

Document of
The World Bank

Report No: 24808-VN

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED GRANT
IN THE AMOUNT OF US\$5.5 MILLION
TO THE
SOCIALIST REPUBLIC OF VIETNAM
FOR A
DEMAND-SIDE MANAGEMENT AND ENERGY EFFICIENCY PROJECT

December 30, 2002

Energy and Mining Development Sector Unit
Infrastructure Unit
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective December 30, 2002)

Currency Unit = Vietnamese Dong (D)
1 D = US\$.00006493
US\$1 = D 15,401.5

FISCAL YEAR

January 1 -- December 31

ABBREVIATIONS AND ACRONYMS

ALGAS	Asia Least-Cost Greenhouse Gas Abatement Strategy
ASEAN	Association of South East Asian Nations
AU	Administrative unit
CAS	Country assistance strategy
CFL	Compact fluorescent lamp
CO ₂	Carbon dioxide
DLC	Direct load control
DSM	Demand-side management
EE	Energy efficiency
ESCO	Energy service company
EVN	Electricity of Vietnam
FMR	Financial monitoring report
FTL	Fluorescent tube lamp
GDP	Gross domestic product
GEF	Global Environment Facility
GOV	Government of Vietnam
GWh	Gigawatt-hours (1,000,000,000 watt-hours)
LRMC	Long-run marginal cost
MoC	Ministry of Construction
MoI	Ministry of Industry
MoSTE	Ministry of Science, Technology and Environment
MW	Megawatt (1,000,000 watts)
PC	Power company
PIP	Project implementation plan
PMB	Project Management Board
SEIER	System Efficiency Improvement, Equitization and Renewables (Project)
SOE	State-owned enterprise
Toe	Tons of oil equivalent
TOU	Time-of-use
UNDP	United Nations Development Programme
W	Watt

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**VIETNAM
DEMAND-SIDE MANAGEMENT & ENERGY EFFICIENCY PROJECT**

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MAP(S)

VIETNAM
Demand-Side Management & Energy Efficiency Project

Project Appraisal Document

East Asia and Pacific Region
EASEG

Date: December 16, 2002 Sector Manager/Director: Mohammad Farhandi Country Manager/Director: Klaus Rohland Project ID: P071019 Focal Area: G	Team Leader: Jas Singh Sector(s): District heating and energy efficiency services (70%), Power (30%) Theme(s): Infrastructure services for private sector develop (P), Climate change (P)
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Project Financing Data

Loan Credit Grant Guarantee Other:

For Loans/Credits/Others:
Amount (US\$m):

Financing Plan (US\$m):	Source	Local	Foreign	Total
BORROWER/RECIPIENT		1.21	0.00	1.21
GLOBAL ENVIRONMENT - ASSOCIATED IDA FUND		0.48	4.72	5.20
GLOBAL ENVIRONMENT FACILITY		3.45	2.06	5.50
LOCAL SOURCES OF BORROWING COUNTRY		3.32	3.32	6.65
Total:		8.46	10.10	18.56

Borrower/Recipient: STATE BANK OF VIETNAM, SOCIALIST REPUBLIC OF VIETNAM

Responsible agency: MINISTRY OF INDUSTRY AND ELECTRICITY OF VIETNAM

Ministry of Industry

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Estimated Disbursements (Bank FY/US\$m):							
FY	2003	2004	2005	2006	2007		
Annual	0.50	2.00	1.20	1.30	0.50		
Cumulative	0.50	2.50	3.70	5.00	5.50		

Project implementation period: 4 years

A. Project Development Objective

1. Project development objective: (see Annex 1)

The objectives of this project are to: (a) develop and expand demand-side management (DSM) business programs and test new market transformation efforts within the national electric utility, Electricity of Vietnam (EVN); and (b) develop sustainable business models and mechanisms to support energy efficiency (EE) retrofit investments in commercial and industrial facilities. This Project represents the second phase of a longer, 12-year (1998-2010) proposed IDA/GEF-supported DSM and EE program designed to achieve significant and sustainable reductions in energy consumption and peak power demand in Vietnam. The program would, in the course of 3-4 phases, test, develop and scale-up successful and sustainable business models to promote DSM/EE and facilitate investments. The first phase (Phase 1) of this DSM/EE program is now under implementation under the ongoing IDA/Swedish Sida-supported DSM program under the IDA-supported *Transmission, Distribution and Disaster Reconstruction Project* (Credit 3034-VN).

2. Key performance indicators: (see Annex 1)

The key performance indicators for this Project will include: (i) total energy saved and corresponding reduction in carbon dioxide emissions resulting from the DSM and EE investments catalyzed under the Project; (ii) peak demand reductions resulting from utility load management and EE programs; and (iii) total commercial activity and investments for Vietnam's energy service industry. Draft performance indicators will be confirmed at Project Negotiations.

3. Global Objective (see Annex 1)

The global objective of the Project is to contribute to the reduction of greenhouse gas (GHG) emissions in the energy sector through the systematic removal of barriers to DSM and EE investments. This will be achieved by supporting large-scale DSM and commercial EE programs in Vietnam and building capability to design, deliver and evaluate such programs within the power utilities, government agencies and private sector.

B. Strategic Context

1. Sector-related Country Assistance Strategy (CAS) goal supported by the project: (see Annex 1) **Document number:** 24621-VN (September 16, 2002)

This Project is in full compliance with the Bank's Country Assistance Strategy (Report 24621) which outlines an emphasis on partnerships and donor coordination and identifies three themes for future IDA support: (i) Supporting the transition towards a market-oriented economy; (ii) Enhancing equitable, socially-inclusive and sustainable development; and (iii) Promoting good governance. For infrastructure, the CAS notes the need to improve service levels and remove bottlenecks which constrain development and competitiveness. The energy sector would also contribute substantially to economic growth. Its continued development is essential to sustaining industrial growth and employment generation. The report "Fueling Vietnam's Development: New Challenges for the Energy Sector" (April 1999) identifies the key issues and lays out a strategy for the sector, which will support extending access in rural areas, increase the efficiency in the entire energy chain and create creditworthy institutions as well as improve corporate governance and rationalize sector management, shift towards mobilization of external financial resources for the sector to ensure the country meeting its energy demands, providing services that will facilitate private participation in the energy sector.

This proposed GEF Project is consistent with the CAS goals through: (i) supporting market-oriented mechanisms to support DSM and EE investments; (ii) promotion of private sector participation and investment in the energy and related sectors by developing a commercial energy service industry; (iii)

improving economic management and reducing infrastructure bottlenecks in the power sector through effective DSM programs; (iv) raising productivity in selected sectors by reducing energy costs; and (v) environmental protection through EE improvements.

1a. Global Operational strategy/Program objective addressed by the project:

The project is consistent with the objectives of the GEF Operational Program No. 5: Removal of Barriers to Energy Efficiency and Energy Conservation. The Project would support a long-term, programmatic approach to the development of sustainable investments in DSM and EE. The Project was designed with significant inputs from four stakeholder workshops, which provided for active participation and strong ownership among the Vietnamese agencies.

2. Main sector issues and Government strategy:

Energy Sector. The energy sector can provide the essential underpinning to future economic growth in Vietnam. Today, it contributes over a quarter of total foreign exchange earnings, from oil and coal exports. Energy demand has been growing at about 13 percent, faster than GDP, over the last five years. Continued expansion in energy and electricity supply and delivery infrastructure will enable rapid growth in the agricultural and industrial sectors and sustain economic growth. It can also help alleviate poverty by providing energy access to the poor and mitigate environmental degradation by encouraging the shift from traditional to commercial energy, as well as appropriate fuel choices in expanding commercial supplies.

New challenges have emerged in the energy sector requiring structural and institutional reforms that are both more difficult and more complex. First, to meet the economic growth targets, electricity supplies will need to grow to support economic growth rates. But this growth will need to be both efficient and more equitably distributed through aggressive DSM and rural energy programs, as today 79 percent of the rural population consumes less than 20 percent of total electricity. Second, although Vietnam is a resource rich country, it should strive to develop the energy sector along an environmentally sustainable path. The promotion of more efficient use of electricity and reduction in peak loads will ease constraints on the national system, reduce the need for new generation and system capacity and reduce energy generation requirements leading to corresponding emission reductions. Recent natural gas discoveries offshore also provide an opportunity to make environmentally and economically beneficial energy use choices. Vietnam is also well endowed with renewable energy resources to generate electricity to serve rural communities. However, only a quarter of its hydro resources are developed, and little to none of its other resources. Third, Vietnam has to invest almost 5.3 percent of its GDP, twice the rate of its ASEAN neighbors, in energy infrastructure. Fundamental reform of energy tariffs, with respect to both level and structure, and increased investments in DSM are required to ease financing constraints and ensure long-term efficiency in investment and resource utilization decisions throughout the economy. Since two thirds of the required investments will need to come from overseas development assistance, export credits and foreign direct investments, public financial resources and government guarantees for private investment should be selectively used. Fourth, attracting foreign private investment will require the creation of an enabling environment and legal framework. The Government needs to embark on restructuring and rationalization of the state-owned energy enterprises, creating a regulatory system and developing a mechanism to coordinate policy and investment decisions in the energy sector.

Electricity Tariffs. Fundamental reforms of the energy tariffs are required to ease financing constraints and ensure long-term efficiency of investment and resource utilization. Retail electricity tariffs, currently uniform across Vietnam, are set by the GOV, and have been raised periodically since March 1992. The most recent estimates of long-run marginal cost (LRMC) for retail tariffs are in the range of D1,125/kWh (US¢7.5/kWh). The achievement of an average tariff of US¢7.0/kWh is the development objective of IDA's ongoing tariff and sector dialogue with the GOV. On September 20, 2002 the Prime Minister issued a decision to increase the tariff levels which was implemented on October 1. The increase is from

the previous average of 740 D/kWh to 840 D/kWh – i.e., an increase of 13.5 percent. According to EVN, the price for urban households increased by the highest level of 25 percent, from 592.72 D (US¢3.95) per kWh (VAT excluded) to 742.72 D (US¢4.95) per kWh on average. Power prices applying to residents in rural areas have also risen by 19 percent, from 327 D (US¢2.18) per kWh to 390 D (US¢2.6) per kWh. Electricity for industrial production will increase by 11-12 percent. Charges for foreign invested firms and foreigners, which are usually higher than domestic ones, remain unchanged as the government plans to apply one electricity price for domestic and foreign consumers from next year. In addition, on July 5, 2002 a time-of-day bulk power tariff was initiated which included three tariff rates for peak, off-peak and low load hours to the PCs. This new tariff schedule was revised in November to account for the October 1 tariff increase and would be retroactive. It is expected that this new initiative will provide improved pricing signals for the PCs to actively participate in the proposed DSM programs and, thus, lost revenues by the PCs for peak load reduction efforts would be substantially reduced. EVN also agreed to conduct a new study on the bulk power tariff under the SEIER Project. Such a shift towards cost-based power tariffs will improve the overall economic and financial viability of DSM and EE investments.

IDA Support. On June 25, 2002, the Bank's Executive Board approved the associated IDA/GEF-supported System Energy Efficiency Improvement, Equitization and Renewables (SEIER) Project. The overall objectives of the SEIER project are to contribute to the Government's poverty alleviation program in rural areas and to improve the overall efficiency of power system services in the country. The Project's main development objectives are to: (a) **improve overall system efficiency and reduce investment needs** through (i) optimization of the transmission system to reduce transmission losses; and (ii) reduction of generation capacity increases by effective DSM and energy efficiency programs; (b) **enhance energy access for the poor** in remote areas by (i) upgrading of the 110 kV sub-transmission and the MV distribution lines for rural electrification; (ii) rehabilitation of small hydro plants and construction of a hybrid wind-diesel power plant supplying electricity to rural areas and an island; and (iii) development of community-based utilities to provide renewable energy to remote communes not accessible by the grid; and (c) **sustain reform of the power sector** through (i) separation of generation, transmission and distribution by institutionalizing transfer pricing and distribution margins; (ii) improvement of corporate governance by instituting more effective financial management and information technology; and (iii) equitization of districts and communes in north, center and southern parts of the country to develop a creditworthy distribution sector.

DSM and Energy Efficiency. From 1992-97, Vietnam experienced unprecedented economic growth, averaging 8.2 percent annually. During this same period, energy demand grew 30 percent faster than GDP and electricity 70 percent faster. The ability of Vietnam to continue to meet such an aggressive economic growth rate will require substantial expansion of the energy sector and, in particular, the electric power sector. The Bank estimates that the power utility, EVN, will experience almost a threefold increase in demand over the next 10 years, from 25,843 GWh in 2001 to over 70,400 GWh by 2010, with annual demand growth of 13-15 percent. (In 2001, EVN's peak demand increased by some 18 percent over 2000.) Generation-level peak power demand is also projected to increase from the 2001 level of 5,655 MW to more than 16,000 MW by 2010, requiring an associated capital investment of more than US\$15 billion (over \$1.5 billion per year). EVN is now experiences system capacity constraints during evening peak hours (6-10pm), with daily peak loads 2-3 times those of off-peak hours, which has resulted in periodic brownouts, low system load factors and major investment requirements in capacity enhancements to meet demand for only a few hours of the day. The projected annual increases in electricity demand over the next few years, combined with the ongoing efforts to increase grid-based electrification to remote areas, will only exacerbate this situation. The major contributors to the increase in peak loads and energy consumption are various end uses (motors, process loads, lighting etc.) in large industrial and commercial customers and lighting loads in the residential and small commercial customers. Thus, the GOV and Bank have concluded that it is essential for DSM and EE programs to be developed and strengthened in order to meet the country's resource requirements and minimize the local and global environmental impacts of this growth.

In 1997, EVN, with World Bank assistance, commissioned the “Demand-Side Management Assessment for Vietnam,” which identified important opportunities for cost-effective electricity savings in a number of sectors and end-use applications. It recommended a phased approach for implementing DSM, which could save as much as 700 MW of capacity and more than 3,550 GWh/yr by the year 2010. Under Phase 1, supported by a SEK 29 million (about US\$2.8 million) Swedish Sida grant under the *Transmission, Distribution and Disaster Reconstruction Project* (Credit 3034-VN), a number of key technical assistance and capacity building activities were initiated, including development of an EVN DSM business plan for Phase 2, completion of a supporting DSM policy review and framework, and implementation and evaluation of pilot load research, load management, lighting and marketing programs; the Ministry of Construction (MoC) has developed an EE building code; and, MoSTE has developed and will introduce EE lighting and industrial motor standards. As a result of Phase 1 efforts, GOV and EVN management have accepted the need for DSM options to complement its large-scale supply-side investments.¹

Commercial Energy Efficiency: In addition to utility-sponsored activities, there is a small but growing number of commercially-oriented firms that are providing energy services to commercial and industrial customers. These include about six entities that are now developing and implementing EE projects. A small number of these firms have been pioneering more complex service models to grow their respective businesses and facilitate transactions in EE during recent years. However, these firms have encountered a number of constraints to business growth which range from limited equity and financing to low awareness and credibility/risk sharing of energy savings. In addition, there are some 40 firms that are interested in entering the market, provided conditions improve and the overall understanding of these projects among end-users is enhanced. It was, therefore, concluded by MoI and the Bank that there is considerable opportunity to support this emerging commercial market through GOV/GEF support. As electricity tariffs continue to increase, state-owned enterprise (SOE) reform progresses, and economic and energy demand growth rates persist, it is expected that there will be a greatly expanding market for these emerging businesses to tap.

DSM Policy Framework: The policy framework influencing the implementation of DSM in Vietnam is governed by the legal system that includes a set of Laws, Decrees, Decisions, Circulars and other legal documents issued by National Assembly, Government, and Ministries. Laws generally lay down a legal framework that is then subsequently elaborated by a Decree. Decrees are prepared by Ministries, and often specify the processes by which the provisions of a Law are implemented.

The original policy framework was established by the 1983 Decree on Regulations on Electricity Supply and Usage, which is currently being revised. In 1996, in accordance with a Decision of the Government, MoI began to prepare an Electricity Law for Vietnam. However, it has been difficult to achieve consensus on the new Law, which is at present in its 14th draft. The National Assembly is expected to approve the new Law before the end of 2003.

Among the most important Decrees (currently in preparation) affecting the electricity industry are:

- Decree on the Establishment and Approval of Electricity Tariff
- Decree on the Organization and Operation of the Electricity Regulatory Directorate of Vietnam
- Decree on Electricity Operation and Usage
- Decree on Energy Conservation and Efficient Use

The proposed Electricity Law has a number of provisions that relate to DSM and EE. For example, there is recognition of the need to introduce cost-based tariffs, develop a National Policy for Electric Power Development that includes DSM, and encourage the use of high efficiency equipment and implementation

¹ For example, as a result of the Phase 1 efforts and Phase 2 analyses, EVN has recognized the significant benefits of expanded time-of-use (TOU) metering and, in 2002, self-financed and installed an additional 19,000 TOU meters. It is expected that this will reduce EVN’s system peak by about 185-235 MW.

of DSM measures. In the drafting of the Decrees, GOV has demonstrated its recognition of the importance of EE and DSM, and its commitment to implementation of appropriate DSM programs. The Decree on Energy Conservation and Efficient Use requires MoI to develop and to submit to the government a five-year plan for energy development based on: (i) shifting the economy to a more efficient structure; (ii) increasing the efficiency of energy use; (iii) developing energy efficient technology; (iv) promoting fuel substitution; and (v) establishing norms for energy using equipment and appliances. (See a more detailed description about this Decree below.) The other Decrees also contain provisions to promote DSM and EE.

The first phase DSM project activities included a detailed assessment of the existing policy framework governing DSM, the roles and responsibilities of MoI and EVN, and recommendations for supplemental regulatory instruments to allow and encourage DSM to be implemented by EVN and its PCs. This comprehensive study concluded that no new policy measures or regulations were needed for EVN to implement DSM programs, launch informational campaigns or provide relevant customer incentives provided that such programs did not unduly conflict with its core business. However, any DSM programs that could significantly affect off-peak sales or provide national social benefits, which are clearly beyond EVN's mandate, would require some regulatory instruments, perhaps in addition to financial incentives to EVN and the PCs, in order for such programs to proceed. At present, the Government is considering these issues. However, at the present time, it has been agreed that EVN will only develop DSM programs that are commercially sound and cost-effective from EVN's perspective. With this approach, no additional regulatory instruments would be required.

Decree on Energy Conservation and Efficient Use: A Decree has been developed by MoI, in consultation with other line ministries and broad public consensus, which establishes a broad regulatory framework for the promotion of energy conservation and efficiency. The Decree is, in part, based on the Energy Conservation Promotion Act from Thailand. The latest draft Decree would regulate the energy conservation and efficiency in production, buildings and equipment, power intensive machines and residential use. Specifically, the Decree would require large factories (over 1,500 toe/year and/or 750kW or 4.5 GWh/year electricity demand) to meet certain requirements specified by MoI, commercial buildings (over 1,000 square meter floor area) to meet certain requirements developed by MoC, establishment of national standards (initially voluntary) for energy intensive equipment by MoSTE and MoI and building codes developed by MoC, creation of EE norms for specialized equipment prevalent in various ministries, required energy audits in facilities specified under the Decree, guidelines for a financial framework for the promotion of EE, and other relevant provisions. The Decree would not create an EE fund, but the GOV intends to create an Inter-Ministerial committee of MoI, MoSTE and Ministry of Finance to prepare a Prime Ministerial decision for such a Fund to support EE investments and activities. The Decree also addresses a number of other relevant issues, such as measures to reduce or eliminate import tariffs on selected EE equipment, to support its implementation. This GEF Project would provide GOV with critical implementation experience and lessons learned for such programs that could then be incorporated into the Decree's implementation framework and detailed plans.

3. Sector issues to be addressed by the project and strategic choices:

IDA/GEF would support a phased, 12-year (1998-2010) programmatic approach to DSM and EE activities in Vietnam. This program has begun with the IDA/Sida DSM project and would continue to build upon initial program results and efforts in 2-3 components in future energy operations. The rationale is to provide a longer-term vision for development assistance, scale-up mechanisms and business models tested in earlier operations, and develop timely intervention mechanisms as programs, markets and reforms develop (see Figure A2-1, Annex 2). This project, along with the associated SEIER Project, would seek to address the main short- to medium-term energy sector issues described in Section B2 and, in particular, expand EVN's DSM programs and test new models to support DSM and EE investments.

The rationale for supporting a DSM program within EVN and its PCs is clear and would form a core component of the IDA/GEF assistance program. The phased DSM program would seek to build upon activities initiated under the IDA/Sida project through the large-scale implementation of successful pilot activities, development of a broader portfolio of programs, improvement in EVN's DSM planning and evaluation abilities, and development of timely and appropriate assistance as sector reforms deepen and the landscape for DSM changes. Given EVN's business priorities, much of this program would focus on load management measures, such as TOU metering, voluntary load control, and tariff reforms, and should be supported with IDA financing. However, such load management efforts are not expected to achieve sufficient peak reductions alone and EVN has expressed its desire to support more EE measures, particularly efficient lighting in residential areas to shave peak loads and reduce new investment requirements in these areas. EVN also sees that CFL promotion in rural areas can help mitigate the effects of ongoing tariff reforms in these areas and, given barriers to the adoption of CFLs, GEF funds will support efforts to address them. EVN's DSM Cell is also interested in improving load research data and information (both customer and end-use profiles), enhancing its audit and customer consultation expertise, and mitigating the effects of ongoing tariff rationalizations through public awareness of DSM measure and IDA/GEF and other donor funds would support these initiatives.

In terms of providing assistance to end-users, the development of an initially small but commercially-oriented service industry to act as "project agents"² and provide support in any or all areas of project development and implementation would offer the most suitable mechanism to address EE barriers on a replicable and sustainable basis in Vietnam today. Because the domestic industrial sector is still largely state-owned and marginally creditworthy, the commercial EE pilot program will initially target those creditworthy energy users – e.g., commercial buildings, hotels, other office buildings, certain high growth industrial sub-sectors – that are able to access financing on their own. The strategy would be to build-up core competencies among participating project agents in simple and replicable technical renovation categories initially and develop more complex business models, technical innovations and financing schemes in subsequent phases. As initial projects are developed and implemented, successful business models would be identified and mechanisms developed to scale-up their operations. Initial phases will include monitoring systems designed to identify strengths and weaknesses of program models as well as feasibility studies for further market development, such as the potential for utility and non-utility energy service companies (ESCOs), various market assessments, and options for financing/guarantee programs, which could then be further developed and/or implemented in subsequent phases with IDA/GEF support.

Barriers to DSM and EE. While substantial opportunities clearly exist for DSM and EE improvements in Vietnam, there are a number of key barriers that have prevented the development of meaningful impacts to date. These include:

- (i) *inadequate information and skepticism*, from and for end-users, equipment manufacturers/suppliers and service providers (including EVN) on potential DSM/EE improvements, costs and benefits of DSM/EE measures, potential low-cost measures, and new technologies/practices;
- (ii) *lack of technical expertise*, by end-users, manufacturers/suppliers and potential service providers on modern efficient technologies and practices, efficiency potentials, DSM planning and implementation, energy audits and inspections, actual performance of EE measures, limited understanding of third party EE services (e.g., ESCOs);
- (iii) *high capital investment costs*, due to prevailing higher costs of EE equipment, limited local manufacturing capability and import tariffs on EE equipment, which currently discourage end-users from

² For the purposes of the pilot commercial EE program, the term "project agent" is used rather than ESCO to represent service providers. The rationale is that there are several misconceptions about whether ESCOs must offer a full range of project services (e.g., energy audit, project design, financing, installation, etc.) and/or provide performance guarantees. Thus the Bank team and MoI concluded that a more neutral term like project agent would minimize confusion and better allow participating Vietnamese firms to provide the types and range of services they wished to offer rather than seeking to expand their level of services based on their perceptions of Western ESCO models. Project agents may include energy auditors, equipment suppliers, leasing companies, ESCOs, installation contractors, and engineering companies.

selecting high-efficiency equipment despite their overall lower life-cycle costs, particularly given limited abilities of households to purchase EE lighting and current short-term priorities among many Vietnamese firms;

(iv) *high project development costs*, due to audits and technical studies required to properly determine investment requirements and ensure appropriate project design, real and perceived risks of projects developed by auditors with limited track record and technologies/equipment with limited tested performance under Vietnamese conditions;

(v) *lack of affordable financing*, due to a lack of commercial lending culture in Vietnam, weak banking sector and very limited term lending, restrictive lending terms, dominance of SOEs and dependence on public budgets for project investment capital, foreign capital requirements for imported EE equipment, relatively small investment sizes for EE, and limited affordable credit available to the residential sector;

(vi) *poor customer creditworthiness*, due to the poor financial status of many of the SOEs, which limit DSM and EE investments;

(vii) *limited interest of end-users*, due in part to a production or core business priority bias, the sometimes limited financial significance of the operating cost reductions from energy savings and the ownership of savings benefits from SOEs/municipal agencies;

(viii) *limited local EE and high quality equipment*, given the current manufacturing capability within Vietnam and low domestic demand for high-efficiency products; and

(ix) *low energy tariffs*, particularly in residential households, which has served to discourage investments in high-efficiency appliances and other DSM measures.

Collectively, these issues have discouraged any sizeable investments in efficiency measures.

C. Project Description Summary

1. Project components (see Annex 2 for a detailed description and Annex 3 for a detailed cost breakdown):

Component	Indicative Costs (US\$M)	% of Total	IDA ^a financing (US\$M)	% of IDA financing	GEF financing (US\$M)	% of GEF financing
1. EVN's DSM Program						
a. Expanded time-of-use metering	2.35	12.7	2.23	42.9	0.00	0.0
b. Pilot direct load control program	0.72	3.9	0.59	11.3	0.00	0.0
c. CFL promotion ^b	1.79	9.6	0.88	16.9	0.89	16.2
d. FTL market transformation	0.78	4.2	0.00	0.0	0.73	13.3
e. Supporting programs and technical assistance	2.58	13.9	1.50	28.8	0.63	11.5
2. MoI's Pilot Commercial EE Program						
a. Training	1.25	6.7	0.00	0.0	1.16	21.1
b. Subproject financing and grants	7.80	42.0	0.00	0.0	1.15	20.9
c. Program marketing, evaluation and administration	1.30	7.0	0.00	0.0	0.93	16.9
Total Project Costs	18.56	100.0	5.20	100.0	5.50	100.0

Notes:

- a. IDA financing for Phase 2 is provided under the recently approved, associated SEIER Project.
- b. Project costs do not include the US\$2 million associated financing from end-users for the CFL program.

The project consists of two components: (i) a second phase DSM component under EVN; and (ii) a pilot commercial EE program under MoI. For the EVN component, a total investment of US\$8.22 million would be sought to support the continuation of EVN's DSM activities initiated under the IDA/Sida project and, specifically, implement four large DSM programs and supporting activities to achieve major reductions in peak load, improve system load factors, transform select lighting markets, and assist

customers with ongoing tariff reforms. A US\$5.20 million credit has already been approved under the SEIER Project and additional support would be provided through a US\$2.25 million GEF grant and US\$0.77 million from EVN's internal funds. The MoI component would seek to test and develop business models and mechanisms to support commercial EE services and investments in industrial and commercial facilities, which would require an estimated \$10.34 million in total project financing (\$3.25 million GEF, \$6.65 million private sector, \$0.44 million MoI). (See Table 1, for a further breakdown of project financing requirements.) Project performance indices will be monitored during implementation of Phase 2 which will then be used as a basis for developing appropriate intervention strategies for future phases and the need for further GEF support (see Annex 2 for further details).

The full second phase DSM/EE program will consist of the following elements:

Component 1. EVN's DSM Program (US\$8.22 million). The main focus of this component would be to implement EVN's DSM business plan which was developed as part of the Phase 1 efforts. This component has been designed to achieve over 120 MW in system peak reduction and electricity savings of about 500 GWh through the implementation of several DSM measures. The program would be managed by EVN and implemented with support from its PCs and would include:

a) Expanded TOU Metering: EVN and its PCs would procure and install 5,600 TOU meters in about 4,000 large- and medium-sized customer premises to help rationalize electricity consumption during peak periods. This would be combined with a marketing and customer consultation component to assist end-users to better understand the TOU rates and identify options to shift load to off-peak or low-load hours. The associated IDA SEIER credit would support procurement and installation these meters as well as support project marketing and administration.

b) Pilot DLC Program: EVN, in collaboration with PC HCMC and PC Hanoi, would introduce a pilot direct load control (DLC) program using ripple control systems to curtail demand of about 2,000 customer end-use loads on a voluntary basis. The equipment (central stations, receivers, communication systems) would be purchased with the associated IDA credit and EVN would use its counterpart funds to pay for program administration and incentives for participating customers.

c) CFL Promotion: EVN would promote sales of 1 million CFLs to Vietnamese households located in areas of high loads and network congestion. EVN would procure CFLs in bulk and distribute them through their PC branch offices, lighting retailers and/or community-based NGOs. Over the three-year program period, EVN would use declining discounts, combined with marketing efforts, to promote the use of the more efficient lamps. GEF funds would be used to support the launch and full-scale operation of the program in the first year (e.g., lamp procurement and marketing) as well as test alternative delivery/financing mechanisms for the lamps, and associated IDA funds would be used to operate the program in the second and third years.

d) FTL Market Transformation: EVN also plans to promote high-efficiency 18/36 W T-8 fluorescent tube lamps (FTLs), by supporting marketing efforts in conjunction with participating manufacturers to actively market the more efficient lamps. EVN would also launch a parallel campaign to educate consumers about efficient FTLs as well as low-loss electronic ballasts. GEF funds would support the marketing efforts to both the manufacturers and EVN, and EVN's internal funds would support project management and administration.

e) Supporting Programs and Technical Assistance: In addition to the four DSM programs noted above, EVN will initiate complementary activities to support these efforts. GEF funds would be used to support DSM business opportunities studies and DSM program monitoring and evaluation, and associated IDA funds would support load research (both facility and end-use levels) to determine customer class and end-use profiles and energy savings potential/impacts, DSM program planning and policy support, development and implementation of new pilot DSM programs, and support to the DSM Center (equipment, staffing, institutional development).

Component 2. Pilot Commercial EE Program (US\$10.34 million). The project will also include a pilot commercial EE program, which would seek to test appropriate business models and mechanisms to catalyze a small and sustainable service market to support EE investments in Vietnam. This would be achieved by supporting a small group of commercial service providers or “project agents” in all phases of EE project identification, development and implementation. Given the existing poor financial conditions among many industrial enterprises, the pilot program will initially focus on private commercial buildings, hotels, other office buildings and selected creditworthy industrial sub-sectors capable of accessing financing on their own. Over 200 subprojects would be supported in order to stimulate the market and demonstrate the viability of such investments, saving over 300 GWh over the project period. Specific activities under this component would include:

a) Comprehensive Project Agent Training Program: The program would support a major training program to provide basic technical, financial and business knowledge to project agents to facilitate the development and implementation of project proposals as well as some customized technical assistance to develop their marketing and business plans. Technical training would be provided for energy auditing, technical system analyses and recommended efficiency improvements in the four end-use systems targeted, financial analyses of EE investments and technology options, various contractual options for EE services, project management, energy savings verification, marketing and sales, etc.

b) Subproject Audit and Investment Grants: The program would provide over 200 subproject grants, to be administered by a local commercial bank or Administrative Unit (AU), for energy audits and investments to project agents and their customers. For the audit grants, the program would offer grant reimbursements for energy audits. As agent capabilities improve and awareness and confidence in EE measures increases, the percentage of audit costs eligible for grant reimbursement will be reduced during the program period. The GEF grant would also provide investment grants (up to 20 percent of project investment) for customers and agents that have fully implemented the EE investments from the audit report. Initial subprojects would be eligible for the full 20 percent grant if they allow MoI to use the project as a case study for other project agents and end-users. As with the audit grants, these investment grants would be used to reduce barriers to customer skepticism of EE project performance and gradually be reduced as agent reputations and technical expertise improve.

c) Program Marketing, Monitoring and Administration: The program would also offer support for: (i) program marketing (e.g., identification and recruitment of project agents, raising awareness of potential customers of EE services, case study development and dissemination to project agents and end-users, etc.); (ii) program administration and monitoring (e.g., AU management fees, technical support, program database development and monitoring, post-installation inspections, evaluation and reporting); (iii) technical assistance to MoI and the AU; and (iv) feasibility studies for expanding successful business models, developing more complex models, establishing various financial mechanisms and instruments (e.g., credit lines, dedicated funds, guarantees, supplier credit/leasing arrangements, etc.) and support policy reviews to support project pipelines, and further market expansion in future IDA/GEF operations.

2. Key policy and institutional reforms supported by the project:

The following policy and institutional reforms are being sought under the associated IDA/GEF SEIER Project, which would allow this Project to fully realize its objectives and impacts:

The principal institutional reform would be capacity building to define and implement institutional structures for improving system efficiency, creating a creditworthy distribution sector and sustainable institutions for renewable energy development. The Project would also support improvement in system efficiency, corporate business and information management systems and increased decentralization and commercialization of management through: (a) implementation of EVN’s comprehensive and modern information technology (IT) Strategy; (b) separation of power plants and independent accounting units with explicit, incentive-based power purchase agreements with EVN; and (c) introduction of cost-based bulk power tariff replacing the internal bulk tariff between EVN and the PCs.

3. Benefits and target population:

The project will provide measurable, cost-effective reductions in energy use, greenhouse gas emissions and other pollutants. Detailed estimates of direct energy savings benefits over a ten year period total about 120 MW in peak load reduction and 2,928 GWh, resulting in over 724 thousand tons of oil equivalent (toe) and 3.5 million tons of carbon (see Annex 4 for further details).

In addition to the environmental benefits, EVN and its PCs will substantially benefit from reduced peak loads, network congestion and new investment requirements from its DSM programs. EVN's CFL program is also expected to offer major social benefits to households, particularly in rural areas, by reducing the impacts of recent and planned electricity tariff increases. EVN's DSM programs could also help reduce public resistance to expected tariff reforms as the utility offers information and support in helping consumers use their electricity more efficiently. Industrial, commercial and residential consumers will benefit from reduced energy/operating costs and corresponding increases in productivity and competitiveness from the activities initiated under the Project. Project agents will benefit from increased business prospects for providing commercial services and technical assistance to expand their capabilities and EE equipment manufacturers would benefit from increased sales of their products.

4. Institutional and implementation arrangements:

a. **Implementation period.** 2003-2006.

b. **Executing agencies.** The executing agencies would be EVN and MoI.

EVN would assume overall responsibility for Component 1. This would include the development of detailed DSM program designs and implementation plans, preparation of evaluation plans, overall DSM planning functions, analysis of all market and load research data, procurement of equipment, procurement and management of consultants and contractors, coordination of program implementation with the PCs and other agencies, and reporting to IDA/GEF. Since EVN does not have direct interface with energy consumers, the PCs would have primary responsibility for recruiting customers for the load management programs, installation of meters and DLC receivers, reselling of CFLs and proving data requirements to support EVN's load analysis and evaluation efforts.

MoI will maintain overall responsibility for the Component 2. This would include selection and supervision of the AU and technical advisors, procurement and management of all training program consultants, program marketing, monitoring, administration and reporting, and coordination among the various program agents, customers, AU and advisors.

Accounting, financial reporting and auditing arrangement

Assessment of the adequacy of the financial management system of implementing agencies and a timetable for measures proposed to improve capabilities: An assessment of the adequacy of the project financial management systems was carried out by the IDA team in September 2002. The scope of the work has been set out in the "Assessment of Financial Management Arrangement in World Bank-financed Projects-Guidelines to Staff" issued by the Financial Management Sector Board dated June 30th 2001. The objective of the review is to assess the suitability of the existing project financial management system as required by the Bank under OP/BP 10.02 with a view to implementing the proposed project. In Annex 5, the financial management risks have been addressed using the recent Vietnam Country Financial Accountability Assessment and also have been analyzed at levels relevant to the project covering risks as well as mitigating factors. The results of the assessment and a corresponding remedial actions to address weaknesses have been agreed with the agencies and are included in the Action Plan (see Annex 5). The review has concluded that with the fulfillment of the above Action Plan, this project will meet minimum Bank's financial management requirements. The Project will be producing Financial

Monitoring Reports (FMRs). In terms of disbursement technique, traditional disbursement technique will be used.

Status of the borrower and the project implementing entities' compliance with audit covenants in existing Bank-financed projects: There are no critical issues arising from audits of ongoing IDA-supported projects under EVN/MoI. To date, there are no overdue audit reports relating to projects under EVN/MoI.

Agreement with the borrower on standard and format for audited financial statements and the timetable for their submission: Project accounts will be kept in EVN and MoI for all project related expenditures using accounting principle and practices acceptable to the Bank. Project accounts will be audited on an annual basis in accordance with international standards on auditing and in compliance with the independent auditing regulations of Vietnam. The auditor's report will be made available to the Bank within six months of the close of each fiscal year. The audit will include a separate opinion on the statements of expenditures other than the Special Accounts and Project Accounts. A management letter addressing internal control weaknesses of implementing agencies will also be provided by the auditor together with the audit report.

D. Project Rationale

1. Project alternatives considered and reasons for rejection:

The Project has been developed during implementation of the Phase 1 project as well as through four stakeholder workshops. For the second phase of EVN's DSM program, the approach proposed is fully consistent with the original DSM Assessment and the design has incorporated implementation experience over the last two years as well as feedback from a stakeholder workshop implemented in September 2001. The project considered additional efforts to support the codes and standards work initiated under the Sida-supported first phase. However, given the very low demand for EE equipment at present, combined with the limited government capacity to test and enforce national standards, it was determined that an initial focus on creating greater market demand for EE equipment would be a more appropriate priority at this stage. As the program and markets develop further, the appropriateness for national standards and codes would improve as well as the prospects for successful introduction and implementation. (UNDP has expressed its interest in furthering this work and the Bank is actively supporting them.)

For the pilot commercial EE program, the strategic approach has been developed in consultation with government agencies, other activities initiated to date in Vietnam, and through three workshops in April and September 2002 involving potential program agents, government agencies, commercial end-users, financial companies and equipment suppliers. It was originally proposed that the Project include an EE financing program, either through a dedicated credit line or possible guarantee facility, to support commercial transactions. However, ongoing consultation with stakeholders and relevant agencies clearly indicated that there is, at present, a lack of commercial lending culture in Vietnam, weak banking sector and very limited and restrictive term lending. Most of the potential program agents and end-users noted that project financing in Vietnam is more often mobilized through internal end-user funds, supplier credit, foreign partners, and government budgets (for SOEs), thus, any dedicated financing facility would not be appropriate under the current climate. Furthermore, there was a concern that the creation of a financing facility may prematurely and unduly distort traditional financing methods. Thus, the design was revised to focus on subproject grants as a means of stimulating investments rather than providing project financing directly. As the banking sector undergoes further reforms and more term lending becomes available, the design and development of appropriate financial instruments and programs could be undertaken in future phases of the program. The project also considered providing large support to a few new or existing entities to establish commercial ESCO businesses, such as utilities, provincial energy conservation centers or research institutes. However, given the relatively small market for EE in Vietnam today, the fact that there were a number of small firms already developing businesses in this area and no

simple method to select the players, it was determined that such a strategy would create unfair competition and possibly even drive out the smaller players from the market.

2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
Bank-financed:			
Energy efficiency	China IBRD/GEF Energy Conservation Project	S	S
Energy efficiency	China GEF Second Energy Conservation Project	S	S
Utility energy efficiency	Poland IBRD/GEF Krakow Energy Efficiency Project	S	S
Energy efficiency	Romania GEF Energy Efficiency Project	S	S
Utility DSM and energy efficiency	Sri Lanka IDA/GEF Energy Services Delivery Project	HS	HS
Utility DSM	Thailand Promotion of Electricity Energy Efficiency Project	S	S
Other development agencies:			
UNDP-GEF	Vietnam Energy Efficient Public Lighting		
UNDP-GEF	Vietnam Energy Conservation in SMEs		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

3. Lessons learned and reflected in the project design:

For EVN's DSM program, Bank/GEF experience has shown the need for proper incentives for utilities to undertake DSM, thus EVN's programs have been restricted to those that directly coincide with their system peak. Previous operations have also shown the need for strong marketing efforts by DSM units, role of manufacturer agreements and linkages to parallel commercial financing programs (*Thailand Promotion of Electricity Energy Efficiency* and *Jamaica DSM Project ICRs*), the need to develop sustainable DSM institutional arrangements given ongoing restructuring plans (*DSM in Thailand: A Case Study, ESMAP Technical Paper No. 8* and *Operating Utility DSM Programs in a Restructuring Electricity Sector, ESMAP Workshop Proceedings*), the need to include distribution utilities in DSM implementation efforts, and design of DSM programs in the local context - all which have been addressed during project preparation.

For the pilot commercial EE program, operational experience has shown the need for market mechanisms to develop sustainable programs and, in particular, support for EE project developers/service providers to assist end-users to identify, design, package, mobilize financing, procure, install and commission EE projects in order to develop sustainable, replicable, commercially-oriented programs (*China Energy Conservation Mid-Term Review* and *Promoting Energy Efficiency and Renewable Energy: GEF Climate Change Projects and Impacts*). The program design has also taken into account the need to develop parallel marketing efforts to end-users, select a few demonstrations for wider dissemination, and keeping a clear focus on transactions and investments (*ESCO Practitioners Workshop, ESMAP Workshop Proceedings*).

4. Indications of borrower and recipient commitment and ownership:

Commitment by the GOV is very high. The development of the Decree on Energy Conservation and Efficient Use, which was submitted in July 2002 and is now under review, demonstrates the Government's commitment to EE on a national basis. During project preparation, four stakeholder workshops (one for EVN and three for MoI) were held and over 200 officials and representatives actively participated in the discussions on existing barriers and potential strategies to overcome them, identified

key implementation issues that would need to be addressed, and offered their support for the Project objectives. In addition, EVN and MoI have worked very closely with the Bank during project preparation and have provided adequate staff and counterpart resources to support project preparation work.

5. Value added of Bank and Global support in this project:

The proposed Project, along with the associated SEIER Project, will provide GOV with key support needed to help reduce energy demand and use energy more efficiently. The Bank team has worked very closely with the EVN and MoI counterparts to supervise Phase 1 and develop this second phase effort. Of particular interest to the GOV is the need for greater investment levels in EE that other programs and donors have been unable to provide or generate so far. Furthermore, the Bank has been able to offer considerable experience on DSM and EE programs elsewhere, particularly in Asia, which has greatly helped the Vietnamese counterparts select elements from other programs suitable to their local context. Finally, the Bank actively encouraged the use of a participatory approach to project design, which has allowed the design to better reflect the needs of all stakeholders and will help ensure that the Project impacts are fully realized.

E. Summary Project Analysis (Detailed assessments are in the project file, see Annexes 2 & 4)

1. Economic (see Annex 4):

NPV=US\$ million; ERR = % (see Annex 4)

Summarize issues below To be defined None

Economic evaluation methodology:

Cost benefit Cost effectiveness Incremental Cost Other (specify)

The incremental cost analysis of the Project, along with the global environmental benefits, are presented in Annex 4.

2. Financial (see Annex 5):

NPV=US\$ million; FRR = % (see Annex 5)

Summarize issues below To be defined None

A complete discussion of financial aspects of the project, including financial analyses of the DSM programs, are outlined in Annex 5.

3. Technical:

Summarize issues below To be defined None

All technologies proposed for the project are fully commercial in other countries and their DSM and EE performance well established. For EVN's component, each DSM program plan will include technical equipment performance specifications to ensure that all goods (e.g., meters, receivers, lamps) meet minimum performance requirements. For MoI's program, the program design requires elements to help ensure that the program does not suffer from early technical and performance failures. Efforts will be made to focus early investments on simple and replicable technical retrofit categories to ensure that core competencies can be built among project agents. Proper review of initial proposals by the AU, rigorous training of program agents and customized assistance provided by MoI will also help ensure that technical risks are minimized and/or explicitly addressed.

4. Institutional:

4.1 **Executing agencies:** In order to ensure successful project implementation as well as its sustainability and possible expansion under future IDA/GEF-supported phases, the creation of appropriate project management boards (PMBs) within EVN and MoI are essential. EVN has already established a DSM

Cell, under the Phase 1 project, and will gradually increase the size and capabilities of this Cell as implementation of the second phase begins. The Bank will need to actively monitor staff enhancements to the Cell and ensure that it is fully capable of managing all aspects of the Project. In addition, there remains a need to better and more formally clarify the roles of each PC for each DSM program and appropriate PC DSM working groups, which were created during Phase 1, to be formalized. For MoI, a DSM PMB was established under Phase 1 to supervise and coordinate all project activities. MoI and the Bank have agreed that this DSM PMB will be responsible for the implementation of the pilot commercial EE program. MoI's appraised project implementation plan (PIP) includes detailed staffing and implementation arrangements to ensure adequate skills and capability to fully manage the program. In addition, MoI has selected and appointed an AU to be responsible for administration of the subproject applications and grants.

4.2 Project management: As noted above, the project would be managed by EVN's DSM Cell and MoI. Each would maintain responsibility for overall management, coordination and reporting of their respective programs to the Bank.

4.3 Procurement issues: As executing agencies, EVN and MoI would be responsible for procurement of related goods and consulting services for their respective components. Both agencies have implemented previous Bank projects and are fully conversant in Bank procurement guidelines and requirements.

4.4 Financial management issues: For EVN, it is expected that a portion of the GEF grant may be used to establish a revolving fund for energy-efficient lighting equipment to be provided to customers that would then repay through their electricity bills or other mechanisms. EVN has agreed to develop a detailed program plan for its CFL program, which would provide distribution mechanisms for the lamps, institutional arrangements, customer/household screening criteria for target rural areas, use of proposed revolving funds, financial management of the GEF funds and repayments, and potential exit strategies for the GEF balances at the end of the project. EVN agreed to submit this detailed program plan to the Bank for review and approval as a condition of Project Effectiveness. For the MoI component, the AU management of the subproject grants would require appropriate financial management procedures safeguards as well as an assessment of the AU systems. MoI has selected a qualified commercial bank to serve as the AU and an assessment of the AU financial systems will be conducted by the Bank prior to Project Negotiations. MoI will also prepare a Program Operation Manual, which would layout detailed procedures for applications to the AU, criteria for approvals, flows of funds, ex-post reviews, financial management procedures, procurement, reporting, etc. An outline of the Manual was finalized and agreed during Project Appraisal and a complete draft will need to be submitted to and approved by the Bank as a condition of Project Effectiveness.

During project preparation, a financial management assessment was conducted by the Bank team. This assessment concluded that the concerned agencies have the basic framework to handle the accounting and disbursement aspects of the project. However, potential areas of weaknesses still exist. For EVN's CFL program, risks may include: (i) households failure to make lamp repayments for proposed revolving funds; (ii) PCs or other agencies fail keep track of installed lamp repayments; or (iii) PCs or other agencies use fund reflows for unapproved items. These issues will be fully addressed in the detailed program plan being prepared by EVN. For the MoI component, it is critical for MoI to select a high quality bank to act as the AU and develop sufficient monitoring mechanisms, since MoI will have to rely fully on the AU in receiving, reviewing applications and approving sub-grants. Thus detailed Terms of Reference were prepared for the AU, banks were pre-qualified, and a workshop was held in September 2002 for interested banks to discuss the program and AU responsibilities. An Action Plan will be prepared and implemented (see Annex 5) to address these issues and ensure that capacity is adequate to ensure proper financial management of the AU.

5. Environmental:

Environmental Category: C (Not required)

5.1 Summarize the steps undertaken for environmental assessment and EMP preparation (including consultation and disclosure) and the significant issues and their treatment emerging from this analysis.

Since this project will only involve the installation of meters, DLC receivers and retrofit of existing equipment (e.g., lighting, motors and pumps, air conditioners and chillers, capacitors, etc.) and no new construction or greenfield development, no adverse environmental impacts are expected. This project will result in major positive impacts on the environment, in terms of improved EE, reduced air pollution, and reduced greenhouse gas emissions. The greenhouse gas and other pollutant emissions as well as reductions in energy use will be quantified for each project activity. Since the Project would support a number of subprojects that have yet to be identified, MoI will prepare an Operation Manual, which would include a basic environmental screening section, to further ensure that there would not be any negative environmental impacts from supported subprojects. An outline of this Manual was developed by MoI and approved by the Bank at Project Appraisal.

6. Social:

6.1 Summarize key social issues relevant to the project objectives, and specify the project's social development outcomes.

No social hardships are anticipated as a result of the project.

6.2 Participatory Approach: How are key stakeholders participating in the project?

Project design has included consultations with a wide range of stakeholders, including government officials, EVN and its PCs, research institutes, end-users, commercial service providers, equipment manufacturers/distributors, financial institutions, nongovernmental organizations and other donors. Major awareness campaigns and marketing efforts supported under the Project will target the entire country and benefit all sectors and end-users. Access to the training activities, technical information/case studies and incentive grants will be open to all interested parties in the targeted sectors and business areas. And, the Project will continue to recruit additional program agents, end-users, and equipment manufacturers/ distributors as implementation proceeds.

7. Safeguard Policies:

7.1 Do any of the following safeguard policies apply to the project?

Policy	Applicability
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	No
Natural Habitats (OP 4.04, BP 4.04, GP 4.04)	No
Forestry (OP 4.36, GP 4.36)	No
Pest Management (OP 4.09)	No
Cultural Property (OPN 11.03)	No
Indigenous Peoples (OD 4.20)	No
Involuntary Resettlement (OP/BP 4.12)	No
Safety of Dams (OP 4.37, BP 4.37)	No
Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)	No
Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)*	No

7.2 Describe provisions made by the project to ensure compliance with applicable safeguard policies.

F. Sustainability and Risks

1. Sustainability:

Sustainability was a key consideration in the decision to develop the programmatic approach adopted while designing this phased, 12-year program. Initiatives developed under the first phase as well as those under this Project will be actively supported and further expanded in subsequent phases with IDA/GEF support. The concept is to provide a longer-term vision for development assistance, a framework for

scale-up of mechanisms and business models tested in earlier operations, and provisions for developing timely intervention mechanisms as programs, markets and reforms develop.

In addition, the program itself would seek market-based, commercial funding for DSM and EE investments. The load management programs under EVN are cost-effective and will help demonstrate to EVN and GOV the potential commercial merits and impacts for further DSM measures to help meet the rapidly growing electricity demand within the country. EVN's market transformation activities are designed to achieve large, sustained impacts on the CFL and FTL lighting markets and the initial grant funds would be phased out over the project period. For the pilot commercial EE program, the focus on improving program agent capability will lead to sustained market activity that will eventually be entirely financed by the private sector. Early successes with participating agents in the program would in turn lead to increased business for them and deepen the level of market activity and momentum. Support may be required in the future to facilitate commercial financing of EE projects, but these future operations would develop local commercial lending and, thus, eventually replace the need for any further Bank/GEF support in this market. Further reforms on electricity tariffs, banking lending and SOE equitization would allow these initiatives to develop further, with less reliance on grant support.

2. Replication Plan

This Project would build upon efforts under the first phase and expand measures deemed appropriate for Vietnam. The second phase would also be closely supervised and lessons learned incorporated into subsequent phases. Of particular interest is the ability for different business and transaction models to work within the Vietnamese context and be supported by existing legal, financial and commercial frameworks.

The programmatic approach will allow activities to be tested, refined and introduced on a national scale. There is also significant potential for the design of this program to be of interest to other relatively smaller countries in the region (e.g., Lao PDR, Cambodia) and globally, that are beginning to consider launching DSM and/or EE initiatives to curb demand growth, promote market-based environmentally sustainable development, etc. In particular, the use of simple load management programs to achieve significant, measurable and cost-effective reductions in peak loads and supporting the development of an emerging EE service market, where the banking sector is not yet ready to provide large-scale financing, could be of considerable interest to other countries.

3. Critical Risks (reflecting the failure of critical assumptions found in the fourth column of Annex 1):

Risk	Risk Rating	Risk Minimization Measure
<i>From Outputs to Objectives (see Annex 1)</i>		
Major changes in customer consumption patterns	N	
Customer willingness to accept and adopt of EE measures during and beyond project	M	Adequate market research to help ensure effective and appropriate program designs and marketing efforts.
Power quality supports EE equipment	M	Project activities will focus in areas with suitable power quality and associated IDA project will seek to improve power quality throughout EVN's system.
Proper energy pricing between EVN and PCs	M	Bulk power tariff study will be conducted under SEIER project and appropriate remedies will be sought.
Ability for project agents to operate successful businesses	M	Proper and rigorous training and identification of agents along with customized technical assistance.
Ability of agents to find innovative ways to share project performance risks to encourage customer investments	M	Training to agents on different successful project structures worldwide.
Continued economic development of sectors and creditworthiness of large end-users	M	Ongoing IDA assistance to SOE reforms.

Risk	Risk Rating	Risk Minimization Measure
<i>From Components to Outputs (see Annex 1)</i>		
Sustained EVN and PC management support and proactivity in DSM program	S	Ongoing dialogue as well as strong attention to early program successes.
Ability of DSM Cell to develop and implement successful programs	M	Technical assistance to DSM Cell, close supervision, ongoing dialogue with EVN on Cell staffing.
Ability and willingness for end-users to accept and invest in EE measures	M	Marketing to end-users, high quality agents, training to agents in selling EE services and projects.
DSM incentives are not misused by EVN/PC staff or customers	M	Proper program design, financial management system, close supervision.
Ability of lighting manufacturers to increase production of EE products at competitive prices	N	
MoI ability to successfully manage program	M	Careful attention to DSM PMB staffing, close supervision, technical assistance to MoI.
Ability for project agents to recruit interested and creditworthy customers	M	Marketing to end-users, high quality agents, training to agents in selling EE services and projects.
Ability for project agents to find alternative options for financing projects	S	Focus on creditworthy customers, recruiting leasing companies as agents, AU ability to offer financing, sharing of financing options between agents.
Ability for equipment suppliers to provide high quality EE equipment	N	

Risk Rating – H (High Risk), S (Substantial Risk), M (Modest Risk), N (Negligible Risk)

Key risks associated with the project include: (i) a lack of commitment by EVN to implement the DSM programs; (ii) limited interest in project agents to participate in the program; and (iii) inability for project agents and their customers to mobilize the necessary financing. Each is elaborated below:

- *Commitment to DSM by EVN.* While EVN has expressed its commitment to implement the DSM programs under the project, it will be necessary for EVN to continue to appoint high quality and capable staff to the DSM Cell and its PCs, actively manage various institutional arrangements and program activities, and fully incorporate DSM savings into the power planning process in order to realize the full benefits from the program. Furthermore, as power sector reforms deepen, it will be necessary for EVN to advocate continuation of its DSM activities in order for them to be sustained in the future. Close supervision of the project activities, careful program evaluation and continued policy dialogue will help address, but not completely eliminate, these risks.
- *Project Agent Participation.* While three workshops were held during project preparation and about 40 project agents identified, significantly more work is required in the project's early months to market the program and enable potential agents to begin developing their businesses in EE project development. The design of the program will provide essential training and technical assistance, but each agent must be committed to developing their businesses, recruiting customers and actively developing high quality and financially viable investment proposals. Careful design of the training programs, proactive marketing and communications by MoI, and timely technical assistance will help ensure sufficient program participation and a solid pipeline of proposals.
- *Access to Project Financing.* Since the project design has not included financing directly, the ability for the project agents and/or customers to access suitable financing for EE projects will be critical. During the first year of project implementation, substantial support will be provided by the AU and MoI to help get the initial pipeline of projects prepared and financed, which will then help raise the credibility and viability of the program and EE projects to new agents, customers and financial service providers. These initial proposals, combined with case studies, will also be used to market the program and demonstrate the financial viability of such investments to new potential players in the market, including commercial banks, leasing companies, etc. If the initial pipeline is slow to develop and initial transactions not completed in a timely manner, it will significantly reduce the credibility of the program, pace of market development and access to

financing. On the other hand, if the program generates significant interest, then the availability of financing and sufficient creditworthy customers could serve as the limiting factor for the program's deal flow.

4. Possible Controversial Aspects:

None.

G. Main Conditions

1. Conditions for

Project Negotiations

- a. Approval of the PIPs, satisfactory to the Bank, by EVN and the Recipient.
- b. Selection of the AU by MoI, satisfactory to the Bank, and completion of a financial management assessment of the selected AU by the Bank.

Project Effectiveness

- a. Execution of subsidiary grant agreement between the Recipient and EVN.
- b. Execution of a Project Administration Agreement on behalf of MoI and the selected AU.
- c. Adoption of MoI's Operations Manual, acceptable to the Bank, for the pilot commercial EE program.
- d. Adoption of a detailed CFL program plan, acceptable to the Bank, by EVN.

2. Other [classify according to covenant types used in the Legal Agreements.]

Agreements to be reached with EVN and MoI at Project Negotiations

During Project Negotiations, agreements will need to be reached on several aspects of the Project, including: (i) conditions for Project Effectiveness; (ii) progress, financial monitoring, Mid-Term Review and other reporting requirements for MoI, EVN and the AU; (iii) eligible disbursement percentages, management of the Special Accounts and required audit reports; (iv) procurement plans, procedures, prior reviews and thresholds; and (v) staffing and other institutional arrangements for adequate implementation of the project.

H. Readiness for Implementation

- 1a) The engineering design documents for the first year's activities are complete and ready for the start of project implementation.
- 1b) Not applicable.
- 2) The procurement documents for the first year's activities are complete and ready for the start of project implementation.
- 3) The Project Implementation Plan has been appraised and found to be realistic and of satisfactory quality.
- 4) The following items are lacking and are discussed under loan conditions (Section G):

I. Compliance with Bank Policies

- 1) This project complies with all applicable Bank policies.
- 2) The following exceptions to Bank policies are recommended for approval. The project complies with all other applicable Bank policies.

Jas Singh
Team Leader

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Sector Director

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Country Director

Annex 1: Project Design Summary

VIETNAM: Demand-Side Management & Energy Efficiency Project

Hierarchy of Objectives	Key Performance Indicators	Monitoring & Evaluation	Critical Assumptions
Sector-related CAS Goal: 1. Reduce infrastructure bottlenecks 2. Increase competitiveness 3. Private sector development 4. Protect the environment	Sector Indicators: <ul style="list-style-type: none"> • Quantified capacity (MW) and energy (GWh) savings • Operating cost reductions through EE investments • Increased commercial EE service providers and transactions • Quantified reductions in emissions and local pollutants from EE investments 	Sector/ country reports: <ul style="list-style-type: none"> • MoI and EVN statistics • Project progress reports • Project surveys and evaluation reports 	(from Goal to Bank Mission) CAS and GEF Objectives to Bank Mission: Promotion of environmentally sustainable development
Global Objective: Reduction of greenhouse gas emissions	Quantified CO ₂ emission reductions from EE investments		
Development Objective: Achieve significant and sustainable reductions in energy consumption and peak power demand	Outcome / Impact Indicators: <ul style="list-style-type: none"> • Peak load (MW) reduction • Energy (GWh) savings • Sustained increased sales of CFLs and T-8 FTLs • Total commercial EE projects and investments • Number of project agents 	Project reports: <ul style="list-style-type: none"> • MoI, EVN, and AU project progress reports • Supervision missions • Surveys and DSM evaluation reports • Project agent proposals 	(from Objective to Goal) Development and Global Objectives to CAS <ul style="list-style-type: none"> • Stable macroeconomic conditions • Appropriate energy pricing • Ongoing SOE and banking reforms
GEF Operational Program: Sustainable removal of commercial barriers to DSM and EE investments	<ul style="list-style-type: none"> • Increased market shares for CFLs and T-8 FTLs • Development of further DSM investment plans by EVN • Sustained increases in EE investment levels by end-users, agents and banks 	<ul style="list-style-type: none"> • MoI, EVN, and AU project progress reports • Supervision missions • Surveys and DSM evaluation reports • Project agent proposals 	
Output from each Component: 1. EVN's DSM Program <ul style="list-style-type: none"> a. TOU metering b. DLC program c. CFL promotion d. FTL program e. Supporting programs 	Output Indicators: a. TOU meters installed a. DLC systems installed/active b. CFLs sold and installed c. T-8 FTLs marketing campaigns launched e1. Load research meters installed and profiles developed e2. Commercial DSM business opportunities assessed and appropriate plans developed e3. DSM planning and policy support developed/initiated e4. DSM pilot programs assessed and implemented e5. Monitoring and verification plans developed/implemented	Project reports: <ul style="list-style-type: none"> • EVN progress reports • Supervision missions • Surveys and DSM evaluation reports • Lighting manufacturer sales data 	(from Outputs to Objective) <ul style="list-style-type: none"> • No major changes in customer consumption patterns • Customer willingness to accept and adopt EE measures during and beyond project period • Power quality supports EE equipment • Ability of lighting manufacturers to increase production of EE products at competitive prices • Proper energy pricing between EVN and PCs

Output from each Component:	Output Indicators:	Project reports:	(from Outputs to Objective)
<p>2. Pilot Commercial EE Program</p> <p>a. Training</p> <p>b. Subproject grants</p> <p>c. Program marketing, evaluation, and administration</p>	<p>a Training programs developed and delivered</p> <p>b. Customers successfully recruited, audits completed and projects implemented</p> <p>c1. Marketing materials developed and delivered</p> <p>c2. End-users trained and educated on EE</p> <p>c3. Case studies developed and disseminated</p> <p>c4. Monitoring and evaluation plans developed and implemented</p> <p>c5. Studies to scale-up program in future phases launched and completed</p>	<ul style="list-style-type: none"> • MoI and AU project progress reports • Project agent proposals • Supervision missions • Surveys and evaluation reports 	<ul style="list-style-type: none"> • Ability for project agents to operate successful businesses • Ability for agents to find ways to share project performance risks to encourage customer investments • Continued economic development of sectors and creditworthiness of large end-users
Project Components/Sub-components:	Inputs: (budget for each component)	Project reports:	(from Components to Outputs)
<p>1. EVN DSM Program</p> <p>a. TOU metering</p> <p>b. DLC program</p> <p>c. CFL promotion</p> <p>d. FTL program</p> <p>e. Supporting programs</p> <p>2. MoI Pilot Commercial EE Program</p> <p>a. Training</p> <p>b. Subproject grants</p> <p>c. Program marketing, evaluation and administration</p>	<p>1. Total cost \$8.2 million</p> <p>a. \$2.3M (IDA)</p> <p>b. \$0.7M (IDA)</p> <p>c. \$1.8M (IDA/GEF)</p> <p>d. \$0.8M (GEF)</p> <p>e. \$2.6M (IDA/GEF/EVN)</p> <p>2. Total cost: \$10.3 million (GEF: \$3.25M, MoI: \$0.44M, commercial: \$6.6M)</p> <p>a. \$1.2M (GEF/MoI)</p> <p>b. \$7.8M (GEF/commercial)</p> <p>c. \$1.3M (GEF/MoI)</p>	<ul style="list-style-type: none"> • EVN progress reports • Supervision missions • Bank disbursement reports • MoI and AU progress reports • Supervision missions • Bank disbursement reports 	<ul style="list-style-type: none"> • Sustained EVN and PC management support and proactivity in DSM program • Ability of DSM Cell to develop and implement successful programs • Ability and willingness for end-users to accept and invest in EE measures • DSM incentives are not misused by EVN/PC staff or customers • Households make lamp payments on time • Ability of lighting manufacturers to increase production of EE products at competitive prices • MoI ability to successfully manage program • AU operates effectively • Ability for project agents to recruit interested and creditworthy customers • Ability of project agents to find alternative options for financing projects • Ability of equipment suppliers to provide high quality EE equipment

Annex 2: Detailed Project Description

VIETNAM: Demand-Side Management & Energy Efficiency Project

IDA/GEF will support a phased, 12-year (1998-2010) programmatic approach to demand-side management (DSM) and energy efficiency (EE) activities in Vietnam. This program has begun with the Phase 1 DSM project and would continue to build upon initial program results and efforts in 2-3 additional phased operations. The rationale is to provide a longer-term vision for development assistance, establish a framework for scale-up of mechanisms and business models tested in earlier operations, and develop timely intervention mechanisms as programs, markets and reforms develop (see Figure A2-1, p. 34). The second phase of the program would consist of two components: (i) a second phase DSM component under EVN; and (ii) implementation of a pilot commercial EE program by MoI. For the EVN component, a total investment of US\$8.22 million would be sought to support the continuation of EVN's DSM activities initiated under the IDA/Sida project and, specifically, implement four large DSM programs and supporting activities to achieve major reductions in peak load, improve system load factors, transform select lighting markets, and assist customers with ongoing tariff reforms. US\$5.20 million has already been approved under the IDA SEIER Project, US\$0.77 million would be made available from EVN's internal funds, and US\$2.25 million from the GEF grant funds would be used. A pilot commercial EE component, also supported under the associated GEF project, would require an estimated \$10.34 million in total project financing (\$3.25 million GEF, \$6.65 million private sector, \$0.44 million MoI) and would be managed by MoI. The full second phase DSM/EE program will consist of the following elements:

Project Component 1 - DSM Program (Second Phase) Under EVN (US\$8.22 million)

The main focus of this component would be to build upon Phase I DSM results and expand the use of DSM to help EVN and its PCs better manage loads and load curves and improve system load factors. DSM is also viewed by EVN as a means to help mitigate the effects of ongoing power tariff reforms, particularly in the rural areas. Based on the studies and assessments conducted under Phase 1, the second phase has been designed to achieve over 120 MW in system peak reduction and electricity savings of about 500 GWh through the implementation of several DSM measures (impact estimates include both the GEF and associated IDA-financed components.). The program would be managed by EVN and implemented with support from its PCs. (Subsequent phases, which would seek to develop a large-scale portfolio of DSM measures by EVN and its PCs and may include support to create an ESCO unit under EVN, could be included in future IDA/GEF energy operations.) EVN's Phase 2 program would include four major programs and some supporting activities as noted below. (See Table A2-1 for a budget breakdown of the various DSM programs.)

1a. Expanded Time-of-Use Metering (US\$2.35 million). EVN introduced a time-of-use (TOU) tariff in 1998 and has supported this with TOU metering since then. The TOU tariff is applicable for large customers with loads over 100 kVA or consumption in excess of 10,000 kWh per month. By the end of 2001, EVN and its PCs had installed about 4,300 TOU meters in customer premises. Many of the customers have responded to the new tariff schedule by shifting loads from the peak hours to off-peak or low load periods. Despite the beneficial load shifting effects of these efforts, EVN has been reluctant to expand these efforts due to competing uses for their limited investment capital and some customer resistance to TOU metering. For example, a number of customers have responded by installing stand-by generation units and disconnecting from the grid during peak times to avoid peak pricing. Others have done so in order to ensure consistent and reliable power supply during peak periods. (However, after the TOU cost/benefits were analyzed under Phase 1 and presented to EVN management during Project Pre-Appraisal, EVN became convinced of the system benefits and, in 2002, installed an additional 19,000 TOU meters using internal funds, saving an estimated 185-235 MW.

Under this program, EVN would continue its efforts to encourage large customers to shift their energy consumption to off-peak hours using TOU metering. These meters would be deployed in about 4,000 new customer premises (5,600 meters in total) by 2005 for production, commercial, service and agricultural (irrigation) customers with transformer capacity over 100 kVA, as the existing tariff regulations allow, to help rationalize electricity consumption during the peak periods. A key element of the program would be the marketing and information campaigns that would accompany the TOU meter installations, so customers could understand the TOU tariff and meter and receive information on load shifting and EE options they could consider to avoid an increase in their overall electricity bill (and help better ensure the peak load reduction benefits to EVN). The program would also include a comprehensive monitoring and evaluation component to identify the benefits of TOU tariffs, define customer segments that provide the greatest load shifting benefits, and identify options for future modifications of the TOU tariffs and programs to improve their impacts. The associated IDA credit under the SEIER Project would allow EVN and its PCs to procure and install additional meters in remaining customers that meet the above criteria as well as support program administration, marketing and information, and monitoring. The total estimated peak load reduction from this program is about 70 MW and would save an estimated \$46 million in new capacity investments by EVN and its PCs.

Table A2-1. Project Budget Breakdown for EVN's Phase 2 DSM Program (all costs in USD)

Sub-Component	Total Cost	GEF	Associated IDA	EVN
A. TOU Metering				
Equipment and installation	2,050,000	0	1,950,000	100,000
Marketing and promotion	150,000	0	139,500	10,500
Administration & logistics	30,000	0	27,900	2,100
Technical assistance	120,000	0	111,600	8,400
<i>Sub-total</i>	<i>2,350,000</i>	<i>0</i>	<i>2,229,000</i>	<i>121,000</i>
B. Pilot DLC				
Equipment and installation	510,000	0	506,500	3,500
Marketing and promotion	60,000	0	55,800	4,200
Customer incentives	120,000	0	0	120,000
Administration & logistics	10,000	0	9,300	700
Technical assistance	20,000	0	18,600	1,400
<i>Sub-total</i>	<i>720,000</i>	<i>0</i>	<i>590,200</i>	<i>129,800</i>
C. CFL Program				
Equipment and installation	1,050,000	300,000	750,000	0
Marketing and promotion	100,000	93,000	0	7,000
Learning grant	500,000	500,000	0	0
Technical assistance	140,000	0	130,200	9,800
<i>Sub-total</i>	<i>1,790,000</i>	<i>893,000</i>	<i>880,200</i>	<i>16,800</i>
D. FTL Program				
Marketing and promotion	650,000	604,500	0	45,500
FTL testing	50,000	46,500	0	3,500
Ballast marketing	50,000	46,500	0	3,500
Administration & logistics	30,000	27,900	0	2,100
<i>Sub-total</i>	<i>780,000</i>	<i>725,400</i>	<i>0</i>	<i>54,600</i>
E. Supporting Programs				
Expanded load research	900,000	0	884,250	15,750
DSM business opportunities	250,000	232,500	0	17,500
DSM planning, policy and pilots	430,000	0	382,500	47,500
Program monitoring and evaluation	345,000	320,850	0	24,150
Staff, facilities and equipment	655,000	78,250	233,850	342,900
<i>Sub-total</i>	<i>2,580,000</i>	<i>631,600</i>	<i>1,500,600</i>	<i>447,800</i>
TOTAL	8,220,000	2,250,000	5,200,000	770,000

Notes:

1. Project budgets do not include the estimated US\$2.0 million from end-users for the CFL program.
2. All costs include contingencies.

1b. Pilot Direct Load Control Program (US\$0.72 million). Under this program, EVN, in collaboration with PC HCMC and PC Hanoi, would introduce a pilot direct load control (DLC) program using ripple control systems to curtail demand of about 2,000 customer end-use loads (e.g., air conditioning, refrigeration, water heating, etc.). The DLC technology would allow EVN to shut-off selected end-use equipment for up to a pre-specified number of hours each year during system shortages and seasonal peaks. The equipment (central stations, receivers, communication systems) would be purchased with the associated IDA credit and EVN would use its counterpart funds to pay for program administration and incentives to the program participants.

The DLC program would be targeted to medium to large commercial customers such as hotels, offices, services, administrative buildings, food stores, etc. Receivers would be installed on end-use equipment and controlled from central stations at the PC centers. A 25 percent control strategy would be used, whereby controlled end-uses would be switched off for 15 minutes each hour on a rotating basis. The targeted end-uses will be selected so that there is little or no loss in comfort, convenience, or productivity due to the appliance load control. The load control will be exercised only when the power system is experiencing a significant supply/demand imbalance, and the customers will be guaranteed that the control will be exercised for a maximum of 60 times in a year. There would be negligible energy savings or revenue losses from the program, since the equipment targeted typically operates with a duty cycle less than 1.0 and, thus, would recuperate any energy deficit by operating at full capacity following a shut-off period. The estimated peak load reduction from the DLC program is about 3 MW.

1c. CFL Promotion (US\$1.79 million). Currently, most electrified urban and rural households use 60-100 W incandescent light bulbs. The promotion of compact fluorescent lamps (CFLs), which typically use 12-18 W and provide comparable lumen output to incandescent bulbs, could significantly reduce lighting loads, which coincide heavily with EVN's system peaks, and reduce electricity costs for end-users. However, incandescent bulbs typically cost \$0.20-0.40 versus \$2.00-3.00 for CFLs. Under this program, EVN would promote sales of 1 million CFLs to Vietnamese households in areas of high loads and network congestion by procuring CFLs in bulk packages and distributing them through their PC branch offices, and possibly through lighting retailers and/or community-based NGOs. Over the three-year program period, EVN would use discounts, combined with marketing efforts, to promote the use of the more efficient lamps and these discounts would decline over the life of the program (about \$1.50/lamp for the first 200,000 CFLs, \$1.00/lamp for the next 300,000, and \$0.60/lamp for the remaining 500,000 CFLs). (Implementation of several pilot CFL programs under Phase 1 are now being implemented and evaluated and results and lessons learned would be reflected in the detailed design of this program.)

Most of the bulk procurement and discounted sales of the CFLs would be financed with the associated IDA credit, given the major load reduction benefit potential for EVN. However, GEF grant support is being sought for the first year of the program (or first 200,000 CFLs sold) in order to test the overall program design, delivery mechanisms, use of subsidies, etc. to refine the design in the latter years. It also proposed that a GEF DSM Learning Grant be provided to EVN which would be used to test alternative delivery mechanisms for the CFLs, which may include one or more of the following options: (i) test and develop a revolving fund mechanism with one or more PCs to offer interest-free financing for CFLs to rural customers, who would repay the cost of the lamps over a 6-12 month period through their electricity bills; (ii) test and develop a revolving fund mechanism with the Vietnam Women's Union (VWU), provincial authorities or other suitable organizations to provide CFLs for sales in rural areas and recover the funds, either on a cash or credit basis; and/or (iii) test and develop load reduction performance-based contracts with program subcontractors (e.g., PCs, lighting distributor/retailers, NGOs, companies) to market and sell CFLs. EVN will develop and submit a detailed program implementation plan, which would include CFL distribution mechanisms, institutional arrangements, screening criteria for target rural areas, use of proposed revolving funds, financial management of the GEF funds and repayments, and potential exit strategies for the GEF balances at the end of the project, to the Bank for review as a condition of Project Effectiveness. This program would provide energy savings of 39 GWh and peak

load reduction of over 33 MW during the project period. More importantly, the program is designed to help achieve a sustained expansion of the residential CFL market by demonstrating the benefits of the CFLs and achieving economies-of-scale to help reduce the prevailing market costs of the CFLs by an estimated 15-25 percent.

1d. FTL Market Transformation (US\$0.78 million). Under the Project, EVN would initiate a program to promote the use of high-efficiency 18/36 W T-8 FTLs, which have about the same lumen output and retail price as conventional 20/40 W T-10 lamps but consume about 10 percent less electricity, in all sectors. The two major local manufacturers of FTLs in Vietnam today, DIMEXCO and RALACO, now possess the capability to produce T-8 lamps and could substantially increase their production. However, given the very low penetration of lamps today (see Annex 11 for a description of the market), these manufacturers are unwilling to alter their production volumes without a significant change in the overall market demand. Thus EVN proposes to work with the manufacturers to increase the production of T-8s and phase out the traditional FTL, develop a cooperative advertising and promotion program with the manufacturers, and launch an information and promotion campaign to increase customer awareness and acceptance of the T-8s and low-loss electronic ballasts. GEF funds would provide for the incremental cost of the marketing efforts to both the manufacturers and EVN and support testing and project management support. Any revolving fund schemes developed under the CFL program would also be used to offer interest-free end-user financing for efficient ballasts. (A pilot FTL marketing effort was also launched under Phase 1 and will be evaluated in the coming months.)

The first year of the proposed program would be focused on working with the manufacturers to get a commitment to produce an increased number of T-8 FTLs. The cooperative information, advertising and promotion campaign will be developed in the first year, and launched at the beginning of the second year. As noted above, the program would also include the promotion of efficient ballasts with the T-8s. The program is expected to increase the installation of T-8s by 3 million units (plus 50,000 efficient ballasts) per year, leading to energy savings of 25 GWh and peak load reduction of over 14 MW during the program period. As with the CFL program, the more important benefit will be the sustained increase in production and sales of the T-8 lamps even after the program has ended.

1e. Supporting Programs and Technical Assistance (US\$2.58 million). In addition to the four DSM programs noted above, EVN will initiate complementary activities to support these efforts. Such activities will include load research (both facility and end-use levels) to determine customer class and end-use profiles and energy savings potential/impacts, DSM program planning and policy support, development and implementation of 1-2 new pilot DSM programs, DSM business opportunities studies (e.g., fee-for-service audits and consultations, utility-based ESCO, capacitor and EE equipment leasing, load management system operations, etc.), DSM program monitoring and evaluation, and support to the DSM Center (equipment, staffing, institutional development).

GEF funds would support measures necessary to fully realize the impacts of the DSM efforts noted above, including the assessments and development of commercial DSM business opportunities and DSM program monitoring and evaluation. The assessment of DSM business opportunities will consist of technical assistance for defining capabilities and interest within various EVN groups in establishing new commercial business lines and for conducting appropriate feasibility studies and developing business plans that would take advantage of EVN's resources to offer DSM-related services to customers. As the power sector in Vietnam restructures, EVN will be looking to spin-off potential profit business centers which may include the DSM Cell or other entities (e.g., Institute of Energy, PECCs 1-4) that could be interested in providing such services.

The program monitoring and evaluation component would provide technical assistance for developing an overall methodology for program evaluation, implementing a program monitoring and tracking system, development of a database for DSM measures and programs, conduct program process and impact evaluations, training of EVN staff to develop and implement evaluation plans for all the programs,

particularly the EE activities which require a higher level of evaluation complexity, and develop a monitoring plan for the overall DSM program indicating key milestones for the institutional development of the DSM Cell and other EVN departments for this and future phases. Detailed program and evaluation plans are now being developed by the DSM Cell and are expected to include: (i) assessment of baseline penetration rates for CFLs and T-8 FTLs through customer surveys, manufacturer and retailer sales data, customer billing data, and complementary load research; (ii) determination of actual load reduction effects from specific end-uses through end-use metering; (iii) refinement of impact assumptions (e.g., operating times, coincidence factors, free rider rates, etc.) through surveys (both program participants and non-participants) and supplemental load research; and (iv) establishment of actual program impacts through engineering estimates, EVN system and load forecast analyses, sample measurements of pre- and post-program consumption patterns for EVN's TOU and DLC program participants; and (v) evaluation of program strategies and market transformation efforts through surveys and select interviews (e.g., EVN and PC staff, manufacturers and distributors, focus groups).

Project Component 2 - Pilot Commercial Energy Efficiency Program (US\$10.34 million)

In addition to EVN's DSM activities, a pilot commercial EE program is proposed to test and develop appropriate business models and mechanisms to catalyze a small and sustainable EE service market resulting in increased EE investments in Vietnam. This will be achieved by training and supporting a small group of service providers ("project agents") who can develop commercial business services to assist customers in all phases of EE project identification, development, financing and implementation. These project agents would include energy auditing and engineering firms, equipment leasing companies, equipment suppliers, installation and construction contractors, and ESCOs. To date, over 40 candidate firms have been identified and confirmed interest in participating in the program. The program will initially focus on private commercial buildings, hotels, other office buildings and select creditworthy industrial sub-sectors capable of accessing financing on their own. EE measures would be initially limited to simple and replicable technical end-use systems in order to gradually build up competence among project agents, facilitate the development of technical program standards to ensure equipment performance, support project evaluation/monitoring, and stimulate the market for EE equipment in these initial areas. The program will initially concentrate efforts in four major cities (Haiphong, Hanoi, Da Nang, and Ho Chi Minh City), in order to allow MoI to better manage and focus market development, training, and project monitoring/administration efforts. (Future phases would seek to build upon successful business models from Phase 2, expand the geographical and technical boundaries of the pilot phase, test new and more complex models {e.g., performance contracting}, and develop appropriate local financing mechanisms to support larger-scale investments and pipelines.)

The project will support over 200 commercial EE projects. As agreed, eligible projects must: (i) result in net energy savings; and (ii) derive over 50 percent of the project's financial benefits from energy savings. For eligible projects, any non-energy savings components that could be removed from the project without affecting the net energy savings would only be eligible for an investment bonus for the energy savings component. In addition, the program would seek to support simple, small and replicable energy efficiency retrofits in end-use systems including lighting systems, motor and drive systems, heating and cooling systems and electrical supply systems. To participate, eligible project agents are expected to be pre-qualified by MoI and would be required to participate in some mandatory training courses. Other principles that were agreed by the Bank and MoI and guided the design of the program included: (a) the program must be investment driven; (b) different business models should be encouraged, developed and tested; (c) customers must be creditworthy, willing and able to access financing; (d) program procedures should be flexible and change based on market demands and early experiences; (e) local competition should be encouraged; (f) access to training, grants, etc. must be provided on an open and transparent basis; and (g) the program would avoid distorting market conditions in Vietnam.

MoI would manage this 4-year pilot program and an Administrative Unit or AU (a commercial bank) would be responsible for managing and disbursing the subproject grants (to help support energy audit costs and provide investment bonuses). Technical assistance would be made available to MoI and the AU to support assessments of the proposals. Through ongoing audit programs within EVN and MoSTE, along with work under the PDF B grant, it is expected that an initial pipeline of investment proposals would be developed and available by Project effectiveness. (Table A2-2 summarizes the cost breakdown for each component as well as the GEF financing requirement for the program.) Specific subcomponents under the pilot program are as follows:

Table A2-2. Project Budget Breakdown for Pilot Commercial EE Component (all costs in USD)

Sub-Component	Total Cost¹	GEF	MoI
A. Training			
Project agent and financial institution training courses	478,500	444,950	33,550
International training advisory services	270,000	251,100	18,900
Local advisory training group	165,000	153,450	11,550
Customized technical assistance to project agents	285,000	265,050	19,950
Additional training support	50,000	50,000	0
<i>Sub-total</i>	<i>1,248,500</i>	<i>1,164,550</i>	<i>83,950</i>
B. Sub-grants			
Energy audits	480,000	480,000	0
Investment bonus grants	671,000	671,000	0
<i>Sub-total</i>	<i>1,151,000</i>	<i>1,151,000</i>	<i>0</i>
C. Project administration			
End-user/agent marketing, information dissemination	240,000	223,200	16,800
MoI administration ²	300,000	0	300,000
AU administration	110,000	102,300	7,700
Program monitoring/evaluation, database development	250,000	232,500	17,500
Audit kits	130,000	130,000	0
Auditing and project accountant	65,000	60,450	4,550
Feasibility studies for future phases	200,000	186,000	14,000
<i>Sub-total</i>	<i>1,295,000</i>	<i>934,450</i>	<i>360,550</i>
TOTAL	3,694,500	3,250,000	444,500

Notes:

1. Project budget does not include the US\$6.65 million, which is expected to be leveraged by commercial sources for subproject financing.
2. All costs include contingencies.

2a. Comprehensive Training Program (US\$1.25 million). A major training program will be delivered to develop the basic technical, financial and business skills of project agents to enable them to effectively market, sell and deliver EE services on a commercial basis. This will include assistance with the development, financing and implementation of EE project proposals as well as customized technical assistance to develop the agents' marketing and business plans. Given the significant gap in actual project experience for many of the project agents in taking retrofit projects through the entire project cycle from identification/customer recruitment through financial closure to full implementation, the training component will be designed to provide project agents with a mix of technical and business skills appropriate to delivering solutions which result in actual EE project investment and implementation. Comprehensive training will be provided in energy auditing, technical system analyses, EE technologies, risk management, marketing and sales, financial analyses, various contractual options for EE services, project management and energy savings verification. Customized assistance will also be provided to advanced agents in how to facilitate EE projects, including identifying/recruiting prospective customers, identifying profitable retrofit investments, selling benefits, structuring and presenting commercial EE offerings and investment proposals, and identifying and matching the most appropriate sources of finance with customers and projects.

This set of training activities would be planned over the 4-year period, with much of the work to be conducted within the first two years, to strengthen and enhance project agent capabilities by covering the major themes noted below through general training courses, seminars and workshops, training materials and more customized technical assistance mechanisms.

- EE Service Industry Opportunities: This training will focus on providing a general introduction to EE service business model options practiced worldwide including energy auditing, equipment supply and leasing, energy systems design, installation and commissioning, monitoring and verification of energy savings, maintenance and project financing. Different contractual options (from both international and local sources) for EE services would be reviewed and discussed. This training module would also provide a detailed explanation of the pilot program and explain how agents can participate and develop new business services. This module will be aimed at attracting a wide range of potential agents and stimulating creative thinking on new and emerging business opportunities in EE services.
- Energy Auditing: This training activity will be designed to develop project agent capabilities to conduct “in-depth” energy audits in commercial, industrial and water plant systems including: (a) data collection for preliminary analysis; (b) energy equipment measurements and instruments needed to accurately calculate operating system efficiencies; (c) EE calculations; (d) energy efficient technology information sources and options; (e) estimating EE project costs; (f) methods for verifying, measuring and calculating post-construction EE savings; (g) conversion of EE opportunities identified in audits into commercial proposals; and (h) preparing grant applications for audit and investment bonus grants.
- Marketing & Sales of EE Services: This series will be aimed at addressing key needs for project agents to: (i) analyze and segregate the market and refine customer focus; (ii) identify and pre-qualify customer prospects; (iii) get appointments and make sales presentations to appropriate levels of decision-makers; (iv) contractual options for EE services providers covering different phases and scopes of EE services; (v) structure and negotiate service offering agreements; (vi) financing options for EE costs; (vii) estimate revenues and profitability from different types of EE services; and (viii) generate market strategies and sales plans for EE business opportunities.
- EE Technologies and Systems: This training series will provide in-depth exposure to a wide range of EE technologies including: (a) standard prevalent systems in use in Vietnam; (b) domestic and international EE technologies and practices; (c) manufacturing methods for EE technology supply; (d) certification and standards procedures; (e) procurement; (f) import duties and requirements; (g) installation and maintenance; (h) warranties and performance guarantees; and (i) sources of information for EE technology updates.
- EE Financial & Project Analysis: This course will seek to provide training in project development and the conversion of technical opportunity into relevant business information required for commercial decision making. Specific training will be provided in (i) risk identification, analysis, allocation and contractual options for risk sharing and structuring; (ii) financial return calculations and other decision data for customers, project agents and financial services providers related to EE projects; (iii) identifying and satisfying customers’ financial needs; and (iv) project financing options.
- EE Implementation Contracting: This training will focus on building the commercial and delivery capability requirements of project agents for professional implementation of EE projects including: (a) phases and management of activities options for implementation; (b) project scheduling; (c) procurement and contractual needs for design, financing, supply, installation and commissioning services; (d) resource and manpower requirements; (e) commercial, insurance and legal aspects of project implementation; and (f) options for alliances, joint ventures and other service structures for combining service capabilities to deliver EE solutions.
- Measuring, Verifying and Maintaining Energy Savings: This component will focus on providing comprehensive training in the “post-construction” phase of the EE project including: (a)

commissioning and verification of EE equipment “start-up” performance; (b) customer and supplier agreements and protocols for verification of EE performance; (c) EE equipment maintenance needs and agreement formats; (d) adjusting for energy price and occupation/activity level variations; and (e) optimization of installed technologies.

- **Customized Technical Assistance:** This element of the training program will focus ongoing technical assisting for more advanced project agents to assist in overcoming market barriers and with developing business plans aimed at creating long term commercial business revenues and profits from various components of the EE service industry chain including: (a) business and market plan development; (b) customer recruitment; (c) project packaging and selling; (d) equipment supply and/or manufacturing; (e) design engineering; (f) measurement and testing; (g) financial services; (h) installation contracting; (i) maintenance; and (j) comprehensive ESCO services.

The above training themes shall be conducted at a general level to a wide array of project agents and in restricted and customized settings for more advanced project agents. The training activities will be developed progressively over the project period and based on feedback from project agents, reviews of proposals by AU and MoI, and periodic program assessments. The training program will target project agents, but would also be available for MoI and AU staff, interested financial institutions, end-users and other appropriate parties (e.g., EVN staff, project staff from UNDP and other donor programs, etc.). The training would be delivered using a variety of mechanisms and approaches including lecture-style presentations, facilitated discussions, workshops and seminars, case study work, training manuals, individual agent support work, etc.

While the financial services industry in Vietnam is at a very early stage of development (a significant proportion of investments are self-financed by owners using both their own funds and low-interest and no-interest informal loans from extended family), the pilot program will provide some training and support material to both formal and informal financial institutions on how to structure offerings for financing EE projects. It is expected that most initial projects will be self-financed by customers or supplier credit schemes, however, over time the development of more commercially oriented financing sources, such as leasing and commercial lending, is expected to pick up and lead to an increase in EE investments.

2b. Subproject Audit and Investment Grants (US\$1.15 million). The program will provide subproject grants for energy audits (US\$0.48 million) and investments (US\$0.67 million) to project agents and their customers. The purpose of these grants is to stimulate the market for EE services by overcoming market barriers such as high project development costs from initial audits, skepticism of customers to actual investment opportunities, limited credibility of project agents to prepare and implement EE projects, and perceived risks associated with committing to EE investments. It is expected that these grants will leverage about US\$6.65 million of private sector investment into EE technologies during the program. The *energy audit grants* will be used to defray the initial costs of project identification and development and allow agents to generate and provide customers with structured information leading to customer decisions regarding EE technology applications and investments. To ensure that the project agents and their customers have incentives to implement the recommendations of the audit reports, a portion of the audit payment (about 70 percent) would be held until the project is under implementation so that the incentive is tied to investment decisions rather than the completion of audit reports. Efforts will also be made to tie audit grant applications with some conditions that commit the customer to proceed to the investment stage if viable EE measures (agreed payback or similar thresholds set upfront) are identified. It is also planned that the percentage of GEF grant reimbursement (of up to \$8,000) for the audit costs will be reduced as the Project progresses (100 percent in Years 1 and 2, 75 percent in Year 3 and 50 percent in Year 4), agent capability and credibility improve and the market develops.

The GEF grant would also be used to offer *investment grants* for customers and agents that have fully implemented EE investments and submitted program commissioning certificates subject to AU inspection

and approval. In the initial years and for selected projects, a higher percentage grant would be offered to customers in order to help ensure actual investments are made and that case study information on these initial experiences is developed and disseminated to other sub-sectors and project agents. As with the audit grants, in order to shift to more commercial terms, these investment bonus grants (of up to \$30,000) shall be provided on a diminishing percent basis over the 4-year program term (20 percent in Years 1 and 2, 10 percent in Year 3 and 5 percent in Year 4). Table A2-3 summarizes the projected financing requirements of the program from the GEF and commercial sources.

A local financial institution shall be contracted by MoI to act as the AU with responsibility for administering the subproject grants based on agreed-upon and publicly available program procedures. The AU has been selected on a competitive process and has demonstrated the necessary internal capabilities and controls to manage and disburse the funds. For some of its functions (e.g., audit report screenings, investment proposals), the AU will require the capability to carry out the technical evaluation of EE projects. It is planned that technical advisory support shall be made available to the AU with project funds to support these AU-led technical appraisals and reviews. Specific funding tasks to be carried out by the AU include: (a) carrying out financial and technical evaluation of proposals for funding based on defined program criteria; (b) administering appropriate terms and conditions for the disbursement of funds to customers; and (c) certifying subproject grant disbursements to MoI and keeping appropriate records of fund disbursements.

Table A2-3. Pilot Commercial EE Program Business Plan

	Year 1	Year 2	Year 3	Year 4	Total
<i>GEF Financing</i>					
Energy audit grants	24,000	96,000	180,000	180,000	480,000
Project investment bonuses	48,800	195,200	220,500	206,500	671,000
Total	72,800	291,200	400,500	386,500	1,151,000
<i>Project Financing</i>					
Small projects (US\$10-20k)	64,000	256,000	640,000	960,000	1,920,000
Medium projects (US\$20-60k)	80,000	320,000	800,000	1,200,000	2,400,000
Large projects (US\$60k+)	100,000	400,000	1,000,000	1,500,000	3,000,000
Total	244,000	976,000	2,440,000	3,660,000	7,320,000

Note: Project financing includes the GEF project investment bonus.

GEF funds disbursed by the AU to program participants are not intended to displace the primary sources of financing arranged by program agents and their clients through their preferred channels. One of the potential advantages of using a local financing institution (and several local banks and leasing companies have been contacted and confirmed their interest in participating in the program) is that in addition to administering the program grants, the AU can offer financial services to customers for EE projects, as required and appropriate.

2c. Program Marketing, Monitoring and Administration (US\$1.30 million). The program would also offer support for overall marketing of the program to various stakeholders, periodic monitoring and evaluation of the program achievements and benefits, and administration of the program by MoI, the AU and other institutions responsible for program implementation. Specific activities are expected to include:

- Program marketing (e.g., identification and recruitment of project agents, raising awareness of potential end-use customers of EE services, case study development and dissemination to project agents and end-users, including non-participants);
- Program administration and monitoring (e.g., AU management fees, technical support, program database development and monitoring, post-installation inspections, evaluation and reporting);
- Technical assistance to MoI and the AU; and
- Feasibility studies for expanding successful business models, developing more complex models, establishing various financial mechanisms and instruments (e.g., credit lines, dedicated funds,

guarantees, supplier credit/leasing arrangements, etc.), and appropriate policy reviews, to support project pipelines, and further market expansion in future IDA/GEF operations.

Substantial activity will be required to market the program to all stakeholders in the initial years due to the early stage of development of the EE service market. As the program is geared towards “testing and developing business models”, it will be critical that structured feedback mechanisms be established to periodically review and assess successes and failures of various business models developed and facilitate corrective actions. Dissemination of successful case studies and lessons learned is also an important aspect to support efficient market development. The program marketing, monitoring and administration component will be managed by MoI and it is expected that this program will establish a strong resident capability within the GOV for the long-term support for this emerging industry. GEF funds would be used to support program marketing efforts, monitoring and evaluation, technical assistance and feasibility studies for future phases. However, GEF funds will not be used to support any MoI administration costs, such as staff and/or office space, which would be supported with MoI counterpart funds.

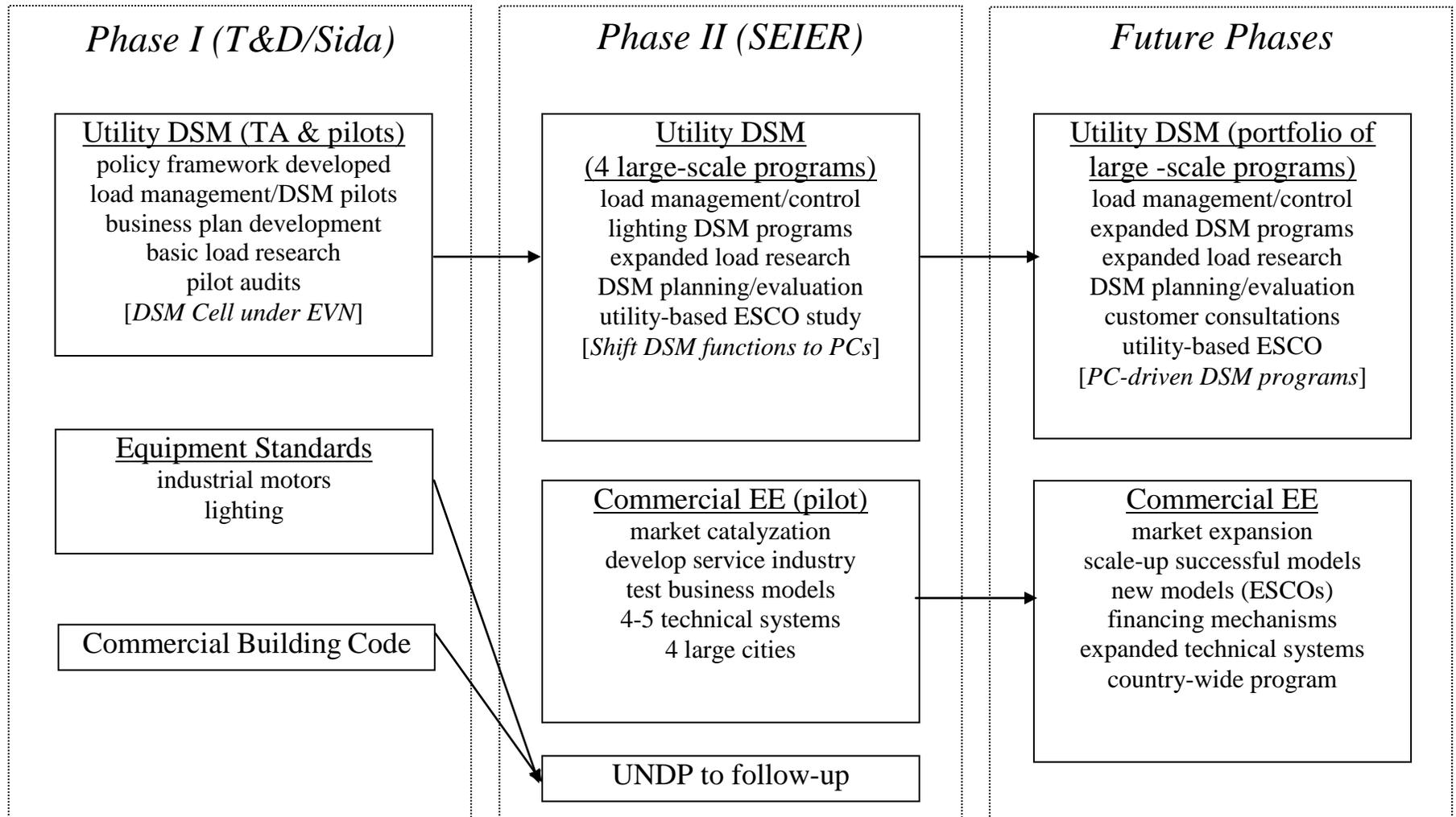
An important aspect of the program will be the inherent plans for replication and sustainability within the project design and commercial models supported. Specifically, the program is designed to support replication by end users that do not participate in the program directly, by: (i) developing capabilities with project agents to provide EE services to end-users on a fully commercially-sustainable basis, even after program has been completed; and (ii) case studies will be developed and disseminated on successful projects to non-participating end users and project agents for further replication. The case studies would provide the technical, financial and logistical information on successful projects for end users to consider, either with or without project agent facilitation. Sustainability will be based on the demonstrated commercial merits of the EE service business and investments to both project agents and end users. Over time, the training and administration costs will decline as the EE business gains more credibility, market barriers are removed, and local capabilities are further developed.

Project Indices for Future Phases: Project performance indices will be monitored during implementation of this second phase operation, which will then be used as a basis for developing appropriate intervention strategies for future phases and justify further GEF support. For EVN’s programs, the capabilities within the DSM Cell and related divisions would be monitored in areas of DSM planning, DSM program design and implementation, DSM program monitoring and evaluation, load research, overall management capability and an assessment of commercial DSM businesses for EVN. Key milestones and indicators for the areas identified above would include: (a) DSM planning - confirmation that EVN has incorporated projected DSM impacts in its system expansion plans by end 2005; (b) DSM implementation – the DSM Cell has successfully developed and launched four large-scale programs by end 2004 and met key program targets by June 2006; (c) DSM evaluation – the DSM Cell has developed evaluation plans, implemented them and reported key findings and impacts to EVN management and the Bank by end 2006; (d) Load research – the DSM Cell has initiated a load research program, developed key customer class and end-use load profiles and determined DSM program impact estimates using this data by end 2005; (e) Overall management – EVN has adequately staffed the DSM Cell with skills needed to fully carry out Phase 2, completed all project procurement successfully, implemented recommendations of Bank supervision missions, successfully coordinated work with consultants, PCs and other program partners, etc. by the end of the project; and (f) Business opportunities – the DSM Cell has implemented a workshop to present findings and recommendations from the DSM business opportunities review and articulated its intent to proceed with agreed actions by end 2006. In addition, all Phase 2 project indicators, as noted in Annex 1, will be monitored to ensure that the objectives of Phase 2 are fully met. Under the evaluation efforts, consultants will be hired to develop an overall monitoring plan for the full DSM program and identify key milestones, institutional development indicators and triggers for future phases. With fully successful outcomes in these key functional areas, future GEF support in subsequent phases would be limited to addressing new institutional challenges for DSM implementation under a restructured sector, removal of market barriers for new targeted end uses, support for new commercial

DSM ventures (e.g., utility-based ESCOs), etc. and any critical supplementary capacity building for EVN as determined under the evaluation assignments.

For MoI's program, key functional areas would include the ability for project agents to identify, develop, implement and monitor projects with decreasing government or program intervention over time (with the exception of commercial financing) and MoI's capacity to manage the overall program, development of appropriate informational databases and monitoring plans for further market development, etc. Key milestones and indicators for the areas identified above would include: (a) Agent capability – a critical mass of agents (e.g., at least 5-10) are actively participating in the program, recruiting customers and developing high quality proposals by end 2005; (b) Subproject implementation – project agents are able to identify new contractual/financing options for completing transactions and implement projects continuously over the full project period, despite the gradual decline in project training and subproject grants; (c) MoI management – MoI has adequately staffed the PMB with skills needed to fully manage the program, completed all project procurement successfully, adequately supervised the AU, implemented recommendations of Bank supervision missions, successfully coordinated work between project agents, customers, AU, banks, etc., and implemented key market development, program marketing and evaluation activities, by the end of the project. Also, indicators for MoI's pilot commercial EE program (see Annex 1) will be monitored to ensure that the objectives of the program are achieved, a requirement for further GEF support in subsequent phases. Close monitoring and achievement of these key indices under this Project would allow future GEF intervention to focus on developing more sophisticated business models for project agents, such as energy performance contracting, and addressing improved access to commercial financing for agents and end users, through establishment of a dedicated EE fund or loan guarantee program and supplemental capacity building to MoI to implement these financing programs.

Figure A2-1: Framework for IDA/GEF DSM/EE Program



Annex 3: Estimated Project Costs
VIETNAM: Demand-Side Management & Energy Efficiency Project

Project Cost By Component	Local US \$million	Foreign US \$million	Total US \$million
1 EVN's DSM Program			
a. Expanded time-of-use metering	0.28	2.07	2.35
b. Pilot direct load control program	0.19	0.53	0.72
c. CFL promotion	1.15	0.64	1.79
d. Fluorescent tube lamp market transformation	0.78	0.00	0.78
e. Supporting programs and technical assistance	1.28	1.30	2.58
2. MoI's Pilot Commercial Energy Efficiency Program			
a. Training	0.16	1.08	1.24
b. Subproject grants and financing	4.14	3.66	7.80
c. Program marketing, evaluation and administration	0.48	0.82	1.30
Total Baseline Cost	8.46	10.10	18.56
Physical Contingencies	0.00	0.00	0.00
Price Contingencies	0.00	0.00	0.00
Total Project Costs	8.46	10.10	18.56
Total Financing Required	8.46	10.10	18.56

Project Cost By Category	Local US \$million	Foreign US \$million	Total US \$million
Goods	5.65	6.75	12.40
Works	0.00	0.00	0.00
Services	2.81	3.28	6.09
Training	0.00	0.08	0.08
Other	0.00	0.00	0.00
Total Project Costs	8.46	10.10	18.56
Total Financing Required	8.46	10.10	18.56

Annex 4: Incremental Cost Analysis

VIETNAM: Demand-Side Management and Energy Efficiency Project

Overall Context for Energy Efficiency in Vietnam

Energy efficiency in Vietnam over the coming decade is critical for the country's continued economic growth and for the global environment. Energy efficiency and conservation investments are necessary to limit the otherwise huge increase in primary energy supply required to sustain the fast pace of growth of Vietnam's economy and to mitigate the economic and environmental consequences of expanded energy consumption. The Government has shown its commitment to the promotion of energy efficiency through the development of the proposed Decree on Energy Conservation and Efficient Use, which would provide a broad policy framework for a comprehensive set of initiatives to promote more efficient use of energy in all sectors. In addition, the GOV has supported a number of programs, in concert with other donors, to launch programs to support these goals.

From 1992-97, Vietnam experienced unprecedented economic growth, averaging 8.2 percent annually. During this same period, energy demand grew 30 percent faster than GDP and electricity 70 percent faster. The ability of Vietnam to continue to meet such an aggressive economic growth rate will require substantial expansion of the energy sector and, in particular, the electric power sector. The Bank estimates that the power utility, Electricity of Vietnam (EVN), will face an almost threefold increase in demand over the next 10 years, from about 25,800 GWh in 2001 to over 70,400 GWh by 2010, with annual demand growth of 10-15 percent. (In 2001, EVN's peak demand increased by some 18 percent over 2000.) Generation-level peak power demand is also projected to increase from the 2001 level of 5,655 MW to more than 16,000 MW by 2010, requiring an associated capital investment of more than US\$15 billion.

In 1997, EVN, with World Bank assistance, commissioned the "Demand-side Management Assessment for Vietnam," to assess the potential for demand-side management (DSM) to help meet the country's future electric power requirements. DSM is a resource planning and energy service tool that encourages electricity consumers to utilize energy more efficiently through a variety of measures, including time-of-use (TOU) tariffs, power factor penalties and correction measures, energy audits and retrofits, load research and management, information/education campaigns, incentive mechanisms to encourage adoption of energy-efficient equipment and other DSM programs targeted for specific industrial, commercial and residential end-uses. This DSM Assessment identified important opportunities for cost-effective electricity savings in a number of sectors and end-uses and recommended a two-phased DSM program, which would reduce the peak load by an estimated 700 MW and save more than 3,550 GWh/yr (about 3.5 million toe) by the year 2010. Under Phase 1, supported by a SEK 29 million (about US\$2.8 million) Swedish Sida grant under the *Transmission, Distribution and Disaster Reconstruction Project*, a DSM Cell within EVN has been established, a supporting DSM policy review and framework has been completed, pilot load research, load management, lighting and marketing programs have been launched, and a DSM business plan for Phase 2 has been developed; the Ministry of Construction (MoC) has developed an EE building code; and, MoSTE has developed and will introduce EE lighting and industrial motor standards. Overall project coordination is being managed by MoI. It was recommended that Phase II would: (i) expand DSM program implementation and evaluation; (ii) increasingly shift DSM functions from to EVN's subsidiary power distribution companies (PCs); (iii) expand the load management program; (iv) enforce the building code and appliance standards and develop an expanded standards regime; (v) develop financing mechanisms for future DSM activities; (vi) build local capacity to perform full-scale commercial and industrial energy audits and investment plans; and (vii) promote private sector participation in providing EE services.

Barriers to Energy Efficiency

Despite the potential for cost-effective EE improvements in all sectors, there are inherent commercial barriers as well as some barriers unique to Vietnam that have prevented any significant DSM/EE investments to date. These include:

- *Inadequate information and skepticism* from and for end-users in all sectors, equipment manufacturers, utilities, and service providers on the potential for EE improvements and estimated impacts. Many end-users are unaware of the difference between low and high-efficiency products, in terms of life cycle costs, equivalent levels of output, longer equipment lives, supply sources, other benefits (e.g., lower heat from CFLs, improved performance of systems from efficiency motors and adjustable speed drives, reduced maintenance costs, etc.) or potential low-cost measures and new technologies/practices. Other end-users are aware but are skeptical of the savings estimates, given the very low penetration rate of these newer products in the local markets.
- *Limited technical expertise* of end-users, manufacturers/suppliers, utilities, and potential service providers on modern efficient technologies and practices, proper energy auditing and detailed project design, alternative business and transaction models to support EE investments, estimating and verifying energy savings, etc. This lack of demonstrated and credible technical expertise heavily contributes to the information barrier noted above.
- *Deficiency in locally available EE equipment*, given the limited awareness and understanding of EE measures as noted above. Local suppliers and manufacturers supply equipment in demand and, thus, face little market pressure to improve product efficiencies and qualities. The resulting lack of EE equipment, in turn, serves to discourage those end-users that are interested in EE improvements. Those that do seek this equipment find supply lines difficult, face high import duties and restrictions, have difficulty identifying suitable, high quality equipment, etc.
- Commercial and industrial customers as well as service providers face *high project development costs and perceived risks*, due to the need for energy audits and technical studies to identify potential EE improvements without the assurances that high return projects exist. Where service providers bear the initial costs of these audits, end-users have been skeptical of the savings estimates developed by auditors with limited track record and technologies/equipment with little or no demonstrated performance under Vietnamese conditions. Comparing potential investments in EE versus core business costs (i.e., increased production), consumers view conventional investments as more risk-free than future revenue streams derived from less tangible sources such as energy savings.

Barrier Removal Strategy

To remove the key barriers noted above, the Project has been designed to increase public awareness about EE measures, achieve increases in the technical abilities of those promoting EE improvements, establish track records in DSM and EE projects, and demonstrate commercially-viable business models to support DSM/EE investments and transactions. Specifically, the Project would support barrier removal in the following ways: (a) achieve transformation of the lighting markets (for CFLs and T-8 fluorescent tube lamps (FTLs)) by a combination of declining subsidies, bulk procurement of lamps, intensive marketing, interest-free financing on utility electricity bills, and manufacturer partnerships/negotiations; and (b) support for EE transactions in the commercial/industrial sectors by testing and developing alternative business models for service providers to facilitate EE improvements through (i) marketing of EE and information dissemination to end-users; (ii) extensive training of project agents; (iii) grant funds to support project development (i.e., energy audit) costs; and (iv) investment grants to encourage initial

projects to help build project agent experience and reputations in the market. In both the EVN and MoI components, funds will also be sought for technical assistance to all relevant parties to ensure successful implementation and full realization of Project impacts.

Project Benefits

The Project activities will result in large and measurable peak load reduction, energy savings and associated carbon dioxide (CO₂) emissions reduction. However, more important than the actual savings derived during the Project period is the removal of key market barriers, sustained market transformation, significant capacity enhancements and firm foundations laid for future DSM and EE programs. These can then be further built upon in future years through subsequent Bank/GEF-supported operations. And as these business models develop and sustain themselves based on their commercial merits, savings will persist and grow even further.

Energy Savings: Energy savings would be derived from EVN’s CFL and FTL programs as well as EE investment projects undertaken by the project agents.³ The total cumulative energy savings from these initiatives is estimated at 798 GWh from equipment installations completed during the project period. (See Table A4-1.) However, since these markets will be significantly more developed after the project has been completed, the full ten year energy savings would be much higher, i.e., 2,928 GWh (see Table A4-2).

Table A4-1. Summary of Direct Project Benefits

Project Component	Peak Reduction (MW)	Energy Savings (GWh)
EVN’s DSM Programs		
<i>TOU Metering</i>	69.7	--
<i>Direct Load Control</i>	3.1	--
<i>CFLs</i>	33.4	303
<i>FTLs</i>	14.4	193
MoI’s Commercial EE Program	--	302
Total	120.5	798

Global Benefits: As shown in Table A4-2, Based on the energy savings estimates from each measure, the total amount of carbon dioxide (CO₂) equivalent emissions derived from the Project is estimated at almost 1 million tons (over the life of the equipment installed under the Project) and over 3.5 million tons over the life of equipment installed over a 10-year period.

Table A4-2. Summary of Total Project Benefits

Project Component	Indicator	During Project Period	Over 10 Year Period
EVN’s DSM Programs	GWh	496	1,478
	Tons CO ₂	594,983	1,773,498
MoI’s Commercial EE Program	GWh	302	1,450
	Tons CO ₂	362,252	1,740,333
Total	GWh	798	2,928
	Tons CO ₂	957,234	3,513,831

Note: CO₂ reduction estimates includes total carbon dioxide and CO₂ equivalents.

³ While EVN’s load management programs, such as their TOU metering and direct load control, may save some energy, their primary purpose is to shift loads from peak to off-peak hours, so no energy savings estimates for these programs have been included in this analysis.

Incremental Costs

Implementation of the barrier removal strategy noted previously would require funding of incremental costs, which would be the difference between the cost of implementing the baseline scenario versus that of the GEF Project alternative. GEF funds are sought to support part of this incremental cost. Descriptions and explanations for the baseline scenario, GEF Project alternative and incremental costs are further elaborated below.

Baseline Scenario

While there have been a growing number of initiatives designed to encourage EE in Vietnam, few have actually led to major reductions in energy use. This is to be expected, since Vietnam is in an early stage of its EE programs and, thus, most of the efforts to date have been on pilot or demonstration bases designed to increase local planning and implementation capabilities. For the DSM activities under EVN, most of the Phase 1 efforts were designed to review regulatory requirements, develop basic load research and DSM planning capability, and implement a few pilot programs. As a result of Phase 1 efforts, EVN management has now accepted the need for load management options that complement its large-scale supply-side investments, and the associated SEIER Project has provided for IDA funds to support these measures. EVN has been more reluctant to make major investments in EE measures, even in end-uses that correspond to system peaks, due perceived skepticism of their load reduction benefits (since load reduction would be heavily dependent on energy use patterns). In the absence of any GEF support, EVN would have limited its DSM activities to load management and load shifting programs (e.g., TOU metering, DLC, load research and DSM planning/pilots) and would not have pursued any lighting programs. Thus the total DSM program investment would have been only \$4.7 million (\$4.3 million from IDA and \$0.4 million from EVN).

Without any lighting programs, sponsored by EVN or other agency, it is not expected that the market for more efficient products would grow much, if at all. According to the results of a survey of about 3,000 households conducted under the Phase 1 DSM efforts, lighting accounted for almost 40 percent of the total peak load of which an overwhelming majority were in the residential sector. Of the residential lighting load, about 17 percent (302 MW) were incandescent bulbs and 83 percent (1,478 MW) were FTLs. The current penetration of CFLs and T-8 FTLs is currently very low. The number of CFLs in the residential sector is estimated to be about 0.5 million, or only 0.6 percent of total lamps, and efficient T-8 FTLs are estimated to be 4.4 million (representing about 8.1 percent of all FTLs). For the purpose of the baseline analysis, it is conservatively assumed that the number of CFLs and FTLs would increase by 5 percent per year without any government-sponsored market intervention. Thus the total market for these efficient lighting alternatives would remain at very low levels over the next 5-10 years. (Annex 11 contains further elaboration of the residential lighting markets in Vietnam today.)

For the pilot commercial EE program, interviews with over 40 potential project agents and end-users indicated that existing investments for simple EE retrofits were less than \$200,000 in 2001. Those few companies that have implemented a number of projects indicated that there are a number of barriers to market development, as noted previously, that have and will continue to prevent any major increases in their businesses. For the purpose of the baseline analysis, it is assumed that the existing agent industry expands their overall businesses by 5 percent per year (due to increased business of existing agents and new agents entering the market), although the trend in past years has been much lower. This would lead to an overall estimated investment amount of about \$905,000 over the 4-year program period in the absence of any GEF or other donor support.

Global benefits under this scenario would have been very modest, since EVN's load management programs would not have yielded in any CO₂ reductions, the lighting markets would have remained

dominated by conventional lighting products, and the existing EE service provider market would continue to develop slowly. Thus, the baseline investment scenario would have yielded emissions reductions of about 334 thousand tons of CO₂.

The total estimated cost for implementation of the baseline scenario is \$4.7 million.

GEF Project Alternative

The proposed alternative will seek to demonstrate the benefits of EE programs to complement EVN's load management efforts by transforming the markets for CFL and FTL lighting equipment. Furthermore, the Project will help test and develop promising business models for EE service providers to facilitate EE investments and improvements in commercial and industrial customer premises. These initiatives, which are developed on a least-cost basis, will be complemented by public campaigns, information dissemination, technical assistance and monitoring and evaluation activities to collectively help overcome and remove the barriers identified earlier.

Under this alternative scenario, additional support would be provided in the following areas to help address, partially remove or fully remove the barriers identified (in addition to those measures that would have taken place under the baseline scenario):

- In order to achieve major increases in the market share of CFLs in the residential lighting market, a comprehensive 1 million CFL program would be launched to intensively market the more efficient lamps, offer declining subsidies, provide interest-free loans to be recovered by EVN and its PCs through customer electricity bills, bulk procurement of lamps by EVN to achieve cost reductions from manufacturers and test alternative delivery models (e.g., sales through PCs, retail outlets, NGOs, performance contracts, etc.). It is expected that this will lead to a substantial increase in CFL sales (about three times the baseline) and achieve a significant cost reduction (estimated at about 15-25 percent) in retail CFL prices as economies-of-scale are realized. EVN has agreed to implement the 3-year program and borrow IDA funds to operate the program in the second and third years given the load reduction benefits. But, grant support will be sought for the first year of the program (or first 200,000 CFLs sold) in order to test the overall program design, delivery mechanisms, use of subsidies, prevention of potential abuses, demonstrated load reduction effects, etc. before the IDA funds would be used. The total estimated cost of this Project alternative would be \$1.79 million.
- To transform the FTL market from 20 W and 40 W (T-10) lamps to 18 W and 36 W (T-8) lamps, a major marketing effort would be launched to promote the T-8 FTLs in concert with manufacturer agreements to increase production of T-8 lamps and correspondingly reduce T-10 lamp sales. This is required to reduce the perceived risks by manufacturers that customers will accept the T-8 lamps and to increase customer awareness and understanding that the T-8 lamps provide the same lumen output at about the same retail cost but use about 10 percent less electricity. EVN would administer the program, enter into agreements with the local manufacturers and importers, and administer the marketing efforts. A target increase in sales of 6 million T-8 lamps is expected during the Project period. The total cost of this Project alternative would be \$0.81 million.
- To support the development and catalyze the expansion of a commercial service industry to promote EE improvements and investments in commercial and industrial facilities, major support would be provided to existing and new project agents to expand their EE business activities. This would be achieved through intensive training activities, marketing of EE to end-users, technical assistance to agents to develop marketing and business plans and close initial deals, grant support for subproject energy audit costs and investment bonuses for early projects in order to stimulate

deal flow in the early years. The grants would be decreased over the program period, as project agent abilities, reputations, and EE awareness builds in the market. (Issues such as project agent equity, access to commercial financing sources, market-based risk sharing arrangements would not be addressed during this phase but would be candidates for future support.) The total cost of this Project alternative would be \$3.0 million.

- In addition to the key initiatives noted above, support would be required for technical assistance, capacity building, monitoring and evaluation to ensure proper implementation, management and reporting of the Project alternative. The total cost of this Project alternative would be \$1.62 million.

The total estimated cost for implementation of the GEF Project alternative is \$11.92 million.

Total Incremental Costs

The total cost of the GEF Project alternative is US\$11.92 million, as compared with the baseline case of \$4.7 million. Thus, the incremental cost of the GEF Project alternative would be \$7.22 million, of which GEF support in the amount of only \$5.5 million is requested. The balance of \$1.72 would be financed by IDA, MoI and EVN. Incremental benefits of the proposed alternative would include both the CO₂ emissions reductions resulting from project implementation as well as further replication of EE measures resulting from the market development and transformation initiatives implemented under the Project. Energy savings derived from equipment replaced during the Project period are estimated to amount to over 798 GWh (about 197 thousand toe), which would lead to the reduction of almost 1.0 million tons of CO₂ equivalent. Over a 10-year period, where much of the market transformation benefits will accrue, the total estimated energy savings would be 2,928 GWh (about 724 thousand toe) corresponding to about 3.5 million tons of CO₂ equivalent. Over the 10-year period, the GEF cost per ton of CO₂ equivalent are estimated to be about US\$1.57 per ton. (A summary of the costs and benefits is summarized in Table A4-3, below.)

Table A4-3. Incremental Cost Matrix

	Baseline	GEF Alternative	Increment
Domestic Benefits	<ul style="list-style-type: none"> • Only load management programs implemented by EVN and PCs • Low growth in EE lighting adoption • Very low growth in existing agent businesses 	<ul style="list-style-type: none"> • Transformation of lighting markets through EVN programs • New pilot DSM programs implemented by EVN • Significant increase in agent businesses and transactions • Increased awareness in EE by consumers and financial institutions 	<ul style="list-style-type: none"> • Removal of skepticism to DSM and EE by utilities, consumers, and manufacturers • Additional energy savings of 2,928 GWh • Significant development of agent (ESCO) industry
Global Environmental Benefits	Reductions in GHG based on low level of agent business.	Reductions in GHG based on market transformation of lighting and higher level of agent business.	3.5 million tons of carbon reduced.
Costs by Component (US\$M)			
EVN DSM Program	4.70	8.22	3.52
MoI Commercial EE Program	0.00	3.70	3.70
Total Costs	4.70	11.92	7.22
GEF Incremental Costs			5.50

Annex 5A: Financial Management Arrangements VIETNAM: Demand-Side Management & Energy Efficiency Project

Financial Management Assessment

Executive Summary. *(Please refer to section C4 in the main body of the PAD.)*

A CFAA analyzing the general financial management environment and risks in the country was released in October 2001. Below is the extract on country issues and risks analysis: “At present, there is clearly a certain degree of fiduciary risk in the use of public resources, given that the budget process is not yet transparent, public access to government financial information is limited, and effective legislative oversight is not fully in place yet. Institutions responsible for ensuring financial accountability are also weak, audit findings are not publicly available as a matter of fact, and the reporting system does not support effective ongoing monitoring. At the present, accountability to citizens for the use of government revenues and for the quality of overall fiscal management does not fully meet the minimum standards of the IMF Fiscal Transparency Code. The Government has committed, however, to take steps to meet these standards. Overall, fiduciary risk will be manageable on on-budget items provided that the Government takes the steps outlined ... as well as those committed under the PER. The risk is currently high on off-budget items, which may not be subject to standard controls and oversight. Risk at the sub-national level is compounded due to the lack of adequate skills and experience in accounting and auditing. Although aggregate information from the budget has recently been made available, data on public financial statements, particularly those of SOEs, are still not available as a matter of course.”

Summary Project Description. IDA/GEF will support a phased, 12-year (1998-2010) programmatic approach to DSM and EE activities in Vietnam. This program has begun with the Phase 1 DSM project and would continue to build upon initial program results and efforts in 2-3 additional phased operations. This Project represents the second phase and consists of two components: (i) a second phase DSM component under EVN; and (ii) implementation of a pilot commercial EE program by MoI. For the EVN component, a total investment of US\$8.22 million would be sought to support the continuation of EVN’s DSM activities initiated under the IDA/Sida project. US\$5.20 million has already been approved under the IDA SEIER Project, US\$0.77 million would be made available from EVN’s internal funds, and US\$2.25 million from the GEF grant. A pilot commercial EE component, also supported under the associated GEF project, would require an estimated \$10.34 million in total project financing (\$3.25 million GEF, \$6.65 million private sector, \$0.44 million MoI) and would be managed by MoI.

Country Issues. No changes from the assessment conducted in support of the IDA SEIER Project.

Risk Analysis. In principal, the financial procedures for EVN and MoI under the project are fairly straightforward with centralization of payment from two Special Accounts under EVN and MoI and, therefore, the risks are not high comparing to other projects. The special features of this project are the possible use of a revolving fund at the PC level and the use of an Administration Unit (AU) in MoI to issue subproject grants.

For EVN’s CFL program, there could be some risks if (i) households fail make lamp repayments; (ii) PCs/others fail to keep track of installed lamp repayments; and (iii) PCs/others use fund reflows for unapproved items. However, these risks could be addressed and mitigated by a detail program plan, now under development by EVN, which would include detailed procedures for PCs/others to: (i) screen, evaluate and select households; (ii) record separately all funds relating to the CFL program in their accounting systems; and (iii) mechanisms to check the validity of payments made from these revolving funds. This detailed program plan will be prepared by EVN and submitted for Bank approval as a

condition of Project Effectiveness. For MoI, selection of a highly qualified AU will be essential, since MoI would have to rely fully on the AU for receiving, reviewing and approving program applications. Thus detailed Terms of Reference were prepared for the AU (including eligibility criteria as determined by the Bank), banks were pre-qualified, and a workshop was held in September 2002 for interested banks to discuss the program and AU responsibilities. In addition, MoI would develop an Operation Manual, which would include: (i) legal obligations of AU; and (ii) guidelines for periodic AU performance reviews. These measures would help MoI reduce these potential risks significantly.

Strengths and Weaknesses. The strengths for both EVN and MoI are the experiences derived from the on-going IDA-financed projects/grants. However, potential areas of weaknesses still exist which could be addressed and mitigated if key actions are taken by the implementing agencies (see risk analysis above). The Action Plan below has been developed to ensure necessary activities are completed before implementation of the project begins.

<i>Action</i>	<i>Responsible Parties</i>	<i>Due Date</i>
<i>1. Conduct a financial management assessment of the selected AU, satisfactory to IDA, to ensure adequate internal controls are in place to carry out the Project.</i>	MoI/IDA	Project Negotiations
<i>2. Adopt a detailed CFL program plan to include procedures to:</i> (i) Screen, evaluate and select households; (ii) Record separately all funds relating to the CFL program in EVN's accounting systems; and (iii) Develop mechanisms to check the validity of payments made from these revolving funds.	EVN	Project Effectiveness
<i>3. Adopt an Operations Manual to include:</i> (i) Legal obligations of AU; and (ii) Guidelines for periodic AU performance reviews.	MoI	Project Effectiveness
<i>4. Appoint a Project Accountant, with qualifications acceptable to the Bank, to assist in overseeing the AU and managing the Special Account.</i>	MoI	December 31, '03

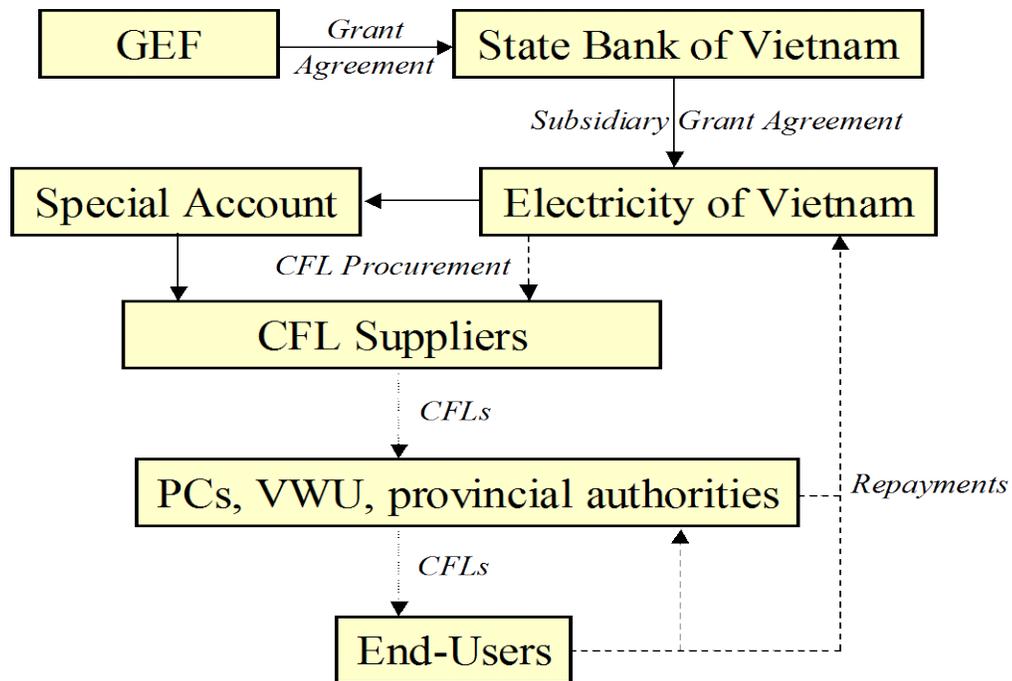
Implementation Arrangements. The executing agencies would be EVN and MoI.

EVN would assume overall responsibility for Component 1. This would include the development of detailed DSM program designs and implementation plans, preparation of evaluation plans, overall DSM planning functions, analysis of all market and load research data, procurement of equipment, procurement and management of consultants and contractors, coordination of program implementation with the PCs and other agencies, and reporting to IDA/GEF. Since EVN does not have direct interface with energy consumers, the PCs would have primary responsibility for recruiting customers for the load management programs, installation of meters and DLC receivers, reselling of CFLs and proving data requirements to support EVN's load analysis and evaluation efforts.

MoI will maintain overall responsibility for the Component 2. This would include selection and supervision of the AU and technical advisors, procurement and management of all training program consultants, program marketing, monitoring, administration and reporting, and coordination among the various program agents, customers, AU and advisors.

Funds Flow. The project is divided into two components: (i) a DSM component with EVN; and (ii) a pilot commercial EE program under MoI. For component (i), EVN will open a Special Account at the central level to disburse GEF-supported project activities. It is also expected that EVN would use a portion of the grant to establish one or more revolving funds at the PC levels (or other suitable arrangement) to finance CFLs. Under their current plans, EVN would first procure a full set of lamps and provide them to rural households via PCs, VWU, provincial authorities or other suitable agency at no initial cost. The PCs or other agencies would then recover the cost of the lamps over 6-12 months through the customers' electricity bills or other suitable mechanism and the reflows would establish revolving funds for additional lamp purchases/distribution. (The idea is that the customers would be able to pay for the lamps each month from the energy savings). Following this process, the replenishment mechanism from the World Bank is straightforward, that is, the Bank would disburse the GEF funds based on the initial procurement of lamps. Based on the assessment of EVN and the PCs under the SEIER Project, it was concluded that PCs would be capable of managing the reflow of funds and would record separately accounting transactions and maintain separate book/supporting documents on that revolving fund. These accounts would be reviewed and monitored by the Bank team during supervision missions. Options for using the remaining balances in the revolving funds at the end of the project period would be discussed and agreed at Project Negotiations. (See Figure A5-1 for a proposed flow chart for the CFL program.)

Figure A5-1. Flow of Funds for EVN's CFL Program



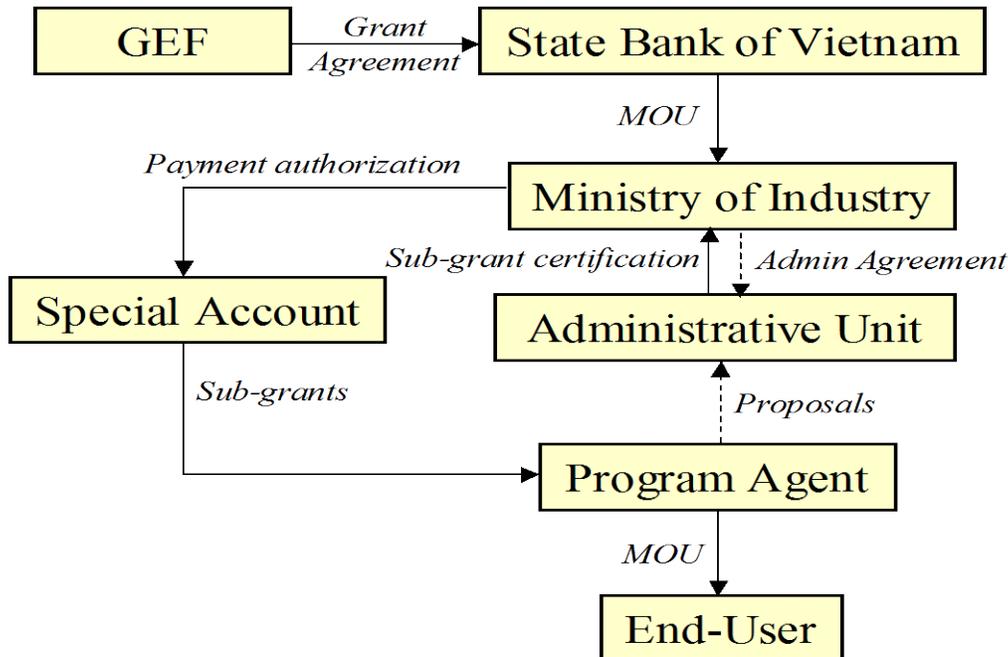
Program Procedures:

1. EVN procures bulk quantity of CFLs and distributes them to PCs, VWU, provincial authorities, etc.
2. CFLs are sold at declining subsidy levels and/or financed through electricity bills/other mechanism.
3. Energy end-users pay for cost of lamps upfront or financed over 6-12 months.
4. Repayments to EVN are then used to procure additional lamps for distribution.

For component (ii), MoI would establish a Special Account at the central level to pay for eligible GEF-supported project activities. In addition, MoI will use a portion of the grant for subproject grants to be administered by a commercial bank (Administrative Unit or AU). MoI has selected an AU to receive and review applications, approve subproject grants (for services and goods) and certify disbursements. A competitive process was followed for selection of the AU, which included eligibility criteria such as

compliance with SBV regulations, solvency, liquidity, profitability, human resources quality. An assessment of the financial management systems and controls will be completed by Project Negotiations, after which an Administrative Agreement between MoI and the AU will be finalized. (See Figure A5-2 for a proposed flow chart for MoI's program.)

Figure A5-2. Flow of Funds for MoI's Pilot Commercial Energy Efficiency Program



Program Procedures:

1. Program agent/end-user agree on an energy audit and submit an application to AU for registration.
2. AU reviews for eligibility and approves/rejects application.
3. If approved, program agent conducts energy audit and submits report to AU.
4. AU review and approve/reject audit report. If approved, the AU certifies a partial audit grant (initially 30%) to MoI for payment from the Special Account directly to the program agent. If end-user agrees to implement the project, signs an MOU with the program agent, and the project reaches financial closure, the remaining audit grant is issued.
5. Program agent helps end-user finalize project design, secures financing and implements project.
6. Program agent and end-user submit commissioning report to AU for review.
7. AU review and approve/reject report. If approved, AU issues investment bonus (up to 20% of project investment amount).

Staffing. Implementation of the DSM component under EVN would be the same PMB as the DSM subcomponent under the SEIER Project. EVN has created a Steering Committee consisting of 16 members from EVN, power companies and is headed by Mr. Tran Quoc Anh, Vice President of EVN. This Committee will provide guidance, coordinate and supervise the implementation. The DSM Cell under the Business Department will be the core implementing board for the DSM program under SEIER and this associated GEF Project. There are now five staff members in the DSM Cell who will directly work on the project activities. For all accounting and financial management aspects, EVN (including the PCs) has existing PMUs in charge of recording project transactions. These PMUs will continue their roles under this GEF Project. The staffing of these PMUs has been assessed by IDA staff in recent IDA-supported projects, including Rural Energy and SEIER. The IDA financial management team has found EVN's staffing arrangement acceptable to afford the Bank's minimum fiduciary requirements.

For MoI, the PMB consists of seven staff members from different departments within MoI. It is headed by Mr. Pham Manh Thang, Deputy Director of Planning and Investment Dept. All PMBs staff are part-time. The PMB is working under direction of the Inter-ministerial Project Steering Committee, consisting 12 members representing MoI, MPI, MoSTE, MoC and EVN. This Committee is headed by Mr. Hoang Trung Hai, former Vice Minister of Industry (now Minister). The PMB staff have gained significant experience in accounting and financial management from two ongoing Bank supervised trust funds (a Swedish Sida grant TF#050554, formerly TF#022228, which was signed in May 1999 and a GEF-PPG TF050064 for Preparation of the GEF Vietnam Demand-Side Management and Energy Efficiency Project). Accounting staff of the PMB will still continue to implement this GEF project.

Accounting Policies and Procedures. No changes from what was assessed under the SEIER Project have been made (please refer to FM assessment for SEIER).

External Audit. The PMUs in EVN and MoI will prepare project financial statements for their respective components in GEF project and have those project financial statements audited following current Bank guidelines. The audit reports must be submitted to the Bank no later than six months after the end of each fiscal year.

Reporting and Monitoring. Annual project financial statements will be prepared following current practice of SEIER. For periodic project monitoring purposes, the project will use the Financial Monitoring Reports (FMRs) developed by the World Bank and will be tailored to meet practical monitoring requirement of the project. EVN and MoI will use the FMR format used in SEIER project for this GEF project and this will be agreed upon during negotiation. The PMU in EVN and PMB in MoI will submit to the World Bank the FMRs on a quarterly basis.

Annex 5B: Financial Summary

VIETNAM: Demand-Side Management & Energy Efficiency Project

Financial Analysis and Summary

As noted previously, the project will result in substantial economic and financial benefits for Vietnam, in terms of reduced and delayed investment requirements in new power sector capacity, eased infrastructure bottlenecks, decreased building/factory operating costs and corresponding increased productivity and competitiveness, increased commercial activity, decreased dependency on imported and domestic fossil fuels, and improved environmentally sustainable economic development. As such, these investments represent financially viable alternatives to the current systems and represent win-win opportunities for the power sector, end-users, and society as a whole.

EVN. A detailed financial analysis for the DSM investments was conducted to assess the viability of the proposed programs. The analysis accounted for the total cost of the investment program including supporting activities such as load research, DSM planning, staffing and technical assistance, as well as forgone or lost revenues from decreased power sales by EVN and its PCs as a direct result of the programs. During the screening of potential DSM programs to be implemented under the project, efforts were made to maximize peak load reduction benefits to EVN while minimizing potential revenue losses during off-peak and low load times. These costs were then compared with the total projected benefits expected to accrue to EVN, in terms of avoided costs of supply during peak periods, shifting of loads to off-peak and low load periods, and delayed investment for additional generation and transmission capacity. The analysis was conducted based on the principles of avoided costs, that is DSM costs are compared with the alternative least-cost supply option. (This type of analysis is referred to as a DSM Utility Cost Test in North America, where the net costs of DSM as a resource option based on costs incurred by the utility are measured against the avoided costs of supply.) Thus, for the purpose of the analysis, the avoided costs are based on the construction and operation costs for a peaking plant, which in Vietnam is assumed to be a gas turbine plant with amortized costs of US\$54/kW/year and 7.82 US¢/kWh at the generation level. Long run marginal costs of supply used for the analysis include 3.904 US¢/kWh at the generation level, 5.166 US¢/kWh at the 110 kV level and 9.373 US¢/kWh below 6 kV. Losses are assumed to be 5 percent for transmission and 10 percent for distribution. For the load shifting programs, such as TOU metering, a price elasticity of 20 percent was used and an escalating percentage of customers relying on self-generation during peak periods (10-20 percent) was used to make the analysis more conservative.

As noted in Annex 4, the overall project benefits are 120.5 MW in peak load reduction and total energy savings of about 496 GWh at a total project cost of US\$8.22 million. Analyses were conducted from various perspectives, including EVN, the PCs, the end-users and society as a whole. The results of the benefit/cost analysis for the DSM programs (including supporting activities) are summarized in Table A5-1. As shown, the NPV to EVN for an investment of US\$8.22 million is over US\$76 million, which represents a substantial benefit to EVN. This result is reasonable, given the high supply costs experienced by EVN during peak periods, the correspondingly low tariffs, particularly in rural households, and the low system load factor. While the NPV to the PCs is substantially less, a recent decision to establish time-of-day bulk tariffs and further rationalize electricity tariffs will boost the DSM benefits to the PCs. Finally, the perspective of the customer is very good, indicating that the programs are beneficial and cost-effective to the customers as well, offering a clear win-win opportunity for all. The overall analysis, which represents the government or societal benefits, have a NPV of over US\$80 million indicating a clear and overall positive impact on the economy. With the quantification of environmental externalities into the set of assumptions, the benefit-cost ratios would be even higher. Issues that also contribute to the overall

benefits to EVN but are not captured in these analyses include improved customer service, mitigation of ongoing tariff increases, social considerations in rural areas, reduced fuel imports, etc.

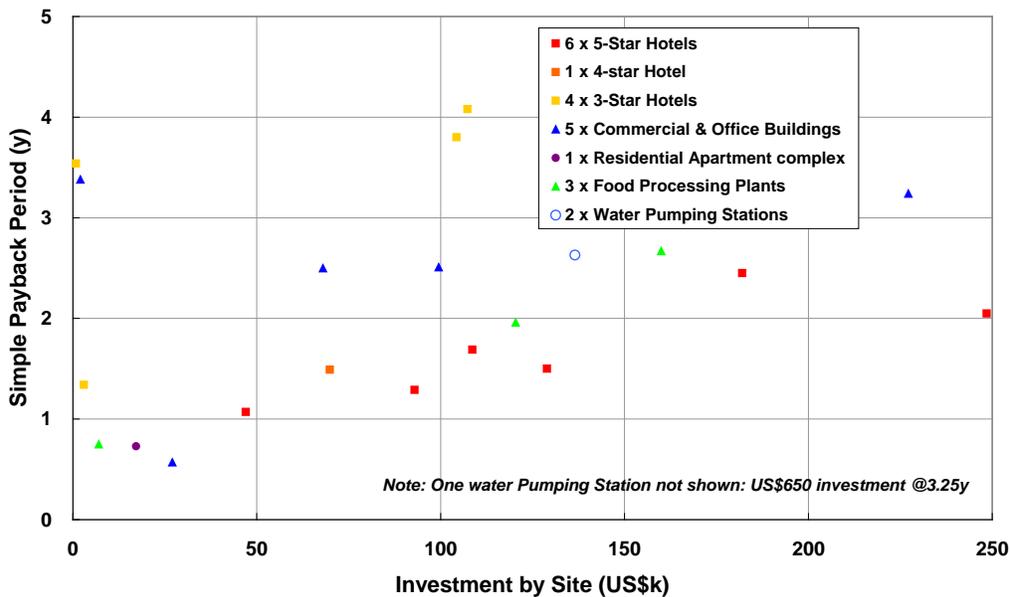
Table A5-1. Benefit/Cost Analyses for All DSM Programs (Including Supporting Activities)

Perspective	Economic Analysis (in USD million)			
	Benefits	Costs	NPV	B/C ratio
EVN (Financial)	96.39	19.50	76.89	4.9
PCs (Financial)	27.95	21.77	6.18	1.3
Customers (Financial)	21.17	2.57	18.60	8.2
National (Economic)	88.56	7.82	80.74	11.3

Assumptions: Ave. BST for all PCs 3.33 US¢/kWh, economic BST of 5.17 US¢/kWh, ave. retail tariff of 3.33 US¢/kWh, discount rates of 10 percent (economic) and 7 percent (financial), 10 percent VAT, exchange rate of US\$1.00 = 15,000 VND.

MoI. For the pilot commercial EE program, no separate financial analysis was conducted, since the major source of program funding would be provided by the GEF grant. However, a full incremental costs analysis of this component was conducted and is summarized in Annex 4. The program is designed to require that each subproject be cost-effective on its own since the project would need to be packaged and sold to the customer on purely commercial terms and supported through commercial service and financing agreements. As such, a review of potential subprojects was conducted during project preparation work supported by the GEF PDF B grant. The market and subproject analyses was based on a series of load research reports by EVN, EVN sales and billing data, review of several previously conducted energy audits, over 20 interviews with existing and potential project agents, and initiation of over 20 new walk-through audits in a range of customer classes.

Figure A5-3. Investment versus Simple Payback on a Site-by-Site Basis



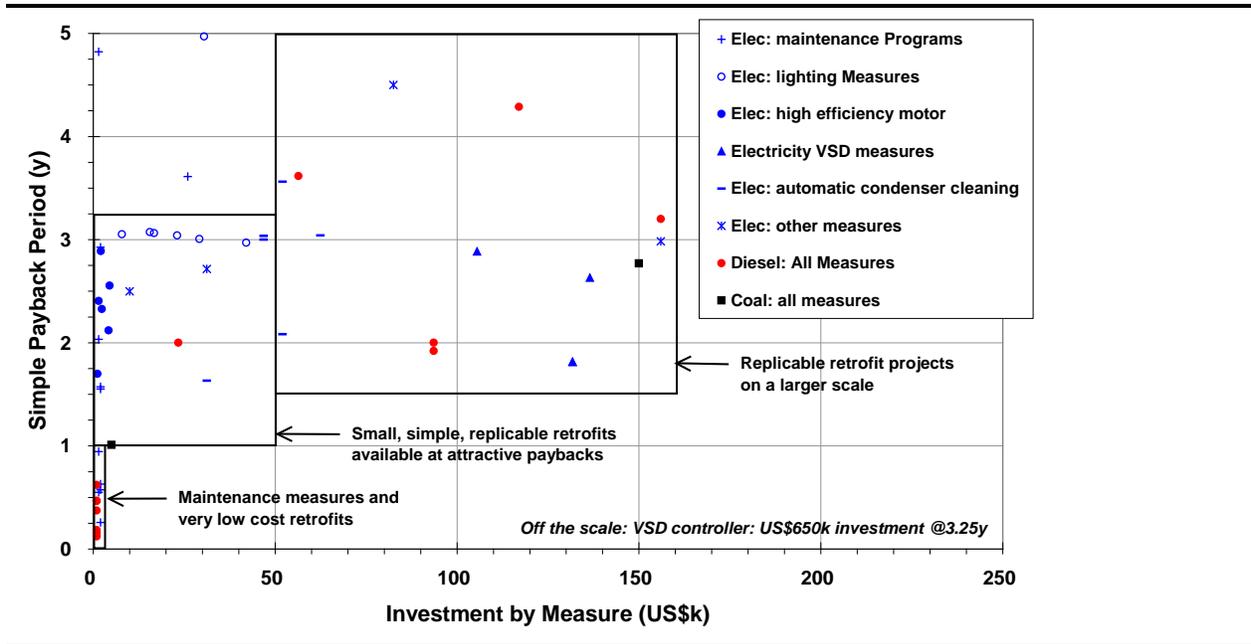
Source: ERM Energy / IIEC on-site audits in Vietnam, April 2002.

Based on the analyses, it has been concluded that there are a number of opportunities to make small, simple and replicable investments in EE improvements in the target markets. Figure A5-3, shows the

relationship between investment and simple payback from the audited sites on an individual whole-site basis. This shows a large range of investment potential from small projects up to US\$250,000 projects, concentrated for the most part between one and four year simple payback periods on a whole-site average basis. Figure A5-4 shows the relationship between investment and simple payback from the audit sites on an individual measure basis, set on axes of the same scale as Figure A5-3. From these figures, it is clear that many of the opportunities are relatively small-scale, with most clustered in the sub-US\$50,000 range and a number in the sub-US\$10,000 range and many of these are available at attractive paybacks of below 2.5 years. As expected, the payback periods are more widely distributed than in the site-averaged case, ranging from near immediate payback opportunities up to a few of beyond five years. Furthermore, many of the measures are similar or essentially the same from site to site, indicating the opportunities for replication of several technology improvements.

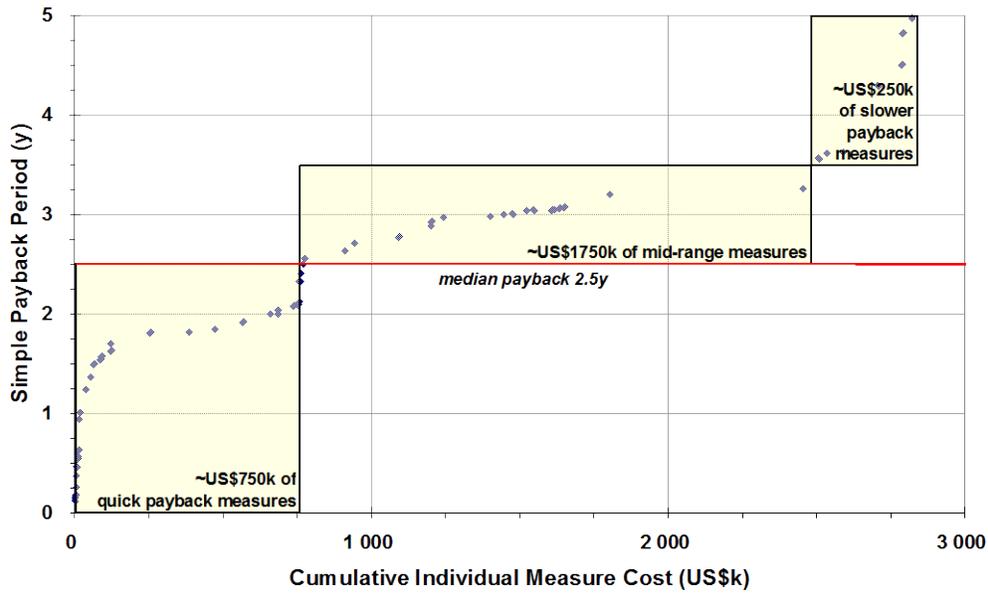
Figure A5-5 presents the individual measures identified in the on-site audits in ascending order of simple payback periods. This figure shows that (i) the investment potential from the audit sites for measures with a payback of up to five years is about US\$2.8million; (ii) this investment can be divided into three blocks: low cost quick payback measures below the median payback of 2.5 years, a mid-range of measures with paybacks between 2.5 and 3.5 years, and some longer payback measures; (iii) a number of low cost maintenance measures with paybacks of less than one year were identified; (iv) about US\$750,000 of investment opportunities with under a 2 year simple payback were identified; (v) about US\$1,750,000 of investment opportunities were found at 2-3 years simple payback; (vi) about US\$250,000 of investment opportunities at between 3-5 years simple payback were identified; (vii) the median simple payback across all US\$2.8million of investment opportunities identified is 2.5 years, and the mean is 2.6 years. As electricity tariff reforms continue, these financial returns will improve further.

Figure A5-4. Investment versus Simple Payback on a Measure-by-Measure Basis



Source: ERM Energy / IIEC on-site audits in Vietnam, April 2002.

Figure A5-5. Cumulative Investment versus Simple Payback on a Single Measure Basis



Source: ERM Energy / IIEC on-site audits in Vietnam, April 2002.

In terms of project financing sources, there are several different possible sources that could be considered. These would include customer self-financing, vendor (project agent) financing, commercial financing (bank loan or lease) or a combination of all of these. Table A5-2 summarizes some of the common financing options used in other countries for similar projects and their main characteristics.

Table A5-2. Financing Options

Financing Option	Balance Sheet	Initial Payment	Payments	Ownership	Tax Deductions	Performance Risk
Cash purchase	On	Percentage	Progress or all at delivery	Client	Depreciation	Client
Loan	On	Down payment	Fixed	Client	Depreciation & interest	Client
Capital lease	On	None	Fixed	Client	Depreciation & interest	Client
Operating lease	Off	None	Fixed	Lessor	Lessor	Lessor
Performance contract	Off	None	Variable or fixed	Contractor	Contractor	Contractor

At present, it is expected that the bulk (50-60 percent) of all subprojects supported under the project will be financed from vendor financing provided or arranged by the project agent. Other sources are expected to include customer self-financing (about 20-30 percent) and banks/leasing (10-30 percent). As the markets further develop and more sophisticated mechanisms, such as greater use of leasing, performance contracts, etc. a wider range of financing is expected. Also, as the banking sector reforms deepen and commercial lending becomes more prevalent, greater use of conventional financing options is anticipated.

Annex 6: Procurement and Disbursement Arrangements
VIETNAM: Demand-Side Management & Energy Efficiency Project

Procurement

All goods procured financed by the GEF grant shall be procured in accordance with the World Bank Group's Procurement Guidelines ("*Guidelines – Procurement under IBRD Loans and IDA Credits,*" January 1995, revised in January and August 1996, September 1997, and January 1999). All consulting services to be financed under the GEF grant shall be selected in accordance with the World Bank Consultant Guidelines ("*Guidelines – Selection and Employment of Consultants by World Bank Borrowers,*" January 1997, revised September 1997, January 1999 and May 2002). Specific procurement arrangements are summarized in Tables A and A1. Table B provides the thresholds for procurement methods and prior review, and Table C provides the allocation of Grant proceeds.

Table A. Project Costs by Procurement Arrangements
(US\$ million equivalent)

Expenditure Category	Procurement Method ¹				Total Cost
	ICB	NCB	Other ²	N.B.F.	
1. Goods	0.50	0.30	7.45	0.00	8.25
(GEF-financed)	(0.50)	(0.30)	(0.80)	(0.00)	(1.60)
2. Services	0.00	0.00	4.08	0.00	4.08
(GEF-financed)	(0.00)	(0.00)	(3.82)	(0.00)	(3.82)
3. Training	0.00	0.00	0.08	0.00	0.08
(GEF-financed)	(0.00)	(0.00)	(0.08)	(0.00)	(0.08)
4. NBF	0.00	0.00	0.00	0.96	0.96
Total	0.50	0.30	11.60	0.96	13.36
(GEF-financed)	(0.50)	(0.30)	(4.70)	(0.00)	(5.50)

Notes:

1. All costs include contingencies. Figures in parenthesis are the amounts to be financed by the GEF grant.
2. Other procurement methods include international shopping and commercial practices (for goods), selection of consultants (see Table A1), and training.
3. This table does not include the procurement plan for the associated US\$5.2 million IDA credit, which is included in the SEIER PAD.

Procurement of Goods. As summarized in Table A, the total cost of goods is estimated at US\$8.25 million, of which only US\$1.60 million would be financed under the GEF grant. Procurement of compact fluorescent lamps (CFLs) by EVN under component 1c would be conducted in 1-2 lots using ICB (US\$500,000 total) and 3-6 smaller lots using NCB (under US\$100,000 each). For component 2, several sets of audit equipment (US\$130,000) would be procured using international shopping (under US\$50,000 each); one set procured each year of the project, based on the changing demands for such equipment. The remaining grant funds (US\$671,000) would be used to support about 210 subproject investment grants (ranging from US\$1,000-30,000) under Component 2B and, as with other financial intermediation operations, procurement of goods would follow commercial practices.

Procurement of Consulting Services. The aggregate amount of consulting services is US\$4.08 million over 4 years, of which US\$3.82 million would be financed by the GEF grant. For Component 1 under EVN, assignments would include marketing contracts, equipment testing, a business opportunities study, monitoring and evaluation services, program management and reporting and DSM advisors (US\$1.42 million). The larger contracts for the monitoring and evaluation and business opportunities study would use QCBS, the fluorescent tube marketing would use SFB and the remaining, smaller contracts would

follow the CQ selection method. Component 2 under MoI would involve assignments including training program development and delivery, customized technical assistance, training and marketing advisors, program marketing and monitoring contractors, and feasibility studies for future phases (US\$1.92 million). QCBS would be used for the training program development and advisory services, program marketing, monitoring and evaluation and feasibility studies for future phases; services by the AU would use SFB; and the remaining, smaller contracts would follow the CQ selection method. The remaining grant funds (US\$480,000) would be used to support about 210 subproject audit grants (ranging from US\$1,000-8,000) under Component 2B of the Project for which selection will follow commercial practice acceptable to IDA (see additional description below). These procedures will also be detailed in the Operations Manual, which is a condition of Project Effectiveness. A summary of procurement methods and prior review thresholds can be found in Tables A1 and B.

Training. The project budget also includes US\$75,000 to support training activities of EVN's DSM Cell and MoI's DSM PMB staff. Technical assistance and advisory services will be provided to each agency under the planned consulting assignments and each of these contracts will include a task to identify training requirements for PMB staff. Thereafter, each agencies will be required to prepare an overall training plan (for the full project period) during the first year of the project for Bank review and approval by December 31, 2003 and updated annually thereafter.

Commercial Arrangements for Component 2. Since the objectives of the project are to establish demonstrated commercial business models for EE, Component 2 has been designed to support a fully commercial approach. However, in order to ensure a high level of technical competence and professional service, some basic safeguards will be in place. Each year of the project, MoI will request, through national advertisements, interested project agents to submit their basic qualifications to ensure that (i) the company has been legally registered in Vietnam for at least a year; (ii) the company has demonstrated technical competence in areas relevant to EE; and (iii) the company has qualified personnel to participate in the program training and develop quality EE audits and investment proposals. These screening criteria will be used to establish a long list of project agents eligible to participate in the program. In addition, each project agent must complete the basic training courses to ensure their full understanding of technical and financial issues related to EE projects. Lists of qualified agents and training participants would be furnished to the AU by MoI periodically. Thereafter, it will be up to each pre-qualified project agent to identify/recruit potential customers, sell their services on purely commercial grounds and submit joint proposals for the program. Since the program would provide energy audit grants for acceptable quality audits/feasibility studies, the AU would assess these documents based on their technical merits and, if found to be of acceptable quality, payment would be made to the project agent. Thus, while selection of the project agent for the purposes of the energy audit services would follow commercial practices (i.e., it is up to each customer to select the agent for the audit), the program would include the pre-qualification measures noted above to ensure that project agents meet some basic qualifications.

Once the energy audit is completed and approved by the AU, then the project agents and their customers would proceed with arranging for the necessary project financing and detailed implementation plans for the EE investment. Procurement of all goods and related service (e.g., detailed design work, installation, commissioning/testing, equipment tendering, etc.) required to implement the project would follow normal commercial practices, i.e., 2-3 quotations from suitable suppliers. However, it should be noted that a number of potential project agents are likely to be suppliers of energy-efficient equipment and, thus, they should not be disqualified from also being an equipment supplier subject to agreement by the customer. Since the customer would select the project agent based on their qualifications and reputation, and still has to approve the final project design and equipment specifications, it must be up to the customer and their agent to determine the most suitable equipment specifications for the project. Also, since the customer will be left with the equipment at the end of the project and obligated to repay all project financing costs, they will have a keen interest in ensuring high quality, and competitively priced,

equipment and supporting services. Once the project has been completed and commissioned, the project agent and customer would submit a second application to the AU for review and, if found to be acceptable, an investment bonus grant (ranging from 20 percent of the total project cost in Year 1 to 5 percent in Year 4) would be issued to the project agent. Thus, the customer would be required to provide a minimum of 80 percent equity or secure financing for the project which helps ensure full ownership of the project. In addition, the investment bonus would only be disbursed after the project is complete, ensuring that ineligible projects are not supported with the grant funds.

Table A1. Consulting Selection Arrangements

Consultant Services Expenditure Category	Selection Method					Total
	QCBS	SFB	CQ	Other	NBF	
A. Firms (GEF-financed)	2.18 (2.03)	0.81 (0.76)	0.43 (0.40)	0.48 (0.48)		3.91 (3.66)
B. Individuals (GEF-financed)				0.18 (0.16)		0.18 (0.16)
Total (GEF-financed)	2.18 (2.03)	0.81 (0.76)	0.43 (0.40)	0.66 (0.64)		4.08 (3.82)

Notes:

1. All figures include contingencies.
2. Figures in parenthesis are the amounts to be financed by the GEF grant.
 QCBS = Quality- and Cost-Based Selection
 SFB = Selection under a Fixed Budget
 CQ = Consultant Qualifications
 Other = Selection of individual consultants and commercial practice (for selection of project agents by customers to conduct energy audits)
 NBF = Not Bank Financed

Agency Capacity Assessment. A Country Procurement Assessment (CPAR) was conducted in October 2001 and a recent procurement assessment was conducted for EVN and MoI for the associated SEIER Project. A supplemental assessment for this project was conducted and the details of these assessments are available in the “Assessment of Agency’s Capacity to Implement Project Procurement” reports which are available in the Project file. For NCB procurement, provisions in EVN’s internal guidelines have been found to be inconsistent with IDA requirements, due to nondisclosure of detailed bid evaluation criteria and price ceilings to bidders. Thus, a side letter will be required by IDA to ensure that GOV complies with all applicable IDA procurement guidelines for this project.

Overall procurement risks are rated as *average*, because the procurement processing for this operation is relatively simple and both EVN and MoI have conducted similar procurement in previous IDA operations and trust fund projects following Bank guidelines. A modest training budget will also be made available to support any required supplemental procurement training for the PMBs and all Terms of Reference for consulting services will be subject to prior review to further mitigate risks.

Institutional Arrangements. For Component 1, EVN’s DSM Cell would be responsible for all procurement for goods and consulting services. The DSM Cell, located under the Business Development Department of EVN, has five full-time technical staff and was assessed and found to be fully capable of carrying out all aspects of procurement, including preparation of advertisements and requests for expressions of interest, development of detailed bidding documents and Terms of Reference, evaluation reports and contract negotiations/awards. EVN also has a department dedicated to procurement that will have prior review responsibilities for all DSM Cell procurement plans, bidding documents, bid evaluation reports and proposed contract awards for larger and more technically complex packages. This procurement department of EVN is among the most experienced in procurement-related matters in

Vietnam and has extensive experience in several previous IDA and trust fund projects following Bank guidelines. All contract awards will be subject to approval by EVN’s management.

For Component 2, MoI’s DSM PMB also has experience with previous technical assistance projects supported with Recipient-executed trust funds under the supervision of the Bank (e.g., TF #022228/050554, 050064). With seven part-time staff experienced with Bank procurement guidelines, the PMB will maintain full responsibility for all advertising, bidding document and Terms of Reference preparation, evaluation reports and contract negotiations/awards. MoI has agreed to have one PMB staff dedicated to the project full-time to coordinate project procurement and other work. As with EVN, all contract awards are subject to approval by MoI’s management. For both components, careful consideration to appropriate packing of consulting services has been done to maximize overall economy and efficiency.

Further actions have been agreed to strengthen each agency’s capacity for the procurement-related aspects of the project. These include (i) MoI will assign one full-time staff to coordinate all project procurement; (ii) both the DSM Cell under EVN and the DSM PMB under MoI will engage in additional procurement training offered by the Bank and periodic workshops to exchange experience with Bank procurement procedures and lessons learned (as part of training plan noted previously); (iii) MoI will develop an Operations Manual, which will include a section on procurement for Component 2 by Project Effectiveness; (iv) EVN and MoI will consider decentralization of responsibilities to the DSM Cell and DSM PMB to maximize efficiency and reduce redundant approvals for smaller contracts; and (v) prior and ex-post reviews will be conducted, as noted below, to help strengthen understanding of Bank guidelines and identify and correct potential deviations from agreed procedures.

Thresholds for Prior Review. All contracts for goods of US\$150,000 or more, as well as the first NCB and IS contracts, will be subject to the Bank’s prior review. All consulting service Terms of Reference will be subject to the Bank’s prior review. Prior review for procurement is required for contracts with firms valued at US\$100,000 or more, and for contracts with individuals valued at US\$50,000 or more. For contracts with firms below US\$100,000, the first two contracts from each PMB (EVN and MoI) will be subject to prior Bank review and approval; for contracts with individuals less than US\$50,000, the first two contracts will be subject to prior Bank review and approval. (See Table B, below.)

Table B. Thresholds for Procurement Methods and Prior Review

Expenditure Category	Contract Threshold (USD ‘000)	Procurement Method	Contracts Subject to Prior Review (USD million)
Goods	>=100	ICB	All contracts \$0.15 and over (\$0.50)
	>=50	NCB	First contract (\$0.05)
	<50	IS	First contract (\$0.05)
Services	>=100 (firms)	QCBS, FB	All (\$3.00)
	<100 (firms)	SBCQ	First 2 contracts from each PMB (\$0.18)
	n.a. (individuals)	IC	>50 All (\$0.05) <50 first 2 contracts (\$0.08)
Total Value of Contracts Subject to Prior Review			\$3.91 (67% or \$3.66 of the GEF grant)

Post Review. At least one in five contracts will be subject to post review by the Bank team.

Frequency of Supervision Missions. Supervision missions will be conducted once every six months for the entire project period.

Disbursement

The GEF grant would be disbursed against: (a) 100 percent of foreign expenditures or 100 percent of local expenditures (ex-factory cost) for goods; (b) 75 percent of local expenditures procured locally; (c) 50-100 percent of eligible subproject energy audit costs (on declining based on project year) and 5-20 percent of eligible subproject investment costs (also on a declining basis by project year); (d) 100 percent of expenditures for consulting services for foreign individuals, 93 percent of expenditures for consulting services for foreign firms, local firms and local individuals; and (e) 100 percent for training. These are summarized in Table C, below. For any revolving funds established by EVN to support its DSM programs, initial disbursements would be against the procurement of goods, such as CFLs. As the goods are sold, the payments would then be used to capitalize the revolving fund mechanism. Thus no initial disbursement to set-up any revolving funds would be required.

The estimated annual disbursements for the project is shown in the Project Financing Data on page 1 and detailed in the EVN and MoI Project Implementation Plans (available in the Project file). Disbursements are expected to begin in the third quarter of 2003 and be completed in the second quarter of 2007.

Table C. Allocation of Grant Proceeds

Expenditure Category	Amount (US\$ million)	Financing Percentage
Goods	\$0.93	100% of foreign expenditures 100% of local expenditures (ex-factory costs) 75% of local expenditures
Subproject grants	\$1.15	
<i>Energy Audits</i>		
<i>FY04-05</i>		100% of eligible energy audit cost
<i>FY06</i>		75% of eligible energy audit cost
<i>FY07</i>		50% of eligible energy audit cost
<i>Investments</i>		
<i>FY04-05</i>		20% of eligible subproject cost
<i>FY06</i>		10% of eligible subproject cost
<i>FY07</i>		5% of eligible subproject cost
Consultant Services	\$3.34	100% of foreign individuals 93% of foreign firms, local firms and local individuals
Training	\$0.08	100%
Total	\$5.50	

Notes:

1. Each fiscal year would begin in July 1 of that year and end June 30 of the following year.
2. The dates indicated represent the date the withdrawal application is received by the Bank.

Use of Statements of Expenditures. For goods costing less than US\$100,000 equivalent per contract; services provided by consulting firms costing less than US\$100,000 equivalent per contract; services provided by individual consultants costing less than US\$50,000 equivalent per contract; training activities costing less than US\$50,000; withdrawals from the Grant would be made on the basis of statements of expenditures.

Special Accounts. To facilitate disbursements under the Grant, one Special Account would be established for each of the implementing agencies with authorized allocations as follows: (i) US\$200,000 to EVN; and (ii) US\$300,000 for MoI. Replenishment applications should be submitted on a monthly basis or whenever the amounts withdrawn equal 20 percent of the initial deposit, whichever comes first.

Annex 7: Project Processing Schedule
VIETNAM: Demand-Side Management & Energy Efficiency Project

Project Schedule	Planned	Actual
Time taken to prepare the project (months)	14	24
First Bank mission (identification)	December 2000	December 2000
Appraisal mission departure	December 2001	October 2002
Negotiations	March 2002	January 2003
Planned Date of Effectiveness	July 2002	June 2003

Prepared by:

Ministry of Industry (MoI) and Electricity of Vietnam (EVN)

Preparation assistance:

Bank missions and consultants

Bank staff who worked on the project included:

Name	Speciality
Jas Singh	Task Manager, Energy Efficiency Specialist
Pham Nguyet Anh	Operations Officer
Dilip Limaye	Senior DSM Specialist (Consultant)
Peter Bassett	Senior EE Market Development Specialist (Consultant)
Hung Viet Le	Financial Management Specialist
Mei Wang	Legal Counsel
Hung Kim Phung	Senior Finance Officer
Thang Chien Nguyen	Senior Procurement Specialist
Anil Malhotra	Regional Energy Advisor
Barry Trembath	Lead Power Engineer, Procurement Specialist

Annex 8: Documents in the Project File*
VIETNAM: Demand-Side Management & Energy Efficiency Project

A. Project Implementation Plan

1. EVN Project Implementation Plan
2. MoI Project Implementation Plan

B. Bank Staff Assessments

1. Preparation Mission Aide Memoires
2. Assessment of Agencies' Capacity to Implement Project Procurement
3. Financial Assessment for SEIER Project
4. System Energy Efficiency Improvement, Equitization and Renewables (SEIER) Project Appraisal Document
5. GEF Project Brief

C. Other Reports

1. DSM Assessment for Vietnam, Hagler Bailly
2. Phase 2 DSM Investment Proposal, EVN
3. Financial Analyses for EVN DSM Programs
4. Incremental Cost Analysis for Project
5. Draft Business Plan for Pilot Commercial Energy Efficiency Program, ERM

*Including electronic files

Annex 9: Statement of Loans and Credits
VIETNAM: Demand-Side Management & Energy Efficiency Project
 12-Dec-2002

Project ID	FY	Purpose	Original Amount in US\$ Millions		Cancel.	Undisb.	Difference between expected and actual disbursements*	
			IBRD	IDA			Orig	Frm Rev'd
P051838	2002	VN-PRIMARY TEACHER DEVELOPMENT	0.00	19.84	0.00	19.74	1.67	0.00
P068396	2002	SYSTEM ENERGY,EQUITIZATION & RENEWABL	0.00	225.00	0.00	237.85	0.00	0.00
P072601	2002	Rural Finance II Project	0.00	200.00	0.00	214.68	0.00	0.00
P073305	2002	VN-Regional Blood Transfusion Centers	0.00	38.20	0.00	40.66	4.50	0.00
P059936	2002	Northern Mountains Poverty Reduction	0.00	110.00	0.00	110.03	-5.80	0.00
P062748	2001	COMMUNITY BASED RURAL INFRASTRUCTURE	0.00	102.78	0.00	105.56	-3.00	0.00
P042927	2001	VN-Mekong Transport/Flood Protection	0.00	110.00	0.00	109.65	43.65	0.00
P004850	2001	VIETNAM - POVERTY REDUC.SUPPORT CREDI	0.00	250.00	0.00	156.79	149.36	0.00
P052037	2001	VN-HCMC ENVMTL SANIT.	0.00	166.34	0.00	165.13	4.12	-1.79
P059864	2000	VN-Rural Transport II	0.00	103.90	0.00	63.32	19.83	0.00
P056452	2000	RURAL ENERGY	0.00	150.00	0.00	100.36	76.66	0.00
P042568	2000	COASTAL Wet/Prot Dev	0.00	31.80	0.00	28.45	16.42	0.00
P051553	1999	VN-3 CITIES SANITATION	0.00	80.50	0.00	68.61	22.45	0.00
P004845	1999	MEKONG DELTA WATER	0.00	101.80	0.00	86.10	64.74	0.00
P004833	1999	VN-Urban Transport Improvement	0.00	42.70	0.00	31.99	32.96	0.00
P004826	1999	VN-HIGHER EDUC.	0.00	83.30	0.00	66.58	37.99	6.47
P004839	1998	FOREST PROT.& RUL DE	0.00	21.50	0.00	17.75	13.28	2.57
P004843	1998	VN-Inland Waterways	0.00	73.00	0.00	56.26	52.18	4.49
P045628	1998	TRANSMISSION & DISTR	0.00	199.00	0.00	159.35	166.33	151.34
P004844	1998	AGRI DIVERSIFICATION	0.00	66.90	0.00	36.71	11.11	-0.53
P004830	1997	VN-WATER SUPPLY	0.00	98.61	26.85	27.01	59.81	10.17
P004842	1997	VN-Hwy Rehab II	0.00	195.60	0.00	25.90	41.84	9.80
P004838	1996	VN-NATIONAL HEALTH SUPPORT	0.00	101.20	0.00	42.46	52.96	0.00
P004841	1996	VN-POPULATION & FAMILY HEALTH	0.00	50.00	0.00	8.50	11.17	0.00
P036042	1996	BANKING SYSTEM MODERNIZATION	0.00	49.00	0.00	28.09	33.47	33.46
P004834	1995	IRRIGATION REHABILIT	0.00	100.00	0.00	16.31	27.21	14.81
P004835	1994	VN-PRIMARY EDUCATION	0.00	70.00	0.00	0.91	3.41	3.03
Total:			0.00	2840.97	26.85	2024.74	938.30	233.81

VIETNAM
STATEMENT OF IFC's
Held and Disbursed Portfolio
Jun 30 - 2002
In Millions US Dollars

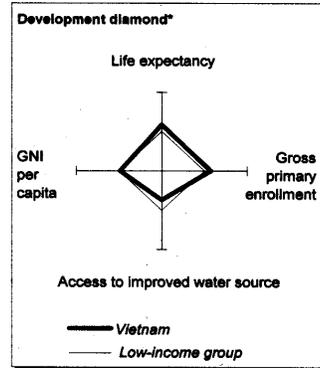
FY Approval	Company	Committed				Disbursed			
		IFC				IFC			
		Loan	Equity	Quasi	Partic	Loan	Equity	Quasi	Partic
2002	CyberSoft	0.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00
2002	F-V Hospital	8.00	0.00	0.00	0.00	5.10	0.00	0.00	0.00
1998	MFL Vinh Phat	0.15	0.00	0.00	0.00	0.15	0.00	0.00	0.00
1996	Morn Star Cement	21.54	0.00	0.00	42.47	21.54	0.00	0.00	42.47
1997	NATL	16.80	0.00	0.00	16.80	16.80	0.00	0.00	16.80
1995/97	Nghi Son Cement	19.12	0.00	0.00	15.24	19.12	0.00	0.00	15.24
2001	RMIT Vietnam	7.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1996	SMH Glass Co.	7.22	0.00	0.00	1.69	7.22	0.00	0.00	1.69
2002	VEIL	0.00	0.00	12.00	0.00	0.00	0.00	6.00	0.00
1996	VILC	0.00	0.75	0.00	0.00	0.00	0.75	0.00	0.00
Total Portfolio:		80.08	2.00	12.00	76.20	69.93	0.75	6.00	76.20

FY Approval	Company	Approvals Pending Commitment			
		Loan	Equity	Quasi	Partic
2000	Interflour	8.00	0.00	0.00	5.00
2002	AZ/AGF Vietnam	0.00	0.00	1.50	0.00
2002	Dragon Capital	0.00	2.00	0.00	0.00
2002	F-V Hospital	1.50	0.50	0.00	0.00
Total Pending Commitment:		9.50	2.50	1.50	5.00

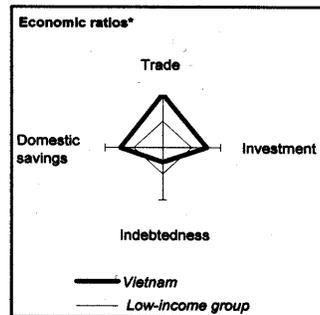
Annex 10: Country at a Glance

VIETNAM: Demand-Side Management & Energy Efficiency Project

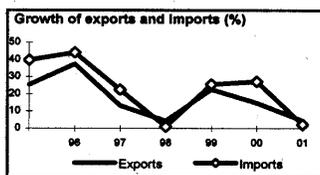
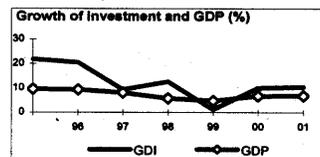
POVERTY and SOCIAL	East		
	Vietnam	Asia & Pacific	Low-income
2001			
Population, mid-year (millions)	78.7	1,828	2,511
GNI per capita (Atlas method, US\$)	420	900	430
GNI (Atlas method, US\$ billions)	33.4	1,649	1,089
Average annual growth, 1995-01			
Population (%)	1.5	1.1	1.9
Labor force (%)	1.7	1.3	2.3
Most recent estimate (latest year available, 1995-01)			
Poverty (% of population below national poverty line)	32
Urban population (% of total population)	25	37	31
Life expectancy at birth (years)	69	69	59
Infant mortality (per 1,000 live births)	37	36	78
Child malnutrition (% of children under 5)	34	12	..
Access to an improved water source (% of population)	56	74	76
Illiteracy (% of population age 15+)	8	14	37
Gross primary enrollment (% of school-age population)	110	107	96
Male	113	106	103
Female	107	108	88



KEY ECONOMIC RATIOS and LONG-TERM TRENDS				
	1981	1991	2000	2001
GDP (US\$ billions)	..	9.6	31.2	32.7
Gross domestic investment/GDP	..	15.0	29.8	30.9
Exports of goods and services/GDP	..	32.6	55.0	54.7
Gross domestic savings/GDP	..	16.5	27.1	28.9
Gross national savings/GDP	..	16.9	31.4	32.2
Current account balance/GDP	..	-2.0	1.8	1.8
Interest payments/GDP	..	0.3	0.9	1.1
Total debt/GDP	..	243.4	41.2	38.4
Total debt service/exports	..	6.3	7.5	6.7
Present value of debt/GDP	35.7	..
Present value of debt/exports	64.3	..
	1981-91	1991-01	2000	2001
(average annual growth)				
GDP	4.9	7.7	6.8	6.8
GDP per capita	2.5	6.1	5.4	5.4
Exports of goods and services	..	21.3	14.8	4.5



STRUCTURE of the ECONOMY				
	1981	1991	2000	2001
(% of GDP)				
Agriculture	..	39.5	24.5	23.6
Industry	..	23.8	36.7	37.8
Manufacturing	..	13.3	18.6	19.6
Services	..	36.7	38.9	38.6
Private consumption	..	77.1	66.5	65.0
General government consumption	..	6.3	6.4	6.2
Imports of goods and services	..	31.1	57.5	58.8
	1981-91	1991-01	2000	2001
(average annual growth)				
Agriculture	4.3	4.7	4.6	2.8
Industry	..	11.7	10.1	10.3
Manufacturing	..	12.1	11.7	11.3
Services	..	7.4	5.3	6.1
Private consumption	..	11.1	3.1	4.5
General government consumption	..	10.6	5.0	5.5
Gross domestic investment	..	18.6	10.1	10.5
Imports of goods and services	..	29.1	27.3	2.3

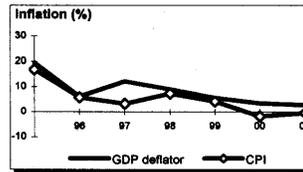


Note: 2001 data are preliminary estimates.

* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

PRICES and GOVERNMENT FINANCE

	1981	1991	2000	2001
Domestic prices				
(% change)				
Consumer prices	..	82.7	-1.7	-0.4
Implicit GDP deflator	..	72.5	3.4	2.7
Government finance				
(% of GDP, includes current grants)				
Current revenue	..	13.5	20.4	20.4
Current budget balance	..	0.0	4.5	4.3
Overall surplus/deficit	-2.8	-3.3



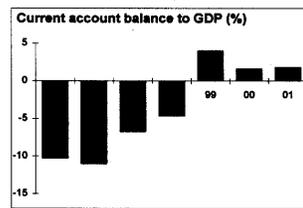
TRADE

	1981	1991	2000	2001
(US\$ millions)				
Total exports (fob)	..	2,042	14,448	15,100
Rice	..	225	687	588
Fuel	..	581	3,503	3,175
..
Total imports (cif)	..	2,377	15,635	16,000
Food	..	82
Fuel and energy	..	485	2,058	1,871
Capital goods	..	714
Export price index (1995=100)
Import price index (1995=100)
Terms of trade (1995=100)



BALANCE of PAYMENTS

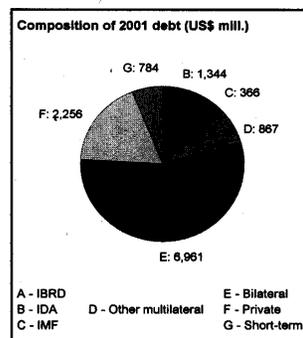
	1981	1991	2000	2001
(US\$ millions)				
Exports of goods and services	..	2,491	17,144	17,910
Imports of goods and services	..	2,377	17,381	17,782
Resource balance	-720	114	-237	128
Net income	-72	-339	-597	-635
Net current transfers	17	35	1,341	1,100
Current account balance	-775	-190	507	593
Financing items (net)	534	472	-391	-268
Changes in net reserves	241	-282	-116	-325



Memo:
Reserves including gold (US\$ millions)
Conversion rate (DEC, local/US\$) 0.6 7,979.2 14,170.0 14,806.0

EXTERNAL DEBT and RESOURCE FLOWS

	1981	1991	2000	2001
(US\$ millions)				
Total debt outstanding and disbursed	26	23,395	12,835	12,578
IBRD	0	0	0	0
IDA	19	58	1,113	1,344
Total debt service	0	160	1,303	1,216
IBRD	0	0	0	0
IDA	0	1	9	10
Composition of net resource flows				
Official grants	104	128	236	..
Official creditors	19	-45	1,022	973
Private creditors	0	50	-717	-590
Foreign direct investment	18	229	1,298	..
Portfolio equity	0	10	0	..
World Bank program				
Commitments	0	0	286	739
Disbursements	17	0	174	279
Principal repayments	0	1	2	2
Net flows	17	-1	173	277
Interest payments	0	0	8	8
Net transfers	17	-1	165	268



Annex 11: Vietnam Energy Efficiency Market

VIETNAM: Demand-Side Management and Energy Efficiency Project

While overall energy consumption in Vietnam is not large by global standards today, it is now the second fastest growing economy worldwide and energy requirements are growing at staggering levels (10 – 15 percent annually). The Asia Least-Cost Greenhouse Gas Abatement Strategy Study (ALGAS) conducted in 1994-6 concluded that the overall technical potential for end-use efficiency was about 180 million toe by 2010 at a cost far less than supply-side options. The DSM Assessment conducted in 1995-6 concluded that EVN alone could achieve some 3.5 million toe in energy savings by implementing a portfolio of DSM programs. Other studies have confirmed that there is significant potential in various industrial sub-sectors for energy intensity reductions through cost-effective energy efficiency (EE) improvements as well as a focus on market transformation efforts in key end-uses. A summary of each key sector is provided below.

The *industrial sector*, dominated by state-owned enterprises (SOEs), consumes over 40 percent of all energy consumed in Vietnam (see Table A11-1) and, by all accounts, represents the sector with greatest energy savings potential. Pilot audits conducted by MoSTE concluded that energy use could be reduced by about 30 percent with equipment retrofits, with investment paybacks of only 3-5 years. Further estimates indicate that EE improvements in the sector could save 700-840 thousand toe/yr (estimated savings of US\$37-47 million per year), with payback periods under 3 years. Within the sector, it was estimated that savings of 50 percent could be achieved in the cement sector, 35 percent in the ceramics industry, and 25 percent in power plants. A number of other donors, including Japan and France, have supported industrial energy audits and found significant financially-viable investment opportunities for energy saving, although no country- or sector-wide EE potential estimates were made. Other reports and studies have confirmed that, given high equipment ages and out-dated technologies, there were indeed significant savings potential and targeted equipment retrofits and replacements of energy-using equipment, such as boilers, motors, energy management/control systems, etc. could have short payback periods and high returns. However, the sustainability of these renovations would be highly uncertain as SOE reforms progress and these facilities are either modernized or shut down. Furthermore, many of these SOEs were not financially-viable and, thus, would not be able to attract the necessary commercial financing for these investments despite their potentially high returns.

Energy use in the *commercial and municipal sectors* is not a huge contributor to total consumption today, though its impact on the total demand is expected to double over the next 10 years due to an estimated 15 percent annual growth rate in high rise building construction. While older buildings have employed more traditional design practices and have limited central air conditioning (and thus have had relatively low energy use), newer buildings are expected to require substantially more energy to support modern comfort and technology requirements. Much of the new building construction is now being designed and financed from non-domestic sources, often resulting in developers seeking to minimize construction costs and reduce investment payback periods; thus opportunities for EE retrofits do exist. For buildings, lighting will continue to dominate the energy savings opportunities in the short-term, though it is estimated that HVAC systems will surpass lighting use in this sector by 2010. This sector represents an attractive target sector given the potential for simple and replicable retrofit projects with fairly creditworthy customers. Hotels, in particular, represent a potentially attractive sub-sector, given their high energy consumption and creditworthiness, although many of the newer hotels have employed reasonably efficient equipment and practices.

The *residential sector*, while not a major energy user today, continues to dominate the peak demand, accounting for over 65 percent. Given Vietnam's low per capita electricity consumption of only 309 kWh/yr and growing household electrification rate, about 75 percent of all households today, it is

expected that increased services to rural areas will be a focus of future IDA support which will further increase this sector's contributions to EVN's peak demand over the next 5-10 years. The major end-use in this sector is lighting, although it is projected that air conditioners, refrigerators and fans will also become major contributors to overall demand in this sector as economic growth continues. Given the very low per capita incomes in this sector and low prevailing electricity prices, promotion of energy saving equipment has been severely constrained, despite cost-effective solutions.

Table A11-1. Electricity Demand and Supply Overview

	1995	2001
Total Electricity Sales (GWh)	11,185	25,843
Peak Demand (MW)	2,679	5,655
Sales by Sector (%)		
<i>Agriculture and Forestry</i>	5.6	2.1
<i>Industry and Construction</i>	41.3	40.7
<i>Service, Trade, and Public Facilities</i>	9.0	8.7
<i>Residential</i>	44.1	48.5
Average Consumption (kWh per capita)	156.0	309.0

Commercial and Industrial Market

The commercial and industrial sectors in Vietnam currently consume approximately one-half of the total electrical power demand. Total electrical power used in these sectors was about 11,800 GWh in 2001, with about 78 percent consumed by the industrial sector, 20 percent from buildings (commercial and government buildings, hotels, hospitals, schools) and about 2 percent from water processing facilities (see Figure A11-1). Energy demand in these sectors is also growing at a very rapid rate (10-15 percent per year) as illustrated in Figure A11-2.

Figure A11-1. Electric Power Consumption By Sub-sector (2001)

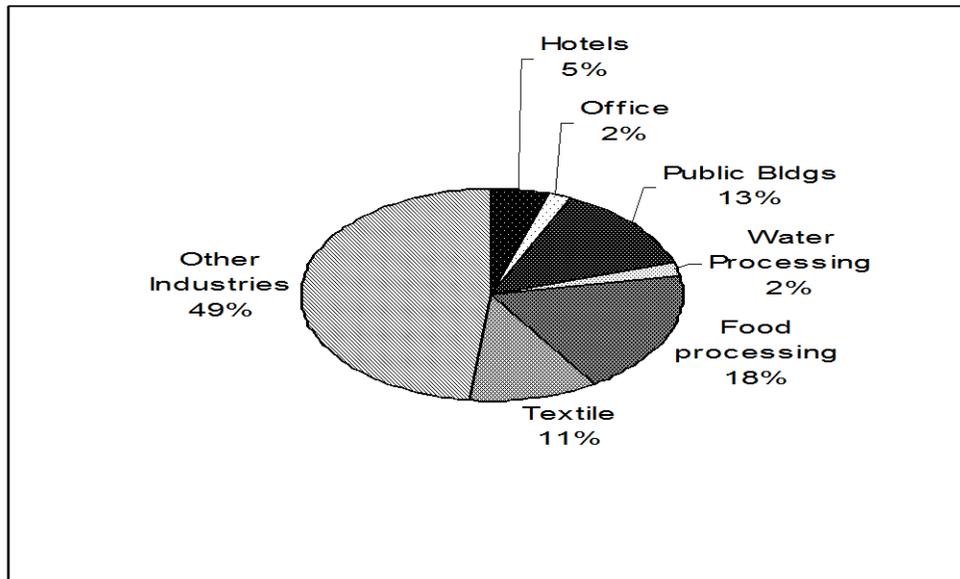
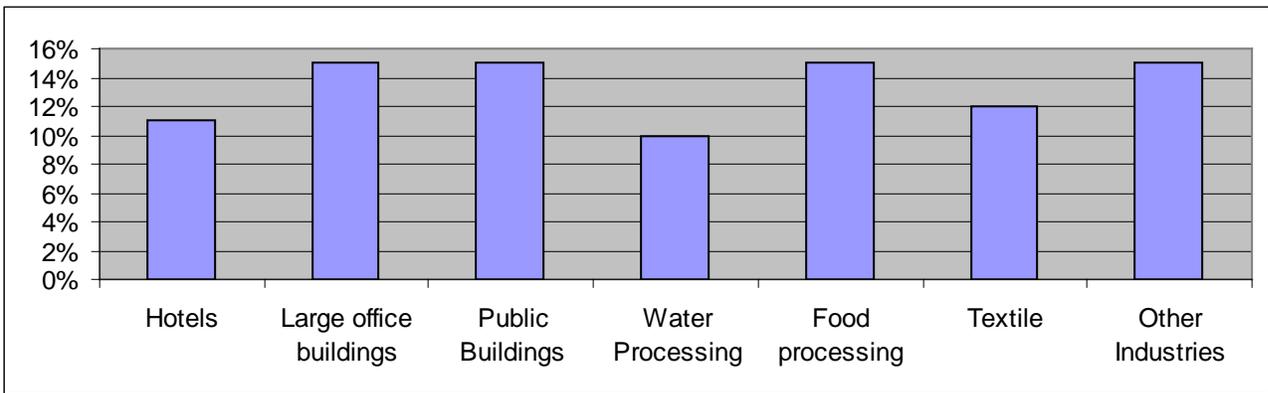


Figure A11-2. Growth Rates in Selected Sub-Sectors



Within the industrial sector, which is dominated by SOEs, certain export oriented sub-sectors such as textile and food processing are growing profitably and quickly due to the strategic advantages Vietnam possesses with respect to natural resources and low-cost labor. The buildings sector energy consumption, while a relatively smaller percentage of overall energy consumption today, is increasing rapidly as the economy of Vietnam progresses and the demand for modern facilities and office space increase. Finally, water processing is keeping pace with increasing population demand and development.

Due to the emerging nature of the Vietnamese economy, the focus of industry and commercial establishments historically has been on “growth,” not “efficiency and conservation.” However, with the limited available investment capital and perceived risks associated with the transitional economy, investors have often been more concerned to minimize expenditures when building and maintaining facilities; the result being that they usually purchase lower cost, less efficient equipment. This has resulted in a large base of existing facilities operating with inefficient equipment and this base of demand represents a significant component of the total country energy demand. The technical opportunity for saving energy consumption through efficiency retrofits in the creditworthy industrial and commercial markets has been estimated (based on analysis in 2002) at 716 GWh per year, with savings within each sector ranging from 8-11 percent.

The combination of high growth rates, coupled with a large base of inefficient equipment, creates conditions for substantial potential for efficiency retrofits. Other macro-economic factors affecting the market for EE retrofits include: (a) trade liberalization which is exposing Vietnamese industries to increased global competition, and hence cost competitiveness, and easier access to imported modern technologies; (b) future increases in electric power tariffs, which will make EE retrofits more financially attractive; (c) banking reforms, which will make access to commercial financing for EE more accessible and less restrictive; and (d) SOE reforms, which will force inefficient industries to improve overall efficiency and productivity, which would include reducing energy and other operating costs, or be shut down.

Pilot Program Market: A market assessment conducted under the PDF B grant analyzed the market in Vietnam and recommend market sectors and technology opportunities which would best match the “commercial market criteria” in order to focus program efforts in a direction most likely to generate short-term successes. The potential commercial transaction volume for identified sectors and technologies has then been further refined by estimating the potential capacity for local project agents to “develop” and “deliver” projects under the Project’s activities. This market research has consisted of: (i) a review of past studies and research on EE potential in the Vietnamese market; (ii) walk-through energy audits in target facilities; (iii) interviews with facility managers to discuss attitudes and barriers to EE investment; (iv) interviews with local project agents to gauge their capability to provide a range of EE solutions and

understand local experiences in overcoming barriers to EE investments; and (v) interactive stakeholder workshops in Hanoi and Ho Chi Minh City with government, commercial building, industrial, energy auditing, equipment supplier, research institute and financial sector stakeholders. The result of the above market research has been the selection of specific sectors and technology areas, which are believed to meet the market criteria required for program success, within the constraint of project agent capacity to deliver EE solutions over the 4-year life of the program.

While the overall market potential for EE in Vietnam is large, commercial transactions require: (i) end users who have access to or can mobilize project financing capital; (ii) service providers who can facilitate project development and implementation; and (iii) awareness by end-users that EE measures are viable and profitable. Based on these criteria and consultation with a wide range of stakeholders and market actors, the following sub-sectors were identified as having potential for energy savings as well as a high percentage of creditworthy owners with access to capital:

- 3-5 star hotels;
- Commercial office buildings;
- Textile factories;
- Food processing plants; and
- Water treatment and supply facilities.

While public buildings represent a larger share of the “buildings” market from an energy consumption standpoint, this segment does not represent a short-term commercial market for EE retrofits due to the absence of any formal EE procurement program within the government, very limited ability for financing and budgetary support, centralized decision-making, lack of life-cycle cost analyses for equipment purchase and incentive lapses, where public agencies may not benefit from energy saving projects due to corresponding budget reductions. Hotels and office buildings, while a smaller share of the total market, represent a more commercially viable short-term opportunity for EE service providers due to the fact that investment decision-making is possible (companies are mostly privately owned) and many owners are creditworthy. Although most of the industrial sector is dominated by SOEs with limited ability to access capital for EE retrofit investments, certain sub-sectors are profitable and growing. Market research has shown that many textile and food processing facilities meet these conditions and, thus, could be attractive candidates for EE investments. Additionally, water supply plants are being privatized and combine the elements of: (i) energy costs representing a significant percentage of their operating cost; (ii) private decision-making structures; and (iii) access to capital.

Thus, for the proposed pilot program, it has been estimated that the total market potential for the targeted customer classes is US\$40-50 million in total. This is based on the viability of technical retrofits, status of creditworthy customers, the capacity for existing and new project agents to grow their businesses, and the creditworthiness of the targeted end-users. However, given the need for significant initial training and marketing, the very early stage of the market and the realistic penetration rates of the service market, it is expected that the program could achieve about US\$7.3 million over the 4-year period. While relatively small, this has been determined to be adequately sized to make a significant and sustainable stimulus to the market and allow the industry to achieve a critical mass of business that could then be capable of expansion in later years. Market analysis has estimated that the above investment could result in more than 47 GWh of energy savings per year by the end of the program. (See Figure A11-3 for a breakdown of energy savings by sub-sector for the pilot program.)

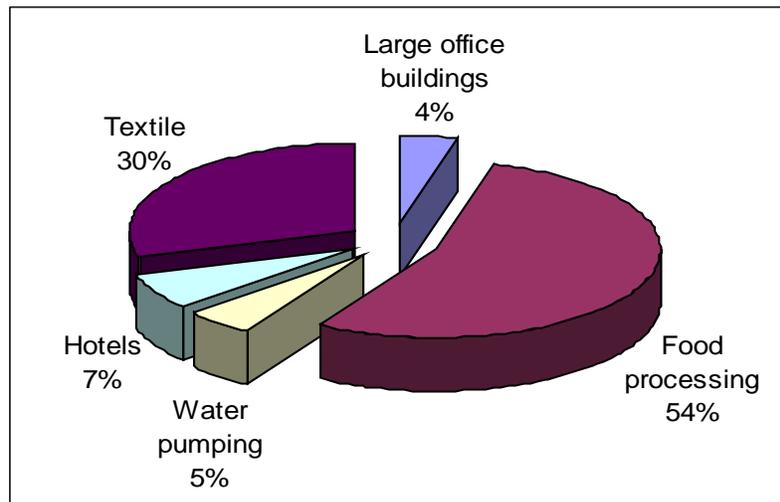
Pilot Program Technologies: As noted above, a number of detailed audits and interviews were conducted to better analyze the potential EE retrofit market in Vietnam and identify potential cost-effective projects and technologies. While the pilot program would be flexible to allow all commercially viable projects to be implemented, an initial focus on simple and replicable technologies will be strongly encouraged early

on to help build a solid base of project successes. Thus it is expected that initial technology training would focus on these key areas:

- replacement of incandescent bulbs with CFLs;
- replacement of 40 W with 36/32 W fluorescent lamps;
- replacement of standard magnetic ballasts with low-loss ballasts;
- introduction of variable speed drives for motor drives, fans and pumps;
- combustion efficiency improvement (for diesel generators);
- high efficiency air conditioners and chillers;
- efficient water heaters and insulation; and
- more efficient electrical supply systems (e.g., transformers, capacitors).

All of the technologies listed are available in Vietnam and can be replicated in a large number of target commercial and industrial facilities. As the portfolio of projects grows and project agents improve their technical abilities and sophistications, it is expected that this list will continue to grow and develop. And, as the industrial sector becomes more financially viable and commercially attractive to service providers, the potential for a greater number of industrial projects and technologies will further increase.

Figure A11-3. Pilot Commercial Program Savings Potential



Project Agents: The total market potential has been further refined to reflect the potential capacity for local project agents to develop and deliver EE projects to end-use customers. This supply side of the market is comprised of local equipment manufacturers, equipment suppliers, and technical services providers (e.g., energy auditors, engineering consultants, technical institutes), which are collectively referred to as project agents, as well as financial services providers. Among local manufacturers and equipment suppliers the players include a mix of major international companies and joint ventures (e.g., ABB, Carrier, Danfoss, GE, LG, National, Osram, Philips, Toshiba) and local Vietnamese companies, some of which represent and distribute imported equipment. Some companies who manufacture locally are also able to import and distribute other products. In addition, there are a growing number of service providers that are seeking business in EE retrofits. Examples include: (i) local companies such as Thang Long Lighting and Enerteam who are transacting under models with some performance-based clauses; and (ii) international firms and/or joint ventures, such as Danfoss and Philips, who are suppliers of EE equipment. Some of these companies have already begun pioneering more complex service models to grow their respective businesses and facilitate transactions in EE improvements. These models have involved vendor financing of EE equipment costs to allow end-user payments to be staggered based on energy savings over a fixed period; deferred payment (as a lump sum) for equipment after its performance

has been demonstrated; breaking EE investments into several smaller projects and using the proceeds of one to finance the next; and basing equipment/service payments on guaranteed performance of energy savings. However, these firms have encountered a number of constraints to business growth which range from limited equity and financing to low awareness and credibility/risk sharing of energy savings. As a result, the total market activity has remained limited. It was estimated that the market activity for commercial EE retrofits in 2001 was only about US\$200,000.

Over 40 companies have now been identified in Vietnam with relevant capabilities and interest in the program (see Table A11-2, below). These would serve as the initial base of project agents, although additional agents would be identified and recruited throughout the program period. The program would offer a broad range of training to assist these agents to develop their businesses and technical competence. As these service providers further develop their technical and business skills, as well as achieve more project successes, the level of technical, financial and contractual complexities would naturally continue to progress leading to further options for risk sharing and project financing to help increase penetration of EE services in the market.

Table A11-2. Breakdown of Potential Project Agents

Business Type	Number
Local Equipment Manufacturers	11
Equipment Suppliers	17
Technical Service Providers	8
Financial Service Companies	4
TOTAL	40

Residential Sector

The estimated number of households in Vietnam in 2000 was 16.7 million, of which 12.8 million were rural and 3.9 million urban households. Of the rural households, some 9.5 million have grid-based electricity services. According to the results of a survey of about 3,000 households conducted under the Phase 1 DSM efforts, the major end uses in the residential sector are lighting, cooking, fans, refrigerators, air conditioners and miscellaneous appliances. Lighting is by far the most important of these end uses and it is estimated from the survey results that residential lighting contributed about 305 kWh in electricity consumption and 133 W per household to the peak load, or a total of 4,088 GWh and 1,780 MW of the peak load in 2000. This represented about 20 percent of the electricity consumption and 36 percent of the total peak. Of the residential lighting load, about 17 percent (302 MW) is from incandescent bulbs and 83 percent (1,478 MW) from FTLs.

The current penetration of CFLs and efficient T-8 FTLs is very low. The number of CFLs in the residential sector is estimated to be about 0.5 million or only 0.6 percent of the total lamps installed to date. The number of efficient FTL (T-8 tube lights) is estimated to be 4.4 million (representing about 8.1 percent of all FTL). Efforts to transform the markets from incandescent lamps to CFLs and T-10 FTLs to T-8 FTLs would, therefore, represent substantial energy savings as well as reductions in EVN's system peak loads. The potential for energy savings through the promotion of CFLs was also noted as a priority area for carbon emissions reduction from the ALGAS Study.

Compact Fluorescent Lamps (CFLs): CFLs represent an excellent opportunity for energy savings in Vietnam. As replacement of incandescent lamps with CFLs can yield reductions in energy consumption of as much as 70-80 percent. CFLs can also provide peak reduction benefits because in the residential sector, lighting loads are major contributors to the system peak load. However, the installation of CFLs is at present limited by a number of barriers including:

- high initial cost, with the average CFL costing about 10-times the cost of an incandescent lamp;
- lack of customer awareness of the benefits of CFL (e.g., energy savings, longer life, reduced heat output);
- limited product availability;
- concerns over CFL failure or breakage sooner after installation;
- low residential tariffs; and
- confusion about the relative merits of the different lamps available and lack of understanding of the quality issues (due to low quality imports).

CFLs are currently available in Vietnam, but, due to the barriers cited above, their current market penetration is very low in the residential sector. The 3,000 household survey conducted by EVN, which covered four PC service territories (PC Hanoi, PC Ho Chi Minh City, PC 1 and PC 2), found that the average number of lamps per household in urban areas is 7.1 and in rural areas 5.9, leading to an overall residential lighting market of over 83 million lamps. Of these, the survey found that 34.7 percent of the lamps are incandescent bulbs and 0.6 percent are CFLs (the rest are fluorescent tube lamps). These results clearly illustrate very low existing penetration of CFLs among the residential household sector and large opportunities for savings if the market could be expanded.

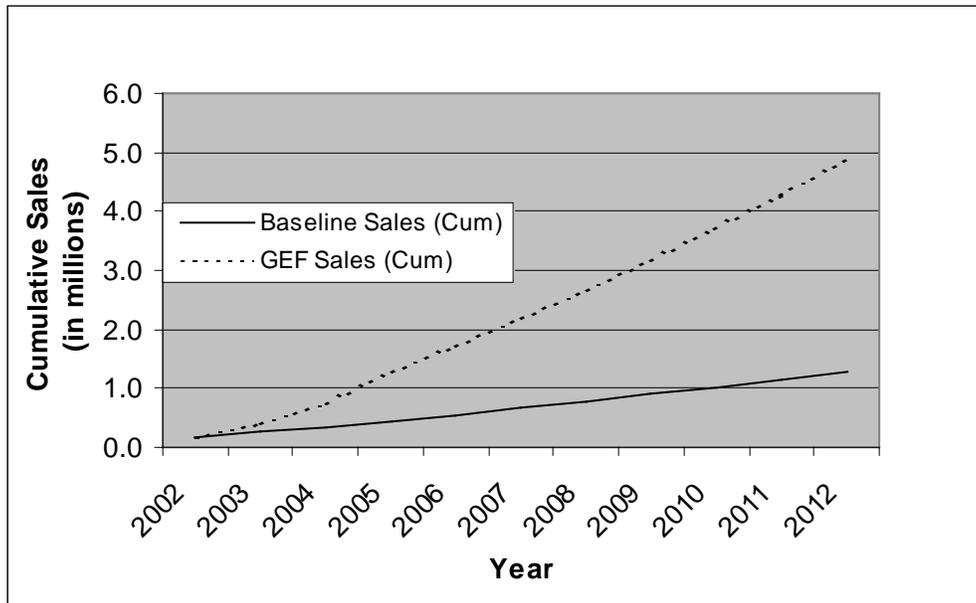
CFLs available in the Vietnamese market today can be roughly categorized into three different types according to their qualities:

- “high quality”: imports from Europe/US with a efficacy ~ 60 Lm/W, and a lifetime of 10,000 hours;
- “medium quality”: domestic Vietnamese production and imports from neighboring Asian countries with a efficacy ~ 50 Lm/W, and a lifetime of 5,000 to 6,000 hours; and
- “low quality”: imports with a low efficacy, and a lifetime of only 1,000 hours.

Both imported and domestic CFLs are readily available in local retail outlets. Imported CFLs range substantially in quality and mainly come from China, Singapore, Spain, Thailand and the United States. The domestically manufactured CFLs come mostly from the two major producers of CFLs in Vietnam, Dien Quang Lamp Company (DIMEXCO) in Ho Chi Minh City, and Rang Dong Light Source and Vacuum Flask Company (RALACO) in Hanoi. These companies manufacture a range of CFLs from 5 to 20 W. The combined production capacity is estimated to be about 3 million units per year, but the current production level is a small fraction of this capacity due to the lack of market demand and most of the sales today are to commercial customers.

Under the Phase 1 efforts, EVN has done extensive analysis on the potential for increasing the sales of CFLs through a combination of declining discounts, bulk procurement, marketing and revolving fund activities. These analyses have concluded that there is significant scope to achieve a sustained increase the penetration of CFLs in the residential sector. It was determined that a 3-year program designed to sell one million new CFLs would significantly expand the residential market (about four times the current size) and could affect a reduction in the prevailing market price of CFLs by some 15-25 percent (see Figure A11-4).

Figure A11-4. Residential CFL Market Transformation



Efficient Fluorescent Tube Lights (FTL): Thin fluorescent tube lights (T-8 lamps) are about 10 percent more efficient than the standard fluorescent tube lights (standard or fat FTL, or T-10 lamps). T-10 FTLs require 20 W (2-foot lamps) and 40 W (4-foot lamps) compared with the T-8 lamps, which use 18 and 36 W, respectively. Energy savings can be increased further if the low-loss electronic ballasts are used with the T-8 FTLs. Since the cost of the T-8 lamps is about the same as the T-10 lamps, the potential for transforming the market is high. The potential benefits of such replacement are also very high since FTLs represent a high proportion of the lighting loads in the residential (and small commercial) sector. However, until now, the installation of T-8 lamps has been constrained by the following barriers:

- Reliance of the large manufacturers on the production of T-10 lamps;
- Lack of customer awareness of the benefits of T-8 lamps;
- Customer skepticism of the quality and savings potential of the T-8 lamps;
- Limited availability of sufficient numbers of T-8 lamps in the market; and
- Perception of power quality issues with T-8 lamps, due to the higher starting voltage requirements, and the effect of large voltage fluctuations on T-8 performance and life.

Due to these barriers, the current market penetration of T-8 lamps is very low, particularly in the residential sector. The survey conducted by EVN found that 65 percent of the lights installed in both urban and rural households in Vietnam today are FTLs, with only about 5.2 percent T-8 lamps. Almost none of the households surveyed use the low-loss electronic ballast with the T-8 lamps, representing further lost opportunities for energy savings.

The local producers of FTLs in Vietnam today include:

- Dien Quang Lamp Company (DIMEXCO), Ho Chi Minh City
- Rang Dong Light Source and Vacuum Flask Company (RALACO), Hanoi
- Dong-A Electric Joint Venture, Hanoi
- Song Hong Construction Company

DIMEXCO has a production capacity of 18 million units per year (3 assembly lines of standard FTL with capacity of 12 million units/year and 1 assembly line of T-8 FTLs with capacity of 6 million units per

year). RALACO has a total production capacity of 20 – 25 million units per year (4 assembly lines, of which 2 have the ability to produce T-8 FTLs). As with the CFLs, the actual production of T-8 lamps is considerably less than the capacity, due to the lack of market demand for them, and most of the T-8 lamps are sold to the commercial sector. Philips expects to open its first local manufacturing plant near Ho Chi Minh City in late 2002 and is considering producing T-8 FTLs.

Under the Phase 1 efforts, EVN has concluded that there is scope to expand the residential sales of T-8 lamps by some 6 million units over 2 years and, thus, achieve a critical mass of demand to sustain and further grow the T-8 product lines, while gradually phasing out the T-10 FTLs. Since the cost differential of the more efficient lamps is negligible, EVN would focus its efforts on informational and marketing campaigns, along with negotiations with the major local manufacturers, to achieve these results. (See Figure A11-5 for the expected shift in sales as a result of the program.)

Figure A11-5. Residential T-8 FTL Market Transformation

