whether any of the successful utility based lighting programs elsewhere in the world will work in China.
4. We agree that other market actors such as architects/engineers and installation contractors are important in lighting system decision-making and these are key audiences for the education and information dissemination component of the project. They are also important constituencies that will be involved in the development of the building lighting efficiency standards. Generally, though, these types of firms do not provide financing for the projects that they are involved in. That is the reason for the focus on EMCs and lighting manufacturers (some of which do already provide financing for their products), to evolve toward more sustainable lighting management companies. We have added installation contractors to lighting manufacturers as candidates to work with to develop lighting management companies.
5. Regarding the comment in Review section 4 about some objectives being partly overlapping or redundant, these objectives are intentionally linked and overlapping, as they are explicitly intended to complement one another. We also agree with the suggestion in Review section 4 to further quantify goals and targets and plan to do this as part of preparing the Project Documents. As the reviewer notes, "it is not meaningful to go too far in level of detail at the project proposal stage." During the project document stage we plan to take the objectively verifiable indicators listed in the Logical Framework [annex B] and quantify targets for many of them. And regarding the reviewers "minor clarification/correction," the goal of reducing lighting energy use by 10% is relative to constant efficiency as stated in paragraph 22. We state our overall goal relative to constant efficiency because a constant efficiency scenario can be objectively quantified while a business-as-usual scenario can only be estimated (a useful exercise which we will continue to

do). Relative to our estimated business as usual scenario, as shown in Table 1 and [annex H], the reduction will be a little over 6%. Thus, the references in [annex B] to business-as-usual are in error and have been corrected.

6. The difficulties involved in enforcing standards (Review section 6) are very relevant, and we plan to have this as a critical issue to be addressed in the evaluation of the standards component. In addition, development and implementation of an enforcement and monitoring plan is a specific task (activity 1.1.8) in the detailed activity plan [annex E].
7. Awareness of the mercury disposal and lamp recycling issue is growing in China. We plan in the education components of the project to inform people about this potential problem, and recommend appropriate disposal of fluorescent lamps. Additionally, we have added to task 3.2.2 a workshop to better understand the extent of the mercury disposal issue, international experiences with this issue, and to discuss appropriate activities for China. Furthermore, while mercury is an issue, based on our review of the technical literature, we agree with the reviewer that substitution of good quality fluorescent lamps for incandescent lamps generally results in net reductions in mercury emissions since the amount of mercury in fluorescent lamps is less than the amount of mercury emitted when generating the extra electricity needed to power incandescent lamps.
8. In Review section 7, it is suggested that one could also consider assisting manufacturers of poor quality products, in addition to offering financing and other assistance to manufacturers of better quality products. Part of the problem in China now is the very large number of CFL manufacturers, many of whom are turning out poor quality products. We anticipate that there will be some winnowing back on the number of manufacturers, and the plan is to assist the better quality manufacturers during this process. As noted in paragraph 34 of the Brief, the better manufacturers will be identified as a result of product testing conducted in the testing and certification component of this project.
9. Regarding categorical labels, we have deleted the categorical label task from the activity plan as suggested by the reviewer, and augmented the building standards task to include development of two standards – a minimum standard and a recommended standard. Such a two-level standard is a step toward the categorical approach suggested by the reviewer. In the Chinese context, we believe that a two-level standard is workable, but that to have more than two categories would be too confusing to equipment purchasers.
10. In Review section 8, a question is posed about activities to address the needs of the rural population. The proposed project will include multiple activities that will affect lighting energy use in rural areas. The minimum efficiency standards will affect all products sold in China, including in urban and rural areas. Likewise, many of the other activities to improve product quality will affect products sold in both urban and rural areas. Public information messages in the news media will reach both urban and rural areas (more than 50% of rural Chinese households now own televisions). Furthermore, as part of project evaluation activities, we plan to survey both urban and rural households regarding their knowledge about, use of, and opinions on efficient lighting technologies. In conducting the surveys in [annex J], we had originally planned to include a outlying towns in semi-rural areas but had to drop this sample due to limited time and budget. However, samples in outlying towns will be added to the initial surveys conducted under activity 9.1.6 of the GEF project. Thus, rural areas should receive substantial benefits from the project, although these benefits may be more limited than in urban areas since urban areas are more easily targeted and reached given limited budgets.

11. For the questions raised under Review section 11, Funding, there had been an error in the table (\$250,000 in the equipment column), which should have been in the training column for five grants to support initial implementation efforts for sustaining activities) that has been corrected. A more detailed, bottom-up budget has been prepared and is available in the project files. Also, we have clarified and corrected the Brief to note that unit abatement costs are based on GEF funding and to consistently state the manufacturers' contribution of \$4.655 million.
12. Finally, regarding the question in review section 15 on primary targets, the consumer awareness efforts will target decision-makers and service-providers serving the residential, governmental and industrial sectors because these are the sectors where efficient lighting technologies are not extensively used at present. We have added language to this effect in paragraph 40 of the Brief.

ANNEX E – DETAILED ACTIVITY PLAN

1 Standards

1.1 Product efficiency standards

Covered products:

1. Fluorescent tubes
2. Compact fluorescent lamps
3. High pressure sodium lamps
4. High pressure sodium ballasts
5. Metal halide lamps
6. Metal halide ballasts

Note: Fluorescent ballast standard now being prepared and will be completed before the GEF project is finalized.

- 1.1.1 Collect and review existing standards
- 1.1.2 Participate in international study tours which will cover testing, certification, labeling and standards issues.
- 1.1.3 Test a sample of products to establish the efficiency range of existing products
- 1.1.4 Draft energy efficiency standards which will establish minimum efficiency criteria as well as more stringent criteria for certification and promotion (options under consideration are a single voluntary endorsement level and multiple voluntary levels such as A, B, C, and D in addition to mandatory level E).
- 1.1.5 Solicit comments on draft standards from manufacturers and lighting experts.
- 1.1.6 Finalize standards.
- 1.1.7 Submit standards to relevant government agency for enactment.
- 1.1.8 Develop and implement monitoring and enforcement plan.

Note: Evaluation of this program in section 9.2.

1.2 Efficiency standards for building design

Standards to be developed:

1. Hospitals
2. Schools
3. Residential
4. Industrial buildings
5. Street

Note: Standards for retail and office buildings and hotels are now being drafted. These cannot be submitted for final approval until standards for other civil building types (e.g., hospitals, schools and residential) are prepared. This work will be closely coordinated with other work on building standards in China including a Canadian-funded project on building standards for cold climates and an Energy Foundation funded project on building standards for the transitional climate zone.

- 1.2.1 Form committee of experts to develop standard.
- 1.2.2 Research experience in China and other countries with building lighting standards.
- 1.2.3 Conduct an international study tour to learn from experience in other countries.
- 1.2.4 Review data on lighting systems in buildings as collected in task.9.1.
- 1.2.5 Develop draft standard.

- 1.2.6 Solicit comments on draft standards from building designers and lighting experts.
- 1.2.7 Finalize standards.
- 1.2.8 Submit standards to relevant government agency for enactment.
- 1.2.9 Develop and implement monitoring and enforcement plan

Note: Evaluation of this program in section 9.2.

2 Certification and labeling

2.1 Improve consistency between test laboratories

Products covered:

- 1. Lamps
- 2. Ballasts

- 2.1.1 Compare test results between national test laboratories (Note: national laboratories are located in Beijing, Shanghai and Guangzhou).
- 2.1.2 Compare results and procedures with international testing laboratories.
- 2.1.3 Participate in international study tours which will cover testing, certification, labeling and standards issues.
- 2.1.4 Assess Chinese national laboratory capabilities and needs with emphasis on products for which different laboratories are obtaining different results. Develop plan for improving capabilities.
- 2.1.5 Upgrade equipment where needed.
- 2.1.6 Conduct training for test laboratory staff where needed.
- 2.1.7 Improve the testing capability of manufacturers through training of testing technicians on the proper testing methodologies.
- 2.1.8 Evaluate effectiveness of activities by conducting another round of comparative test results.

2.2 Certification and endorsement label of Energy Conservation Products

Products covered are the same as those in 1.1 plus fluorescent ballasts.

- 2.2.1 Finalize list of products for certification, the selection of the products is contingent on existing standards developed in 1 and market demand.
- 2.2.2 Participate in international study tours which will cover testing, certification, labeling and standards issues.
- 2.2.3 Develop certification procedures, and testing and other technical requirements.(Note: Certification procedures are being developed under the Energy Conservation Product Certification Committee; testing and other technical procedures will be developed under the GEF grant).
- 2.2.4 Prepare written materials and conduct workshops for manufacturers on procedures and benefits of certification [coordinate with other manufacturer workshops if possible]
- 2.2.5 Certify selected products that meet standards for certification established in task 1. Issue endorsement labels.
Note: Promotion of certified products to consumers covered in 5.
- 2.2.6 Conduct periodic testing of certified products (at least one annual round of tests of covered products) and take away the certification if products fail to meet certification criteria.
- 2.2.7 Explore cooperation with international certification organizations and seek to establish systems of mutual recognition.

Note: Evaluation of this program in section 9.2.

3 Improve quality and technology level of key lighting products as well as key raw materials and components.

China has many plants that produce poor quality lighting products and components. In addition, even some new imported production lines do not operate properly due to major quality/technology problems with Chinese components and raw materials.

3.1 Survey and assessment

3.1.1 Perform survey of key raw material and component manufacturers to determine where quality problems arise, and report on findings (Note: Surveys of lighting product manufacturers have already been conducted as part of prior China Green Light Program activities)

3.1.2 Identify key products and primary manufacturers of these products that need improvement

3.1.3 Organize technical experts to survey key products and manufacturers to seek improvement opportunities

3.1.4 Technical experts prepare feasibility reports on technology quality improvement opportunities, identifying which technologies or equipment have worst problems, and the current status of technology level, with feasibility of improvement and suggested retrofit needs with investment and risk analysis.

3.2 Technical exchange

3.2.1 Invite 2-3 international experts to do on-site surveys, locating problems and identifying ideas for improvement in plant equipment

3.2.2 Hold international technology exchange workshop to discuss and review potential technology quality improvement plans. Also hold a workshop to discuss the issue of proper disposal of lamps containing mercury, including presentations on international experiences and discussion of appropriate steps for China.

3.2.3 Consultants to provide findings report and recommendations

3.3 Identify specific projects and technology retrofit schemes

3.3.1 Develop a priority list of technology improvement projects,

3.3.2 Explore cooperative opportunities to address technology quality issues

3.3.3 Carry out research toward these issues (leveraging R&D sponsored by China in existing research institutions), and evaluate for effectiveness

3.3.4 Prepare and implement technology retrofit plans

3.3.5 Organize and hold international conference and exhibition for suppliers to lighting equipment manufacturers to share technology and lessons learned.

Note: Evaluation of this program in section 9.2.

4 Organize Market Aggregation Activities

4.1 Research potential policies and measures to encourage setting up national and provincial bulk purchase systems

4.1.1 Invite international experts as consultants to introduce their experience

4.1.2 Participate in international study tours covering market aggregation, market promotion, and DSM activities.

4.1.3 Compile report on relevant international and domestic experience (e.g., the GEF-supported China refrigerator project includes a mass-purchase component)/

- 4.1.4 Organize multi-department government working group to develop policies and procedures for bulk purchase activities, closely tied to the certification program (Activity 2), and to expressly support increasing market share of quality products
 - 4.1.5 Facilitate and assist with bulk purchases
 - 4.1.6 Develop policy on appropriate subsidies for bulk purchases.
- 4.2 Identify potential purchaser groups
 - 4.2.1 Potential groups could include hotels, schools, hospitals, retail chains, utilities, municipal governments, and building and housing management departments
 - 4.2.2 Conduct survey to determine present purchasing process, and learn about potential barriers to a bulk purchase program
 - 4.2.3 Identify potential participant list
 - 4.3 Demonstration mass purchase activities
 - 4.3.1 Select approximately 7 cities willing to participate in pilot mass purchases
 - 4.3.2 Help city governments develop their plans for mass purchases; include subsidies for quality products as appropriate on a pilot basis
 - 4.3.3 Determine feasibility of revolving loan fund, or city/utility matches of subsidies to continue beyond pilot (coordinated with Activity 6, Utility based programs)
 - 4.3.4 Implement demonstration pilot activities in the approximately 7 cities
 - 4.3.5 Widely disseminate the results
- Note: Evaluation of market aggregation activities in section 9.2.

5 Consumer education and information dissemination and training for professionals

- 5.1 Develop consumer education media promotion plan
 - 5.1.1 Hire marketing consultant
 - 5.1.2 Participate in international study tours covering market aggregation, market promotion, and DSM activities.
 - 5.1.3 Develop marketing plan
 - 5.1.4 Hire media relations consultant to assist with implementation of plan. Consultant to work closely with full-time media relations staffperson in Project Office.
- 5.2 Mass Media Promotion (TV, radio and newspapers)
 - 5.2.1 Work with national and provincial TV stations to develop at least one TV program or program segment annually on Green Lights, particularly as part of Energy Conservation Week (in October).
 - 5.2.2 Public service announcements
 - 5.2.2.1 Hire consultant to develop two public service announcements – one on Green Lights generally and one on certification and labeling
 - 5.2.2.2 Distribute public service announcements to television and radio stations
 - 5.2.2.3 Periodically contact television and radio stations to monitor use of public service announcements and to promote additional use of the announcements.
 - 5.2.3 Newspapers
 - 5.2.3.1 Regularly issue press releases covering noteworthy developments in the Green Lights and quality certification programs as well other developments related to the promotion of efficient lighting.

- 5.2.3.2 Prepare monthly newspaper column for the general public on efficient lighting issues and send column to major newspapers.
- 5.2.3.3 Undertake press relations activities at the local level to promote newspaper and other media coverage of the Green Lights message.
- 5.2.4 Cooperative advertising
 - 5.2.4.1 Develop policies regarding use of Green Lights and certification logos in manufacturer advertising.
 - 5.2.4.2 Promote use of logos in advertising by manufacturers with certified products and that are consistent with the policy developed above.

- 5.3 Retail promotions
 - 5.3.1 Develop materials to promote certified efficient products at retail level.
 - 5.3.1.1 Conduct interviews with manufacturers and retailers to identify most useful materials for promoting efficient certified products at the retail level such as point-of-sale displays, etc.
 - 5.3.1.2 Develop most useful materials as identified in item above.
 - 5.3.1.3 Work with manufacturers, major retailers and local energy management offices to distribute materials to individual shops.
 - 5.3.2 Expand retail level “quality commitment” program
(This program is now taking place in four cities and involves manufacturers guaranteeing that products will last for at least a year or they will be replaced at no charge)
 - 5.3.2.1 Select at least four additional major cities to expand program to.
 - 5.3.2.2 Work with local energy conservation offices to identify participating shops.
 - 5.3.2.3 Shops establish special “quality commitment” sales counters, provide information and advertise the program.
 - 5.3.2.4 Monitor results in each participating city.
 - 5.3.2.5 Widely disseminate results around China to encourage other municipalities, retailers and manufacturers to undertake similar activities.

- 5.4 Prepare educational publications for the public
 - 5.4.1 Brochure
 - 5.4.1.1 Prepare brochure for the public on selecting quality, efficient lighting products.
 - 5.4.1.2 Print brochure in large quantities
 - 5.4.1.3 Distribute brochure through task 5.3.1.3 and via other means
 - 5.4.2 Case studies and technical manual
 - 5.4.2.1 Contract with Information Dissemination Center for preparation of 10 case studies on successful lighting projects in the commercial and industrial sectors and one technical manual for commercial and industrial customers; case study sites to be selected jointly by Info Center and Green Lights staff.
 - 5.4.2.2 Have Information Dissemination Center distribute case studies and manual, supplemented with distribution efforts by Green Lights Project Office
 - 5.4.3 Lighting pattern books
 - 5.4.3.1 Hire consultants to prepare six lighting pattern books designed for residents and small businesses on efficient lighting design and featuring attractive pictures and easy-to-copy lighting layouts. Pattern books will be for:
 1. Urban residences
 2. Rural residences (make very simple)
 3. Small offices
 4. Small shops
 5. Schools

6. Restaurants

Pattern books should draw from Chinese case studies and lessons learned with international pattern books.

5.4.3.2 Disseminate pattern books through local energy conservation centers, special energy conservation events, and via other tasks in this plan (e.g. 5.1.3.1).

5.5 Develop and Maintain Green Lights Web page

(Will be in both Chinese and English; will include product and manufacturer information, advice for consumers, and information on the Chinese lighting market and the China Green Lights Program)

5.5.1 Establish website

5.5.2 Maintain and update site

5.6 Professional training

(Training in efficient lighting design for architects, engineers, and skilled contractors involved in lighting design. Part of the training will discuss the standards for building design developed in 1.2 and the benefits of certified efficient products as developed in 2.2).

5.6.1 Develop book for lighting designers on efficient lighting design

5.6.1.1 Hire consultant to prepare book, drawing where possible from existing Chinese and international publications.

5.6.1.2 Distribute to designers, developers and large contractors

5.6.2 Training course

5.6.2.1 Hire consultant team to develop an approximately 3-day course for lighting designers on techniques for incorporating energy efficiency into lighting system designs

5.6.2.2 Convene expert team to review and comment on draft course

5.6.2.3 Refine and finalize course

5.6.2.4 Offer course at least thirty times, covering different regions of China

5.7 Workshops for large end-users

(Workshops are to explain benefits of efficient lighting to purchasing and maintenance managers at large- and medium-size commercial and industrial facilities and to teach them ways to select and purchase quality efficient products)

5.7.1 Hire a small group of domestic lighting experts (and maybe one international expert to assist) to develop a 1-day course for purchasing and maintenance managers.

5.7.2 Offer a “train-the-trainers” course for staff at local energy conservation centers.

5.7.3 Staff at local energy conservation centers offer course at least 15 times, covering different regions of China.

Note: An evaluation of all market promotion and training activities is included in section 9.2.

6 Financing

6.1 Utility-based programs

6.1.1 Compile information and introduce international experience

6.1.1.1 Review experience from China Green Lights pilot activities and other Demand-Side Management (DSM) pilots in China

6.1.1.2 Coordinate review with State Electric Power Corporation and National DSM Center

6.1.1.3 Investigate international experience relevant to lighting in China

- 6.1.1.4 Participate in international study tours covering market aggregation, market promotion, and DSM activities.
 - 6.1.2 Design innovative utility based programs relevant to the Chinese situation
 - 6.1.2.1 Develop criteria for selected utilities for pilot programs, select utilities.
 - 6.1.2.2 Develop potential utility leasing programs, including details of leasing procedures and how consumers repay lease requirements
 - 6.1.2.3 Design potential tariff based programs to encourage efficient lighting equipment and systems
 - 6.1.2.4 Tie utility programs into ESCO, bulk purchase, and certification activities
 - 6.1.3 Implement Demonstration Programs
 - 6.1.3.1 Implement demonstration programs with at least 2 utilities
 - 6.1.3.2 Disseminate for wider program activity
- Note: Evaluation of utility program efforts in section 9.2.

- 6.2 Promote development of EMC financing for lighting projects
 - 6.2.1 Assist/encourage EMC's to undertake more lighting projects
 - 6.2.1.1 Research past EMC lighting projects, identify profitable projects and keys to their success. Prepare and disseminate case studies on these projects.
 - 6.2.1.2 Work with several EMC's to develop product lines dealing with lighting design and maintenance/management (and not just simple lamp and ballast replacements). Prepare and disseminate case studies.
 - 6.2.2 Assist/encourage lighting equipment manufacturers to offer financing for lighting upgrade projects, and manufacturers and others to offer broader lighting management functions, including service and maintenance contracts.
 - 6.2.2.1 Research past manufacturer and other efforts in this area and lessons they teach
 - 6.2.2.2 Develop materials for manufacturers explaining financing options and recommendations for implementing these options.
 - 6.2.2.3 Offer workshops for manufacturers and lighting management companies explaining financing options, recommendations, and where to go for additional assistance

7 Improve Mechanisms to Sustain Key Project Activities

While much will be accomplished over the four years of project operation, benefits can be increased by sustaining some key project activities after the end of the grant period.

- 7.1 Research methods to sustain key activities on a long-term basis
 - 7.1.1 Identify key activities that should be sustained (standards, certification, promotion, utility programs, monitoring, etc.) and possible approaches for sustaining these activities.
 - 7.1.2 Research methods used in China and other countries to staff and finance these activities on an on-going basis
 - 7.1.3 Write report on findings
- 7.2 Develop action plan
 - 7.2.1 Based on report above, and consultation with key participants in Chinese lighting market, develop action plan for efforts to sustain key project activities.
- 7.3 Support initial efforts to implement plan
 - 7.3.1 Assist Chinese government agencies, China Association of the Lighting Industry, and other appropriate organizations to begin implementation of action plan.

8 Program Reporting

8.1 Annual and periodic reports

- 8.1.1 Prepare annual report that documents Green Lights activities and progress.
- 8.1.2 Prepare periodic reports as results are obtained from major activities.
- 8.1.3 Distribute reports to energy management agencies, project funders, and other interested parties.

8.2 Annual Green Lights conference

The Annual Green Lights conference will be organized as a forum to highlight the importance of lighting efficiency, to promote program activities, to review program progress, and to showcase successful pilot programs. Both the schedule and the agenda of the conference will be tightly coordinated with overall program activities and schedule, making the conference a milestone event in program reporting and planning.

- 8.2.1 Hold a Green Lights conference for domestic audiences in years 1 and 3 to discuss lessons learned and future directions with key program participants.
 - 8.2.1.1 Establish conference planning committee and choose conference themes, topics, and site.
 - 8.2.1.2 Develop conference program – solicit conference papers.
 - 8.2.1.3 Invite participants.
 - 8.2.1.4 Prepare conference proceedings.
 - 8.2.1.5 Hold conference.
 - 8.2.1.6 Prepare report on conference findings and recommendations for next year's conference.
- 8.2.2 Hold a Green Lights conference for domestic and international audiences in years 2 and 4 (steps same as for 8.2.1).

9 Program evaluation

9.1 Prepare evaluation plan and track progress towards performance indicators

- 9.1.1 Prepare detailed initial evaluation plan.
- 9.1.2 Track progress towards performance indicators on a quarterly basis.

9.2 Market tracking

On an annual basis conduct the following surveys and data collection efforts in order to monitor program progress, receive feedback on the program and efficient lighting products, and provide input for program refinements.

Note: A set of baseline surveys are now being compiled with funding from the Energy Foundation and will be attached to the GEF brief.

- 9.2.1 Develop survey plan, questionnaires and analysis approaches.
- 9.2.2 Compile available data on production, sale, import and export of lighting products from the China Lighting Association, State Statistics Bureau, Customs Bureau and other government agencies.
- 9.2.3 Survey manufacturers regarding their production, sales, and prices; their perception of overall market production; and their opinions on efficient lighting products, the China Green Lights program, barriers to efficient lighting and appropriate next steps. This survey will seek to cover manufacturers who account for at least 60% of the market for each featured product (CFLs, T8 lamps, electronic ballasts, and sodium and metal halide lamps).
- 9.2.4 Survey lighting wholesalers and retailers regarding product availability, product market shares and prices; their knowledge of and opinions on efficient lighting products, the China

Green Lights program, barriers to efficient lighting, and appropriate next steps. This survey will include both wholesalers and retailers and will take place in approximately four cities including a mix of regions, size and market development. A total sample of about 80 surveys is planned each year.

- 9.2.5 Survey commercial and industrial lighting users regarding their buying habits and needs; their use of and perceptions on efficient lighting (include survey of current installed wattage and hours of use by lamp type) and barriers to efficient lighting; their knowledge of and opinions on China Green Lights program and opinion on several possible next steps. This survey will take place in the same cities as 3.8.1.3 and will include a mix of business types and sizes. A total sample of about 100 surveys is planned each year.
- 9.2.6 Survey residential households regarding their buying habits and needs; their use of and perceptions on efficient lighting (include survey of current installed wattage and hours of use by lamp type) and barriers to efficient lighting; their knowledge of and opinions on China Green Lights program and opinion on several possible next steps. This survey will take place in several cities including a mix of regions, size and market development. A total sample of about 400 surveys is planned each year of which a third will take place in the main urban areas, and a third in outlying towns, and a third in more rural areas. The sample will include a mix of neighborhoods, home types and income levels.

9.3 Evaluate special programs

Each of the major projects discussed above will also be evaluated as they are completed. Evaluations will consist of reviewing project accomplishments and impacts through discussions with program staff and a sample of people and organizations affected by each program. Evaluations will also make recommendations on program improvements and recommended next steps. Evaluations will be conducted by independent evaluators not directly affiliated with the China Green Lights program. Evaluations will be conducted by domestic consultants with assistance from international evaluation experts.

- 9.3.1 Evaluate product and building standards programs (Activity 1)
- 9.3.2 Evaluate product certification and labeling program (Activity 2)
- 9.3.3 Evaluate effort to improve key raw materials and components (Activity 3)
- 9.3.4 Evaluate mass purchase programs (Activity 4)
- 9.3.5 Evaluate promotion and training efforts (Activity 5)
- 9.3.6 Evaluate utility DSM efforts (Activity 6)
- 9.3.7 Evaluate overall program operations (Activity 8)

9.4 Prepare final evaluation report

Based on all of the other evaluation efforts, compile a final program evaluation report including program accomplishments, lessons learned, and recommendations for follow-up efforts.

10 Program Support

10.1 Prepare project documents.

- 10.1.1 Working from the activity plan and budget that have already been prepared, draft detailed project documents.
- 10.1.2 Submit draft documents to UNDP and GEF for review and comment.
- 10.1.3 Revise documents to reflect comments; submit to UNDP and GEF for approval.

10.2 Establish project management office (to manage entire project and monitor project implementation)

- 10.2.1 Establish office including renting and setting up an office, purchasing office equipment and hiring staff.
 - 10.2.2 Establish periodic training programs to build skills of office staff.
 - 10.2.3 Establish a travel budget for office staff
 - 10.2.3.1 Domestic travel and meetings
 - 10.2.3.2 International meetings and conferences
 - 10.2.4 Engage CICETE to assist with administration of international consultants.
- Note: An evaluation of overall program management activities is included in section 9.2.

ANNEX F – COORDINATION WITH OTHER RELATED ACTIVITIES IN CHINA

1. Some of the components of this project are closely related to, and interact with, other internationally funded activities in China and the rest of the world. This annex describes those activities, and explains the complementary fit of the components of the expanded China Green Lights Program.
2. Certification & Labeling: In addition to the lighting equipment certification and labeling activities proposed in this Brief, there are four other projects in China which address certification and labeling of energy-consuming equipment. Many of these other efforts do not involve lighting equipment; where lighting equipment is involved, the China Green Lights Program plays a central role.
3. The central certification and labeling program in China is the program established under China's Energy Conservation Law and directed by the Center for Energy Conservation Product Certification. This Center includes a variety of agencies active in product certification and labeling in China; the Center is chaired by SETC and key staff come from the same Division that directs the China Green Lights Program. The Center plans to certify and label a wide variety of products in China, beginning with refrigerators and CFLs and expanding to other products. The certification and labeling activities of the China Green Lights Program will all take place through this Center.
4. In addition to the China Green Lights Program, two other GEF grants involve certification and labeling – one for refrigerators (grant awarded) and one for air conditioners (Brief now being drafted). Both of these grants involve non-lighting products. Both of these grants will work with the Center for Energy Conservation Product Certification in one way or another.
5. Finally, the Energy Foundation is planning to award a grant to promote harmonization of the different labeling efforts in China. Details of this project have yet to be finalized but the project will center on development of a common categorical label for use across product types. The focus of the project will be on appliances, but lighting products may be included as well. Any lighting activities will be closely coordinated with task 2 in the detailed China Green Lights Activity Plan (Annex E). Key staff that work on the China Green Lights Program will be involved in this Energy Foundation project in order to ensure coordination between these two projects. The Center for Energy Conservation Product Certification will be heavily involved as well.
6. Thus, all of the other projects in China that work on certification and labeling will be coordinated with the efforts of the China Green Lights Program. Furthermore, the China Green Lights program will play a central role in the certification and labeling of lighting products. Without the China Green Lights Program, very few lighting-related certification and labeling activities would take place.
7. World Bank/GEF Energy Conservation Project: As noted in the brief, there is some connection between this project and the World Bank/GEF Energy Conservation Project. That project was designed to overcome many of the general financial and information barriers to all energy efficiency technologies, and is managed by the same government unit within SETC as proposed for this lighting project, which will ensure close coordination.

8. A key component of the Energy Conservation Project is the development of demonstration Energy Management Companies (EMCs), which will implement energy efficiency improvement projects in their customers' facilities, their investments repaid on a energy savings performance contract basis. The pilot EMCs all developed planned "project lines" of target technologies, and initially lighting projects were included as target technologies by the three pilot EMCs. In the project appraisal document, it was assumed that the three pilot EMCs would invest over 400 million RMB (US\$ 49 million) on lighting projects over the period 1997-2006. As the EMCs have moved beyond their initial pilot projects, though, their focus has moved beyond lighting projects due to some of the barriers cited in this brief. Among the reasons cited by EMC managers for not doing lighting projects include quality problems with some of the efficient technologies. Additionally, relative to other types of projects (mostly in large industrial enterprises) the size of lighting projects is too small, and resulting transaction costs to implement a performance contract are prohibitively high. The Green Lights project will work with existing and developing EMCs to publicize the success of lighting projects done to date, and expand their activities to include more lighting projects, though in more of the improved lighting design are instead of simple lamp or ballast retrofits.

9. EMC managers do believe that focused, proper lighting management companies have potential for success, though these technologies are not their priority. In this Green Lights project, the project will work with lighting equipment manufacturers and others to explore business opportunities for lighting management companies which would seek to develop long term relationships with commercial customers such as shopping centers, office buildings and hotels. These firms would first retrofit inefficient lighting systems, and then provide ongoing management and maintenance services for building lighting and potentially other end-uses. The Green Lights project will take the lessons learned through all of the EMC and other market based projects, to maximize the potential for lighting projects to be done by private sector companies on a sustainable basis in China.

10. Another component of the Energy Conservation Project is an Information Dissemination component, which will include products such as case studies and technical guides. The Green Lights project will work closely with, and complement the products of the Information Dissemination Center that has been established. While it was planned that there might be a small number of lighting related products developed by the Information Dissemination Center, the Consumer Education and Information Dissemination component of the Green Lights project will substantially expand this activity. The work will be done in close cooperation with the already established Center, with the corresponding economies of scale due to the fact that the Center has already been set up.

11. As noted in the brief, this project will also complement the IFC/GEF Efficient Lighting Initiative. Because of the immense size of the Chinese lighting industry, and the fact that products developed and sold in China are also exported around the world, the project will have significant global effects. The availability of improved quality Chinese lighting products will greatly expand international demand for lower cost, high quality energy efficient lighting systems. One of the planned activities of the IFC ELI is to have a centralized coordinator to administer cross-cutting, multi-country activities. It is anticipated that the Project Management Office administering the China Green Lights project will work closely with the managers of the ELI cross-cutting administrators to coordinate information flow, and maximize the opportunities for international information sharing.

12. China Refrigerator Project. As noted above, a GEF project to assist the Chinese refrigerator industry to develop and market more efficient refrigerators is now underway. The primary strategy in this project is financial assistance to manufacturers to develop improved products. This project differs substantially from the China Green Lights Project in approach for several reasons including:

(1) efficient lighting products are more readily available in China than efficient refrigerators, and thus product development is a much smaller portion of the lighting project; and (2) to the extent funding for product development is needed, for lighting, this funding will come directly from manufacturers and the Chinese government (with lighting, investment costs are generally lower and manufacturers and the government are more able to provide funding).

ANNEX G – CHINESE ORGANIZATIONS INVOLVED IN THE GREEN LIGHTS LEADING GROUP

As noted in the Brief, the SETC is responsible for coordinating this project, with support from the Beijing Energy Efficiency Center (BECon). Other organizations involved in the Leading Group that will participate in the implementation of the project include:

1. State Development Planning Commission (SDPC) - The SDPC is responsible for the long-term, macro-economic planning for China. It also allocates government resources. In respect of its role in the Leading Group, SDPC will help to ensure that the program is implemented in a manner that is consistent with government policies and plans.
2. Ministry of Science and Technology (MOST) - MOST is the research, development and demonstration arm of the Chinese government. It oversees the development and demonstration of new technologies and related components and materials. As a member of the Leading Group, MOST will ensure that research activities are coordinated with other research programs and the most qualified people and organizations are involved in the lighting research activities.
3. State Bureau of Quality and Technology Supervision (SBTS) - Being a member of the Leading Group, SBTS provides oversight and guidance on product standards, product quality, and enforcement of standards in China. SBTS will also provide input and guidance on lighting energy-efficiency standards development and enforcement issues.
4. Ministry of Construction (MOC) - The MOC is responsible for building energy-conservation programs. As a member of the Leading Group, MOC will ensure that lighting standards conform to Chinese and international standards. The MOC will promote bulk purchase for public buildings, publicize the concepts of green lighting in buildings, play a role in the development and implementation of building design standards, and provide training opportunities for architects and lighting designers.
5. State Environmental Protection Agency (SEPA) - SEPA is a department of environmental supervision and administration. As a member of the Leading Group, it will advise on the aspects of the GLP activities to achieve the targets of environmental protections.
6. China National Council of Light Industry (CNCLI) - The CNCLI represents China's lighting industries, providing input to the government on lighting related regulations, policies and programs. As a member of the Leading Group, CNCLI will ensure that the lighting industry's views and insights are considered in the formulation and implementation of lighting programs and policies under the Green Lights Program.
7. Ministry of Information Industry (MOII) - The MOII oversees and guides China's electronics industries and programs. As a member of the Leading Group, MOEI will provide its expertise on electronics and assist in the development of specialized bulbs needed for China's electronics products such as computers.
8. Ministry of Agriculture (MOA) - The MOA oversees and provides policy guidance on agricultural issues in China. As a member of the Group, the MOA will coordinate GLP with China's township and village enterprises, and rural residents to ensure that the program considers their needs and interests.
9. State Power Corporation (SPC) - SPC is the national electric power production and operating company in China. As a member of the Leading Group, the SPC will coordinate the national DSM

center's activities to promote electricity-conservation in the green lighting programs through the demand-side management methods.

10. Chinese Academy of Sciences (CAS) - CAS is the principal technical advisor to the Chinese government. In addition, it develops and demonstrates advanced technologies, and runs companies to introduce advanced technologies into the marketplace. As a member of the Leading Group, CAS will provide technical advice on the development of lighting technologies and methods for increasing their use in the marketplace.

11. China Energy Conservation Investment Corporation (CECIC) - CECIC is a national-level company specializing in energy-conservation investment. As a member of the Leading Group, CECIC will advise on financing GLP initiatives and may provide monetary incentives to some projects. CECIC aims to become a major producer of efficient lighting products through mergers and acquisition.

In addition, the Leading Group receives advice and counseling from following organizations:

1. China Energy Conservation Association (CECA) - CECA is a non-governmental organization that promotes energy conservation in China. CECA will advise and support SETC and other members of the Leading Group on all aspects of the GLP.

2. Chinese Society of Lighting (CSL) - CSL is a non-governmental organization on lighting issues that provides consultant services, issues lighting publications, and holds lighting seminars, among other things. CSL will advise and support the Leading Group in a variety of ways, primarily in assisting in designing lighting information dissemination and education programs for GLP.

3. China Lighting Association (CLA) - CLA, previously a division under the former Ministry of Light Industry, functions as an official institution to provide guidance to the lighting industry. CLA will advise on a variety of lighting issues.

4. China Certification Center for Energy Conservation Products (CECP) - CECP was established by SETC and SBTS, and will serve as the third-party certification center for energy-conservation products under the supervision of the Certification Committee of Energy Conservation Products (CCEC). CECP will undertake relevant activities of energy-conservation product certification.

5. Local Energy Conservation Centers - The local energy conservation service centers, under the supervision of local provincial Economic and Trade Commissions, will support and help the implementation of local GLP activities.

ANNEX H – LIGHTING SAVINGS SCENARIOS

China Greenlights Costs and Savings Estimate Summary of Analysis

	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>
Investment (mRMB)	12,432	13,241	14,050	14,859	16,112	17,364	18,616	19,869	21,121	22,374
kWh (million)	186,458	198,723	211,004	223,319	235,703	249,430	263,623	277,795	291,924	305,948
Op. cost (mRMB)	130,520	139,106	147,702	156,323	164,992	174,601	184,536	194,457	204,347	214,164
Carbon (MMT)	74.6	79.5	84.4	89.3	94.3	99.8	105.4	111.1	116.8	122.4

Intervention Case

	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>
Investment (mRMB)	12,953	13,936	14,918	15,901	17,363	18,825	20,287	21,749	23,211	24,673
kWh (million)	183,088	193,773	204,248	215,729	227,089	239,010	251,349	263,548	275,584	287,233
Op. cost (mRMB)	128,162	135,641	142,974	151,010	158,962	167,307	175,944	184,484	192,909	201,063
Carbon (MMT)	73.2	77.5	81.7	86.3	90.8	95.6	100.5	105.4	110.2	114.9

Change Due to Intervention

	<u>Cumulative</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>
Investment (mRMB)	7,724	521	695	868	1,042	1,252	1,461	1,670	1,880	2,089	2,299
NPV Invest. (mRMB)	5,399										
kWh (million)	-103,277	-3,370	-4,950	-6,755	-7,591	-8,615	-10,420	-12,274	-14,247	-16,340	-18,715
Op. cost (mRMB)	-72,294	-2,359	-3,465	-4,729	-5,313	-6,030	-7,294	-8,592	-9,973	-11,438	-13,101
NPV Op. Cost (mRMB)	-39,015										
NPV of project (mRMB)	-33,616 (These are reductions in costs = savings)										
Carbon (MMT)	-41.3	-1.3	-2.0	-2.7	-3.0	-3.4	-4.2	-4.9	-5.7	-6.5	-7.5

Notes:

Analysis only includes products sold during 2001-2010. Analysis includes salvage value of products that will last past 2010.

Average electric rate (RMB/kWh) = 0.7

Carbon (MMT)/ million kWh = 0.0004 . This figure was calculated by J. Sinton at LBL for the ADB and assumes the current generation mix of 75% coal, 19% hydro, 5% oil and 1% nuclear.

Real discount rate = 0.1

ANNEX I: CHINA GREEN LIGHTS GEF PROJECT - TENTATIVE WORKPLAN

Component	Year 2001				Year 2002				Year 2003				Year 2004			
	1-Qtr	2-Qtr	3-Qtr	4-Qtr	1-Qtr	2-Qtr	3-Qtr	4-Qtr	1-Qtr	2-Qtr	3-Qtr	4-Qtr	1-Qtr	2-Qtr	3-Qtr	4-Qtr
Standards	1															
Baseline																
GEF																
Certification & Labeling	3															
Baseline																
GEF																
Quality & Technology	6															
Baseline																
GEF																
Market Aggregation	7															
Baseline																
GEF																
Consumer Education	9, 10, 11															
Baseline																
GEF																
Financing Programs	13															
Baseline																
GEF																
Mechanisms to Sustain	16															
Baseline																
GEF																
Program Reporting	17															
Baseline																
GEF																
Evaluation	15															
Baseline																
GEF																
Program Support	14															
Baseline																
GEF																

Milestones:

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Issue first set of product and building design efficiency standards 2. Issue second set of product and building design efficiency standards 3. Consistent product testing results assured 4. First set of Certification & endorsement labels implemented 5. Second set of Certification & endorsement labels implemented 6. Technology retrofit projects accomplished 7. Mass purchase groups identified 8. Seven mass purchase pilots underway | <ol style="list-style-type: none"> 9. Green Lights website established 10. Cooperative Advertising with manufacturers begins 11. Professional training classes underway 12. All lighting pattern books published 13. Utility Program designs complete 14. Case studies of successful EMC projects disseminated 15. Lighting Management Companies operating in 3 cities 16. Report on key activities to be sustained completed 17. Action plan for sustaining key activities in place |
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