Document of
The World Bank

Report No: ICR00001645

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(TF-51256)

ON A

GLOBAL ENVIRONMENT FACILITY GRANT

IN THE AMOUNT OF US$5.5 MILLION

TO THE

SOCIALIST REPUBLIC OF VIETNAM

FOR A

DEMAND-SIDE MANAGEMENT AND ENERGY EFFICIENCY PROJECT

March 28, 2011

Vietnam Sustainable Development Unit
Sustainable Development Department
East Asia and Pacific Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective March 25, 2011)

Currency Unit = Vietnamese Dong (VND)
VND 1.00 = US$ 0.0000479
US$ 1.00 = VND 20,875

FISCAL YEAR
January 1 to December 31

ABBREVIATIONS AND ACRONYMS

AU	Administrative Unit
CEEP	Commercial Energy Efficiency Pilot
CFL	Compact Fluorescent Lamp
DB	Database
DSM	Demand-Side Management
DSM/EE	Demand-Side Management and Energy Efficiency
EE	Energy Efficiency
EEC	Energy Efficiency and Conservation
EECO	Energy Efficiency and Conservation Office
ERAV	Electricity Regulatory Authority of Vietnam
ES&L	Energy Standards and Labeling
EVN	Electricity of Vietnam
FSP	Financial Services Provider
FTL	Fluorescent Tube Lamp
GEF	Global Environment Facility
GHG	Greenhouse Gas
GOV	Government of Vietnam
IDA	International Development Assistance
IT	Information Technology
M&V	Measurement and Verification
MOI	Ministry of Industry
MOIT	Ministry of Industry and Trade
PA	Project Agent
PAD	Project Appraisal Document
PC	Power Company
PMB	Project Management Board
PP	Project Proponent
SEIER	System Energy Efficiency Improvement, Equitization, and Renewables

Sida	Swedish International Development Agency
SOE	State-Owned Enterprise
SWH	Solar Water Heating
VNEEP	Vietnam National Energy Efficiency Program

Vice President:	James W. Adams
Country Director:	Victoria Kwakwa
Sector Manager:	Jennifer Sara
Project Team Leader:	Ky Hong Tran
ICR Team Leader :	Ky Hong Tran

VIETNAM
DEMAND-SIDE MANAGEMENT AND ENERGY EFFICIENCY PROJECT

CONTENTS

A. Basic Information

Country:	Vietnam	Project Name:	Demand-Side Management & Energy Efficiency Project
Project ID:	P071019	L/C/TF Number(s):	TF-51256
ICR Date:	07/14/2010	ICR Type:	Core ICR
Lending Instrument:	SIL	Borrower:	STATE BANK OF VIETNAM
Original Total Commitment:	USD 5.5M	Revised Amount:	USD 4.8M
Disbursed Amount:	USD 4.8M		
Environmental Category: C		**Global Focal Area: C**	
Implementing Agencies: Ministry of Industry Vietnam Electricity (EVN)			
Cofinanciers and Other External Partners: Private sector			

B. Key Dates

Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	03/09/2001	Effectiveness:	11/25/2003	11/25/2003
Appraisal:	10/17/2002	Restructuring(s):		
Approval:	06/24/2003	Mid-term Review:		05/09/2006
		Closing:	06/30/2007	06/30/2010

C. Ratings Summary

C.1 Performance Rating by ICR

Outcomes:	Satisfactory
Risk to Global Environment Outcome	Moderate
Bank Performance:	Moderately Satisfactory
Borrower Performance:	Moderately Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance

Bank	Ratings	Borrower	Ratings
Quality at Entry:	Moderately Unsatisfactory	Government:	Satisfactory
Quality of Supervision:	Moderately Satisfactory	Implementing Agency/Agencies:	EVN: Moderately Unsatisfactory MoIT: Moderately Satisfactory
Overall Bank Performance:	Moderately Satisfactory	**Overall Borrower Performance:**	Moderately Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating**
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA):	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA):	Moderately Satisfactory
GEO rating before Closing/Inactive status	Satisfactory		

D. Sector and Theme Codes		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
District heating and energy efficiency services	70	70
Power	30	30
Theme Code (as % of total Bank financing)		
Climate change	67	67
Other financial and private sector development	33	33

E. Bank Staff		
Positions	**At ICR**	**At Approval**
Vice President:	James W. Adams	Jemal-ud-din Kassum
Country Director:	Victoria Kwakwa	Klaus Rohland
Sector Manager:	Jennifer Sara	Mohammad Farhandi
Project Team Leader:	Ky Hong Tran	Nguyet Anh Pham
ICR Team Leader:	Ky Hong Tran	
ICR Primary Author:	Yabei Zhang	

F. Results Framework Analysis

Global Environment Objectives (GEO) and Key Indicators(as approved)

Reduction of greenhouse gas emissions in the energy sector through systematic removal of barriers to DSM and EE investment.

Revised Global Environment Objectives (as approved by original approving authority) and Key Indicators and reasons/justifications

The project global environment objectives were not revised.

(a) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Reduction of CO2 emission (million tons)				
Value (quantitative or Qualitative)	0	0.95		3.43
Data Achieved	5/30/2003	6/30/2007		6/30/2010
Comments (incl. % achievement)	Significantly exceeded the target (261% greater than the target)			

(b) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1:	Peak load reduction (MW) and energy savings (GWh)			
Value (quantitative or Qualitative)	0	Peak load reduction of 120MW; Energy saving of 496 GWh		Peak load reduction of 310.1MW; Energy saving of 2,859 GWh
Data Achieved	5/30/2003	6/30/2007		6/30/2010
Comments (incl. % achievement)	Significant exceeded the target (Peak load reduction: 158.4%; Energy saving: 476.4% greater than their target respectively). EVN's CFL program was considered one of the most successful CFL programs supported by the World Bank.			
Indicator 2:	Number of full-scale and pilot programs designed and launched by EVN			
Value (quantitative or Qualitative)	0	Four full-scale and two pilot DSM programs designed and launched by EVN by Dec 2004 and evaluated by Dec 2006		CFL, ToU and FTL programs were completed. DLC was cancelled. Two pilot programs were completed
Data Achieved	5/30/2003	6/30/2007		6/30/2010
Comments (incl. % achievement)	Achievement of target: 83.3%. Two pilot programs were implemented by MOIT			
Indicator 3:	Number of CFL and T8 FTL sold. Completion of DSM business opportunities study			
Value	0	One million CFL sold;		One million CFL

(quantitative or Qualitative)		six million additional T8 FTL sold; and DSM business opportunities study completed under EVN's programs.		sold; about 25 million FTL sold[1] in 2010. DSM opportunities study was not completed
Data Achieved	5/30/2003	6/30/2007		6/30/2010
Comments (incl. % achievement)	Achievement of target: CFL: 100% Additional T-8 TFL was exceeded the target but its impact was not assessed.			
Indicator 4:	Energy savings from MoI's pilot commercial energy efficiency program (CEEP)			
Value (quantitative or Qualitative)	0	302 GWh		353 GWh
Data Achieved	5/30/2003	6/30/2007		6/30/2010
Comments (incl. % achievement)	Exceeded the target: 117%			
Indicator 5:	Total commercial investment from MoI's CEEP			
Value (quantitative or Qualitative)	0	$6.41million of investment*		Total investment of approved subproject was about $5.34 million.
Data Achieved	5/30/2003	6/30/2007		6/30/2010
Comments (incl. % achievement)	Achievement of target: 82.7%. This number excluded the investment that was not registered with the CEEP.			
Indicator 6:	Number of active commercial energy service providers from MoI's CEEP			
Value (quantitative or Qualitative)	0	5-10		>10
Data Achieved	5/30/2003	6/30/2007		6/30/2010
Comments (incl. % achievement)	Exceeded the target (>100%)			

**The total investment target was recorded at US$7.32 million in the PAD, which included both investments from CEEP and non-CEEP participants. Because the indicator only measures the investment from CEEP participants, by checking original files and calculations for energy savings, the ICR team found that the original investment target for CEEP participants was US$6.41 million.*

[1] According to the MOIT's record.

G. Ratings of Project Performance in ISRs

No.	Date ISR Archived	GEO	IP	Actual Disbursements (USD millions)
1	12/19/2003	Satisfactory	Satisfactory	0.00
2	06/28/2004	Satisfactory	Satisfactory	0.00
3	12/28/2004	Satisfactory	Satisfactory	0.30
4	04/29/2005	Satisfactory	Satisfactory	0.65
5	04/28/2006	Moderately Satisfactory	Moderately Satisfactory	1.48
6	05/23/2007	Satisfactory	Moderately Satisfactory	2.70
7	06/08/2007	Satisfactory	Satisfactory	2.88
8	06/27/2008	Satisfactory	Satisfactory	3.58
9	06/26/2009	Satisfactory	Satisfactory	4.29
10	06/17/2010	Satisfactory	Satisfactory	4.84

H. Restructuring (if any)

Not Applicable

I. Disbursement Profile

1. Project Context, Global Environment Objectives and Design

1.1 Context at Appraisal

The project focused on supporting Vietnam's transition towards a market-oriented economy identified as a priority for the 2002 Country Assistance Strategy (CAS) (Report 24621). The CAS considered that the energy sector would contribute substantially to economic growth and that its continued development would be essential to sustaining industrial growth and employment generation. Improvements in the quality of energy supply and delivery infrastructure was hampered by the high rates of demand growth: an average of about 13 percent per annum over the period of 1997-2002.

In 1997, Electricity of Vietnam (EVN), with World Bank assistance, commissioned the "*Demand-Side Management Assessment for Vietnam*", which identified important opportunities for cost-effective electricity saving in a number of sectors and end-user applications. In 1999, the Bank report "*Fueling Vietnam's Development: New Challenges for the Energy Sector*" further identified capacity constraints during peak hours as a key issue and the role that demand-side management (DSM) and energy efficiency (EE) programs can play in reducing them. A phased approach for implementing DSM was recommended. The first phase, supported by a grant from Swedish International Development Agency (SIDA), reviewed DSM policy[2], piloted load research, developed a DSM business plan for EVN, and helped set up a DSM Cell within EVN. It also identified a small but growing number of commercially-oriented firms that were providing energy services to commercial and industrial customers. Given the results of the first phase, government and EVN management accepted the need for the DSM program to complement the large-scale supply-side investments.

This project, which was considered as the second phase of the DSM program, contributed to the CAS through: (i) supporting market-oriented mechanism to support DSM and EE investment; (ii) promotion of private sector participation and investment in the energy and related sectors by providing a commercial energy efficiency 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 energy efficiency improvements.

The Bank was in a natural position to develop this second phase of the DSM program. The Bank had been closely involved in the first phase of the DSM program. It had also been closely engaged in supporting power system expansion and had established a good basis for further investment, including on the demand side. EVN senior managers had shown commitment to DSM through the creation of the DSM Cell. Ministry of Industry

[2] From which the output was: *"A Review of Existing Legal and Institutional Framework for DSM in Vietnam*, 2002."

(MOI) [3] had also expressed interest in supporting the further development of Vietnam's commercial energy efficiency business. This DSM operation would complement the supply side investments while also supporting the global objective of reducing greenhouse gas emissions.

1.2 Original PDO and Global Environment Objectives (GEO) and Key Indicators (*as approved*)

Project Development Objectives	Key Performance Indicators
Develop and expand demand-side management (DSM) business programs and test new market transformation efforts within the national electric utility, Electricity of Vietnam (EVN).	• Peak load reduction • Energy savings • Sustained increased sales of CFLs and T-8 FTLs
Develop sustainable business models and mechanisms to support energy efficiency retrofit investments in commercial and industrial facilities	• Total commercial EE projects and investments • Number of project agents • Energy savings
Global Environmental Objectives	**Key Performance Indicators**
Contribute to the reduction of greenhouse gas (GHG) emissions in the energy sector through the systematic removal of barriers to DSM and EE investments.	• Carbon dioxide emission reductions resulting from energy saving and peak demand reduction.

1.3 Revised PDO and GEO (*as approved by original approving authority*) and Key Indicators, and reasons/justification

The GEO and key indicators were not revised.

1.4 Main Beneficiaries

EVN and its Power Companies (PCs) benefited from reduced investment in new capacity, while industrial, commercial and residential consumers benefited from reduced load shedding, lower electricity costs, and corresponding increases in productivity and competitiveness. Consumers, especially households in rural areas, benefited from reduced consumption of electricity by virtue of the compact fluorescent lamp (CFL) program hence reducing electricity expenditures. Manufacturers of efficient lighting also benefited from increased sales of their products.

Project agents (PAs) [4] and project proponents (PPs) [5] directly benefited from grant incentives for energy auditing and energy efficiency investments and increased capacities

[3] The Ministry of Industry (MoI) and the Ministry of Trade (MoT) merged in 2007 into the Ministry of Industry and Trade (MoIT). MoIT has first-line policy and supervisory responsibilities for the energy sector. Therefore, MOI and MOIT are used interchangeably in the report and refer to the same counterpart.

[4] "Project agents" refer to commercial service providers in all phases of EE project identification, development and implementation.

through training. Project agents also benefited from increased business prospects for providing commercial services and technical assistance to expand their capabilities.

1.5 Original Components (*as approved*)

Component 1. EVN's DSM Program (US$8.22 million). The main focus of this component was to implement EVN's DSM business plan which was developed as part of the Phase 1 efforts. This component was 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 was managed by the EVN and implemented with support from its PCs and included: (a) Expanded Time-of-Use (TOU) Metering; (b) Pilot Direct Load Control (DLC) Program; (c) Compact Fluorescent Lamp (CFL) Promotion; (d) Thin Fluorescent Tube Lamp (FTL) Market Transformation; and (e) Supporting Programs and Technical Assistance.

Component 2. MoI's Pilot Commercial EE Program (US$10.34 million). This component was designed to test appropriate business models and mechanisms to catalyze a small and sustainable service market to support EE investments in Vietnam 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 focused on private commercial buildings, hotels, other office buildings and selected creditworthy industrial sub-sectors capable of accessing financing on their own. Specific activities under this component included: (a) Comprehensive Project Agent Training Program, (b) Subproject Audit and Investment Grants; and (c) Program Marketing, Monitoring and Administration.

1.6 Revised Components

Project components were not changed

1.7 Other Significant Changes

The grant was amended in 2005 to include Goods and Incremental Operating Expenses as disbursement categories for MoI's CEEP component and to permit national shopping and direct contracting for EVN's DSM component.

Extension of closing date. The project was originally scheduled to close in June 30, 2007. The project was extended twice:

- From June 30, 2007 to June 30, 2009: This extension was to allow component 2: CEEP to implement the investment grant subcomponent which was behind schedule mainly due to delay in completion of training subcomponents.

---

[5] "Project proponents" refer to the owners or decision-makers of commercial and industrial facilities to whom project agents propose and carry out EE investment projects.

- From June 30, 2009 to June 30, 2010: The second extension was to provide time to complete investment subprojects under CEEP which had suffered delay as a result of the domestic and international financial crisis in 2008 and 2009.

Reallocation of proceeds: In June 2007, EVN's DSM component was closed at the original schedule. The unused amount of $510,000 was reallocated from the EVN component to the MoIT component to support the newly approved the Vietnam National Energy Efficiency Program (VNEEP). Particularly, it supported the implementation of two pilot programs on solar water heating (SWH) and standard & labeling (S&L) for air conditioners, technical support and capacity building to MoIT's Energy Efficiency and Conservation Office (EECO), which is responsible for developing and implementing the VNEEP. This allowed the Bank to better meet the GOV's need for promotion of EE in Vietnam.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

The choice of areas for support – the DSM program and the commercial EE program, was based on the sound sector analysis as discussed in Section 1.1. The project design was built upon the activities initiated under the SIDA-financed first phase of the DSM program and on *Program Design and Investment Plan Phase II 2003-2005* (October 2001). It also took into consideration of experience of previous IDA-financed operations, of which three[6] were under implementation by then. Nonetheless the project was not well designed in terms of its choices of areas to support, which was reflected in the uneven implementation progress and outcomes achieved.

The analysis of the EVN component correctly identified the biggest risk to the component as the institutional arrangements for implementation. It foresaw the need for a DSM business unit consisting of 24 staff, operating with adequate delegation to carry out its activities including procurement. The procurement assessment in particular was too optimistic and did not take into account either earlier experience in the first phase of the DSM program or the complexity of IT procurement. No plan was agreed with EVN and put into place, such as recruiting external staff if necessary. There was, therefore, a mismatch between program activities and the ability to carry them out.

The design for the CEEP component could also have been more thoroughly analyzed during preparation. The initial design had expected that training for PAs, which were to be the main vehicles for component implementation, would take place in parallel with their implementation of subprojects. After the negotiation, the design was changed so that the training would be required before implementation of subprojects. This design change almost certainly improved project outcomes. However, if the original design considered the necessity of this sequence and the time required for training, the original

[6] Vietnam Power Development project, Vietnam Rural Energy Project and Vietnam Transmission, Distribution and Disaster Reconstruction Project.

schedule should be extended and could be retained during implementation. It is not clear why the need for implementation to be done in this way had not been identified earlier. In any event, it added time to the project implementation period which could reasonably have been anticipated but was not and the original project schedule was retained.

Project design also relied on implementation approaches for more usual utility operations but which may have been less appropriate to the project. Procurement packaging and methods in particular were cumbersome and time-consuming given their value. The staff of the DSM cell and MoIT were also less familiar with Bank procurement methods, thus, procurement became a significant burden, slowed implementation, and reduced the time available for DSM staff to spend on other activities.

Last, the project was originally designed as a component of the System Energy Efficiency Improvement, Equitization and Renewables Project (SEIER) which was intended to be a single project with IDA and GEF funds blended for both renewable energy and energy efficiency. GEF procedures did not allow a single project to cover two GEF operational programs. Consequently, this DSM and EE work was separated and approved as a GEF stand-alone project, although in substance it still relied on SEIER funds to implement the EVN DSM component. This added complexity to the project implementation, monitoring, and evaluation because GEF- and IDA-financed activities were closely linked and neither could be implemented without the other. The change appeared to take place at the last minute. More thought-through design would have made the project less complex.

Adequacy of Government's Commitment and Stakeholder Involvement. The Government's commitment to DSM and EE was considered high at project appraisal. A Decree on Energy Conservation and Efficient Use was submitted in July 2002 and then approved by Prime Minister in 2003. Stakeholders were also actively involved and consulted during the project preparation. Four stakeholder workshops (one for EVN and three for MoI) were held and over 200 officials and representatives participated in the discussions for the project design. MoI provided adequate staff and counterpart resources to work closely with the Bank during project preparation. In the light of its subsequent performance, EVN's commitment may have been overestimated.

Assessment of Risks. Risks associated with the project and measures to mitigate these risks were adequately identified at the project appraisal. Three key risks to the project included: (i) Commitment to DSM by EVN (substantial risk); (ii) project agent participation (modest risk); and (iii) access to project financing (substantial risk). Regulatory risk was underestimated for the DLC program. It required approval of the incentives for consumers to participate in the DLC program, since it was related to retail tariffs.

2.2 Implementation

EVN DSM Program

Increased commercialization of EVN had a major impact on its willingness to adopt DSM measures. Starting from late in preparation and continuing through to implementation, EVN had been under increasing pressure to operate as a fully commercial entity. This affected its attitude towards DSM interventions: increasing its interest in those which would help either reduce financial costs or increase revenues, and decreasing its interest in those it could not see immediate financial benefit. As a result, it implemented the TOU metering activity even before IDA financing became available, and both the CFL and FTL activities were well implemented. A fourth activity, the DLC program, was canceled because the approval of the incentive program was not given by MoF. Several of the "softer" activities such as capacity building, DSM planning and load research stalled. In part this was due to complexity of the activities and lack of capacity within the DSM cell, but lack of clarity of the connection between the activities and EVN's business needs was also a contributing factor.

Insufficient staffing and lack of support to EVN DSM cell. A major common and recurring problem was insufficient staffing in the DSM Cell and lack of adequate support at the senior management level. Although the project design suggested that the DSM cell should need 24 staff, only four were ever hired, and there was only one part-time manager. The serious shortage of staff and inadequate delegation of authority particularly impacted procurement activities, and there were too many procurement packages for the DSM cell to handle. Despite EVN's repeated commitments to increase staffing of the DSM cell, it made little substantial effort to meet that commitment. Delay of a number of important activities such as the load research program largely contributed EVN's failure in building up its capacity and establishing a sustainable DSM utility-based program. This result is closely linked to the increased commercial pressures on EVN at the time.

The success of the TOU metering, CFL and FTL activities by the original closing date of June 2007 was sufficient to achieve the energy saving target. Although other activities under the EVN component were continuing, a positive outcome appeared to be unlikely and in consequence, it was decided to close this component according to the original schedule. Uncompleted activities were completed by EVN using its own financial sources.

CEEP

*Delays in Training***.** Delays to the original schedule were inevitable when the decision was made to change the design of the project from a parallel implementation of training and audits and investment to the sequential design. It took time to select the Training Advisor and it was then decided that the Training Adviser would provide input to the training package and revise the Operations Manual before launching the selection of training firms. The training program delays had further knock-on effects on the subproject audits and investment activities which fell even further behind the original schedule.

Institutional Change. The Project Management Board responsible for implementation of the component was moved to ERAV mainly because almost its core staff were relocated to the agency when it was established in November 2005. The effects of this unforeseen

change had some minor negative impacts on the project as staff adapted to their new organization. It may also have had some impact on the outcomes of the project – the electricity regulator is not the natural home of this kind of activity. While it may have allowed efficient implementation of the project, it did not build capacity or knowledge and understanding of the energy efficiency market of for MoI's Energy Efficiency and Conservation Office (EECO), which had become responsible for all energy efficiency activities, including the newly approved Vietnam National Energy Efficiency Program (VNEEP).

Impact of Macroeconomic Conditions. Vietnam experienced national macroeconomic problems starting 2007 with high interest rates and high inflation. It was further affected by the global financial crisis in 2008-2009. Local financing for enterprises became scarce and lending rates by commercial banks rose to a level which discouraged borrowers. As a consequence, many subprojects were stopped or delayed and fewer subprojects came forward for financing. Therefore, the component was further extended by one more year to June 30, 2010 to allow the project completing ongoing subprojects.

***Mid-term Review*:** A mid-term review was conducted in late 2006. The mission reviewed the project implementation status and the latest energy efficiency development in Vietnam including government initiative on the VNEEP. The main recommendations of the mid-term review were: (i) extension of the CEEP program closing date to allow completion of the program; and (ii) closing EVN's component as original scheduled and reallocation of the unused amount from the EVN component to MOIT to support implementation of the VNEEP. Findings and recommendations of the MTR were the important inputs for decision made by the Bank and the GOV on improvement of the project implementation.

Fund Reallocation: An amount of $510,000 was reallocated from EVN's component to MoIT component to support development and implementation of two pilot programs which were originally designed under the EVN component and provided technical support and capacity building to the EECO. The fund reallocation contributed to meet the project development objectives.

***QAG Rating*.** The Quality Assurance Group (QAG) conducted a supervision assessment on the project in 2006 while the MTR was being finalized. The QAG rated the overall quality of supervision in FY05-06 Moderately Satisfactory (3). The main issues identified by the QAG were that the Bank should have pressed more forcefully and earlier on in the dialogue with EVN on staffing and related actions, the ISRs should have been more transparent and flagged issues sufficiently, and the MTR should have been done earlier.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

M&E Design. The M&E plan included well defined indicators and targets and effective collection data methods. Key performance indicators linked project outputs such as the numbers of CFLs and FTLs sold, and the number of EE projects and total EE investments to outcomes, in terms of energy savings and peak load reduction. The M&E design also included key milestones on EE investments and energy savings expected by the MTR.

M&E Implementation. The M&E plan was implemented satisfactorily for the CEEP component. Data for all M&E indicators were collected periodically as part of the Project Implementing Unit (PIU) and PMB progress reports. Data quality was satisfactory. Implementation of the EVN M&E plan, however, was unsatisfactory. No cost data was collected and no energy savings were estimated in the M&E study for the FTL program. No baseline data were collected for the TOU metering program. Insufficient data collection for these two important indicators had made the assessment of achievement of the EVN's DSM program difficult.

M&E Utilization. M&E information was used to review progress of the project against the agreed timetables. It was used during the MTR as important inputs for project adjustment, reallocation of resources and modification of operational procedures. The successful implementation of M&E for the CEEP component demonstrated the achievement of the component objectives. For the EVN component, due to poor implementation of M&E for other programs, the component outcome relied entirely on the achievement of the CFL program, which was adequately monitored and evaluated.

2.4 Safeguard and Fiduciary Compliance

Safeguard Compliance. No safeguard policies were triggered during the project appraisal and implementation stages.

Financial Management. Financial management was satisfactory. Audits were satisfactory throughout the project. EVN component was compliant with OP10.02 on Financial Management. Regarding the MOIT component, shortcoming issues on internal control and timely submission of audit report at early stage of project implementation were addressed according to the Bank recommendation.

Procurement. Procurement was satisfactory but slow, particularly for the EVN component. There was a delay in finalization of procurement arrangements under the EVN component. Most procurement process and contract management were well undertaken except for the IT procurement for the load research program conducted by EVN, which took three attempts to complete.

2.5 Post-completion Operation/Next Phase

Sustainability of the DSM program within EVN. Upon completion of the project, EVN and its PCs continued the DSM program including distribution of CFLs. They also participated in scaling up a program on solar water heaters initiated by MoIT and supported by the project. They have conducted awareness raising activities on demand side reductions. Where DSM is in their direct commercial interest, EVN and PCs will sustain DSM operations.

ERAV, the electricity regulator, has made progress in development of regulations and procedures for future utility DSM programs and has linked tariff setting to the achievement of DSM targets. Those regulations will largely contribute to the continuity and suitability of EVN and the PCs' DSM program. But given the relatively unadvanced

state of sector reform and regulation – there are many pressing issues to address in the regulatory field – the impacts are likely to be felt only after some years of further work.

Sustainability of the business model to support EE retrofit investments. Information from post-completion workshops and survey has shown that PAs have continued and expanded their business and some even initiated more comprehensive business models. They expressed their confidence in continued growth of the industry.

Expansion of MoIT's program for high EE equipment. Pilot programs supported by the project resulted in rolling out phase of the activities in Vietnam. MoIT is implementing a program jointly with local manufacturers to install 35,000 SWH systems in two years, which can be further scaled up. Experience from S&L of air-conditioners benefited MoIT in review and revision of S&L regulations and an action plan to expand S&L program for other appliances.

Next Phase/Follow-up Operation

The GOV has made strong commitment to support scaling-up of energy efficiency to address energy security, reduce cost to maintain its economic competiveness and concerns on environment. The Law on Energy Efficiency and Conservation ("the Law") was approved in 2010. A number of decree and regulations are under preparation to implement the Law. The second phase of the VNEEP (2011-2015) with the target to save 5-8% of the country total energy demand has started to scale up the success of phase I and aimed to get the real energy savings. The Bank's further engagement thus aims to support the Government's effort to meet these energy saving objectives. The Bank has just finished the TF funded Vietnam Energy Efficiency TA which provided policy advice and development of an M&E framework for the VNEEP. Two other projects are under preparation: (i) The GEF Vietnam Clean Production and Energy Efficiency Project which focuses on development of EE action plans for key industrial sectors and development of energy service provider industry; and (ii) Distribution Energy Efficiency Project which focuses on improving efficiency of Vietnam's power distribution network. The survey also revealed a need to continue capacity building and introduce further concepts such as energy performance contracting to the PAs. Financing for EE investments was also identified as a main barrier for scaling up as there is still lack of awareness on EE opportunities of local commercial banks. Other financiers including IFC, ADB and JICA are now addressing this area.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

The project objectives were highly relevant to the current national development priorities and the Bank's country assistance strategy; they continue to be relevant in the current CPS covering 2006-2011 and are likely to receive continued attention in the CPS under preparation. The GOV has placed a strong emphasis on energy efficiency as a way to improve energy security, reduce energy cost, and thus improve economy competiveness and address environmental concerns. It has made a series of major efforts to promote

energy efficiency in the recent years such as approval of Energy Efficiency and Conservation Law and implementation of the VNEEP.

3.2 Achievement of Global Environmental Objectives and Project Development Objective

Rating: Satisfactory

The GEO of contributing to the reduction of greenhouse gas (GHG) emission has been achieved. The project has reduced about 3.4 million tons of CO2, exceeding the original target by three times.

The PDOs include (i) Archive significant and sustainable reductions in energy consumption and peak power demand; and (ii) Sustainable removal of commercial barriers to DSM and EE investment have been also achieved. The project has reduced peak power demand of 310 MW, 158% greater than the target, and 2859 GWh, 476% greater than the target. Number of CFL and T-8 FTL sold was higher than the targets. At least US$5.3 million investment on energy efficiency has been made under the project. More than 10 PAs are active which was exceeding the target of 5-10 active PAs.

Summary of the project indicators and actual results are in the table below:

Key Performance Indicator	Results
Peak load reduction of 120 MW and energy saving of 496 GWh from the EVN's DSM program	EVN's programs exceeded its original indicators. The program has reduced 301.1 MW peak load and saved 2506 GWh energy. The results did not include impacts of ToU and FTL programs because their impact was not assessed.
Four full-scale and two pilot DSM programs designed and launched	Three of the four proposed programs have been successfully completed. The fourth program was cancelled. Two pilot programs have been developed and implemented
One million CFL sold; six million additional T-8 FTL sold; and DSM business opportunities study completed	One million CFL sold; number of additional T-8 FTL sold in 2010 was about 25 million. DSM business opportunities study was not developed by EVN.
Energy saving of 302 GWh from MOIT's program	Energy saving from the program was 353 GWh, 18% greater than the target.
Total commercial investment of US6.41 million from MOIT's program	Total investment approved by the project was US$5.34 million[7]
At least 5-10 active commercial	At least 10 commercial energy service providers

[7] The figure does not include investment made by PPs that has not been registered with the program.

energy service providers; 210 transaction completed; Marketing and case study material developed and disseminated under MOIT's program	are active, which is exceeded the target. 118 transactions have been completed. Although the number of the transactions was smaller than the target but it is mainly because of larger size of investment projects than expected. Marketing and case study materials have been developed and disseminated under MOIT's program
Reduction of CO2 emission of 0.95 million tons	The project has reduced 3.4 million tons of CO2, significantly exceeding the target

3.3 Efficiency

EVN's DSM Component

At appraisal, the whole program was estimated to have a NPV of US$76.9 million for EVN, US$18.6 million for customers, and US$80.74 million for the nation based on 10-year data projections. At project completion, due to lack of data for other programs, analysis was only conducted for the CFL program. Furthermore, since there was no time series data to compare with original NPV indicator, benefit cost ratio for CFL sales in 2006 was used. The results showed that the CFL program was extremely cost effective with the benefits to EVN around 99 times the costs and to the customers around 8.4 times the costs, compared to the original estimated benefit cost ratios of 2.7 and 6.3[8], respectively. The EVN benefits are much higher than expected at appraisal because of successful CFL market transformation. The CFL sales in 2006 were more than 6 million, 15 times what was projected at the appraisal stage.

For the FTL program, although financial and economic analysis could not be conducted directly for this program, for illustration purpose, a simulation analysis was conducted using the data from a similar school lighting project under Vietnam Energy Efficiency Public Lighting (VEEPL) project implemented by UNDP. The analysis showed that the FTL program was cost effective, with a simple payback period of 1.6 years and a financial internal rate of return (FIRR) of 51 percent. More importantly, as the old lighting system before improvement was substandard, the school lighting program contributed to a better learning and teaching environment and better health for pupils, which has significant social and economic benefits.

CEEP Component

At appraisal, a review of 20 potential subprojects was conducted and showed that all investments were under US$250,000 with a simple payback period between one and four years. FIRR and EIRR were not presented. On project completion, a review of 95 completed subprojects showed that the investment size was between US$10,000 and US$168,000 with an average of US$40,247. Most projects were clustered under

[8] The original estimates for the CFL program were not presented in the PAD. They were in a separate calculation file "EVN Proposal Benefit Cost Analysis" (2003).

US$50,000. The simple payback period is between 0.3 year and 6.6 years with an average of 2.26 years. FIRR and EIRR were calculated for 95 completed subprojects and revealed high financial and economic efficiency of those EE investments. The FIRR ranged from 13 percent to 306 percent with an average of 43 percent and EIRR ranged from 17 percent to 372 percent with an average of 53 percent.

3.4 Justification of Overall Outcome Rating

The project was and remains highly relevant to the GOV priorities. The project exceeded the GHG emissions reduction, peak load reduction and energy savings and targets. It successfully transformed the CFL market and introduced and demonstrated new business models and mechanisms to support EE retrofit investments in commercial and industrial facilities. For components that economic and financially analysis was able to be conducted, the results showed high efficiency in terms of high benefit cost ratios, FIRR, and EIRR to its beneficiaries.

Rating: Satisfactory

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

Education and Health Benefits. The School Lighting Demonstration Program designed and installed EE lighting system for 405 classrooms at 135 schools in 127 provinces and cities nationwide. The impact assessment of this program concluded that lighting quality at the participating schools considerably improved in terms of luminance, uniformity, glare, color quality, and shade. The program contributed to a better learning and teaching environment and better health for pupils. It was highly appreciated by beneficiaries, local authorities (e.g. Department of Education and MoIT) and has widespread influence. Some schools decided to invest their own funds to install the EE lighting systems. By 2010, about 15,000 classrooms have been installed EE lighting systems

(b) Institutional Change/Strengthening

The project's support to the VNEEP helped MoIT in finalization of the Energy Efficiency and Conservation Law and its capacity building.

(c) Other Unintended Outcomes and Impacts (*positive or negative, if any***)**

N/A

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

CFL Program Beneficiary Survey of 300 randomly selected participating customers found that overall satisfaction with the performance of the CLFs was very high (~92%) and the key factors that influenced consumers to participate in the program was saving potential and discounted price offered by EVN. All respondents believed the marketing materials provided by EVN were effective and easy to understand.

School Lighting Demonstration Program Beneficiary Survey was conducted where 3,374 questionnaires were distributed for pupils and 405 questionnaires for teachers. The survey found that the pupils and teachers were highly satisfied with lighting improvements.

CEEP Beneficiary Survey was conducted with participating PAs and PPs. All PAs responding to the survey confirmed that the CEEP helped them enter and develop EE business. All PPs reported their appreciation to PAs for their EE services and indicated that they would continue to implement additional EE projects with PAs after the CEEP. All PAs and a vast majority of PPs (89%) reported the CEEP training was very useful.

4. Assessment of Risk to Development Outcome

Rating: Moderate

The risk that the DSM program will not be continued and/or expanded is considered moderate. Although EVN has been not successful in developing of a long-term DSM program, , the GOV has made strong commitment on energy efficiency activities, for instance, the approval of the VNEEP phase II 2011-2016. In addition, establishment of the regulator – ERAV and its initiatives on DSM regulations including load research regulations will ensure the continuity and expansion of the DSM programs. Continued support, particularly to power companies, will further mitigate the risk.

Risk to sustainability of the commercial EE investment initiated by the project is also considered moderate as access to financing will be a main barrier for PAs/PPs to develop and scale up EE investments. Continued capacity building to PAs and commercial Banks is also needed. However, ongoing and planned programs of donors such as IFC's EE financing credit line with Techcombank and continued capacity building and development of new lending product to other commercial banks will help mitigate the risk. The World Bank also plans to continue its support in capacity building to PAs and development of financing mechanism for EE investment under proposed GEF Vietnam Clean Production and Energy Efficiency Project.

5. Assessment of Bank and Borrower Performance

5.1 Bank

(a) Bank Performance in Ensuring Quality at Entry

Rating: Moderately Unsatisfactory

Preparation and appraisal were not sufficient for the EVN component, and did not adequately address the key staffing issue, as discussed in Section 2.1. Thus, Bank performance at entry on this component was unsatisfactory. The CEEP component's basic project design, monitoring and evaluation, and project cost- benefit analysis were sound, but preparation had moderate shortcomings, and is thus rated moderately satisfactory. Combining these two ratings leads to a moderately unsatisfactory rating for Bank performance.

(b) Quality of Supervision

Rating: Moderately Satisfactory

With the TTL and most core task team members based in the field, it was possible to supervise the project closely. This partially mitigated the effects of the design flaws, and problems were identified early and quick responses provided. International experience was also properly incorporated in project supervision, particularly during the MTR. The task team maintained a focus on development impact and played an effective role in addressing implementation problems as they arose to accelerate the project implementation.

The shortcoming in the Bank's supervision was its lack of concrete action to address the issues on EVN DSM cell staffing and find ways to accelerate implementation of CEEP component. Another shortcoming was with supervision of the M&E plan including final reporting of project costs and KPIs which made assessment of some key programs difficult. Stronger supervision on the M&E plan could have resulted in better quantitative assessment of the achievement of project outcome.

(c) Justification of Rating for Overall Bank Performance

Rating: Moderately Satisfactory

The supervision phase of the project was able to support a satisfactory project outcome and the mid-point between the two dimensions is taken.

5.2 Borrower

(a) Government Performance

Rating: Satisfactory

The GOV cooperated closely with the Bank during the project preparation. It provided support throughout the project implementation, particularly in project restructuring. The GOV issued the Decree on Efficiency Utilization of Energy and Energy Conservation in 2003 and launched the VNEEP in 2006, which all provided enabling environment for the project implementation.

(b) Implementing Agency or Agencies Performance

EVN. *Rating: Moderately Unsatisfactory*.

The key subcomponents of EVN's DSM program especially the CFL program were successfully implemented and the overall program targets were met. Nonetheless, EVN's commitment waned and it failed to address the issue of insufficient staffing in the DSM cell or ensure adequate implementation progress in several key activities.

MoIT. *Rating: Satisfactory*.

MoIT demonstrated a strong commitment to achieving the project development objectives and provided adequate staff and resources to ensure implementation success. It worked closely with the Bank during project preparation. It showed a high degree of ownership and made effort to get results. Minor shortcomings are that MoIT should have taken more properly and timely measures to address the slow implementation and improve reporting obligation.

(c) Justification of Rating for Overall Borrower Performance

Rating: Moderately Satisfactory

More weighting is applied to the government's participation given its longer involvement thus the overall borrower performance is rated as Moderately Satisfactory.

6. Lessons Learned

The lessons learned from the project are as below:

- ***The bulk procurement approach can significantly reduce the costs and contribute to the achievement of the lighting market transformation.*** The bulk procurement approach used in the CFL program reduced the costs by half and the market share of CFLs increased dramatically after the implementation of the program. The percentage of low quality CFL sold in the market also dropped substantially because the CFL program used a sole supplier and ensured that the product met the required technical specifications. This was the first large-scale IDA/IBRD financed bulk purchase of CFLs and the approach has been successfully replicated in many other developing countries.

- ***Adequate product range should be offered when CFLs being used to substitute for existing incandescent lamps***. The CFL program was designed to replace 100W incandescent lamp with 20W CFLs. However, the surveys indicated that the majority of the incandescent lamps replaced were below 60W. Hence, better understanding consumers' needs and offering consumers CFLs with a range of wattages would maximize energy savings.

- ***DSM program needs to be designed in such a way that the utility has strong incentives to implement***. EVN showed strong commitment when there were clear benefits from DSM options. For example, EVN installed TOU metering using its own funds instead of waiting for the IDA fund. The CFL and FTL programs were also successfully implemented. In particular, the CFL program showed a very high benefit to cost ratio of over 99 to EVN. On the other hand, EVN showed less interested in other supporting programs and was not committed to expand its DSM program. Therefore, quantitative assessment of benefits and costs of various DSM options are particularly helpful to engage the utility.

- ***The CEEP that combines targeted marketing, training, and grant incentives demonstrated to be an effective model to establish market capacity and develop sustainable business models for delivery of energy efficiency services***. The targeted

marketing and training increased awareness and abilities for EE development in Vietnam. Post-survey indicated that most PAs and PPs found the CEEP training was very useful in increasing their capacities to develop EE businesses. The grant was well designed to encourage EE investments and not just energy audits and the phase-out approach helped the transition to more commercial transactions. The design of the CEEP can be adapted in other developing countries.

- ***When introducing a new business model, the design for procedures needs to balance rigorousness and simple implementation.*** The detailed procedures established by the CEEP for project registration and grant processing prevented grant abuse but also made the program quite complex for implementation. Some PAs reported that the complex procedures discouraged them or some the potential PPs from participating in the program. Special efforts are needed to strike a good balance.

7. Comments on Issues Raised by Borrower/Implementing Agencies/ Partners

(a) Borrower/implementing agencies

Evaluations of the project by borrower/implementing agencies are consistent with that of the Bank. The evaluation report prepared by EVN on the DSM component and the ICR prepared by MOIT/ERAV on the CEEP component are included in Annex-7.

(b) Cofinanciers: NA

(c) Other partners and stakeholders *(e.g. NGOs/private sector/civil society):* NA

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent)

Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
1. EVN'S DSM Program	***8.22***	***17.04***	***207%***
a. Expanded ToU metering	2.35	12.00	511%
b. Direct load control program	0.72	0.00	0%
c. CFL promotion	1.79	1.72	96%
d. FTL market transformation	0.78	0.74	95%
e. Supporting programs and technical assistance	2.58	2.58	100%
2. MOI'S Pilot Commercial EE Program	***10.34***	***8.80***	***85%***
a. Training	1.25	1.13	90%
b. Subproject financing and grants	7.80	6.23	80%
c. Program marketing, evaluation and administration	1.30	0.88	68%
d. MOIT's pilot programs and policy advice	0.00	0.55	N/A
Total Baseline Cost	**18.56**	**25.83**	**139%**
Physical Contingencies	0.00	0.00	
Price Contingencies	0.00	0.00	
Total Project Costs	**18.56**	**25.83**	**139%**
Project Preparation Facility (PPF)	0.00	0.00	
Front-end fee IBRD	0.00	0.00	
Total Financing Required	**18.56**	**25.83**	**139%**

(b) Financing

Source of Funds	Type of Cofinancing	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Borrower		1.22	13.15	1075%
GLOBAL ENVIRONMENT - Associated IDA Fund		5.20	2.54	49%
Global Environment Facility (GEF)		5.50	4.81	87%
Local Sources of Borrowing Country		6.64	5.34	80%

Annex 2. Outputs by Component

<u>Component 1:</u> EVN's DSM Program

This component includes four main DSM programs: (1) Time-of-Use (TOU) Metering, (2) Compact Fluorescent Lamp (CFL) program, (3) Direct Load Control (DLC) program, and (4) Thin Fluorescent Tube Lamp (FTL) program. The summary of DSM program results is presented in Table A2-1 and the outputs are presented in Table A2-2.

Table A2-1: Summary of DSM Program Results

Program	Goals	Results	Comments
Time-of-Use Tariffs (TOU)	69.7 MW	Not estimated	The evaluation study could not estimate the load impacts of TOU meters because no baseline data was available.
Compact Fluorescent Lamps (CFL)	33.4 MW 303 GWH	310.1 MW 2506 GWH	Includes direct effects of CFL program (30.1 MW and 243 GWH) plus indirect market transformation impacts (estimated to be 280 MW and 2263 GWH)
Direct Load Control (DLC)	3.1 MW	0.0 MW	Program was cancelled
Efficient Fluorescent Tube Lamps (FTL)	14.4 MW 193 GWH	Not estimated	Savings were not estimated. Marketing and promotion and School Demonstration program successfully completed
Total Peak Load Reduction (MW)	120.5	310.1	Peak impacts of TOU and FTL not quantified.
Total Energy Savings (GWH)	496 GWH	2506 GWH	Energy savings from FTL program not estimated
Total Carbon Savings (Tons CO2)	594,983 tons	3,008,040 tons	Savings from FTL program not estimated

Table A2-2: Summary of DSM Program Outputs

Activities	Indicator	At appraisal	At completion	% Appraisal
TOU Metering	Number of TOU meters installed by EVN by mid-2006 using its own funds.	5,600	>60,000	1000%
	Survey of selected customers who originally transferred from the old tariff to the new TOU tariff.		Yes	N/A
DLC Program	DLC systems installed/active	2	0	0%
CFL Program	Number of CFLs procured and distributed	1,000,000	1,000,000	100%
	Survey of lighting suppliers		Yes	N/A
	Survey of participating customers		Yes	N/A
FTL Program	T-8 FTL marketing campaigns launched		Yes	N/A
	Promotional documents and videos for broadcast on radio and television stations		Yes	N/A
	Number of seminars to promote the program to education officers in provinces and cities nationwide		28	N/A
	Designed and installed energy efficient lighting system		405 classrooms at 135 schools	N/A
	Survey of suppliers and consumers		Yes	N/A
	Survey of school lighting program beneficiaries		Yes	N/A
	Number of participants in the training course		40	N/A
Supporting Program and Technical Assistance	Load Research Metter installed and profiles developed		1,026 LR meters installed. LR software installed. Design of LR database, data analysis plan and Plan for LR expansion developed.	N/A
	Commercial DSM business opportunities assessed and appropriate plans developed		DSM considered as element of the power development master plan	N/A
	DSM planning and policy support developed/initiated		Yes	N/A
	DSM pilot programs assessed and implemented	1-2	2[9]	100%
	Monitoring and verification plans developed/implemented		Yes	N/A
	Study tour –Thailand and Denmark		Three delegations	

[9] See detail in table A2-4.

Component 2: CEEP

This component includes the following subcomponents:

A. Training program. The training program supported training and capacity building activities to develop basic technical, financial, and business skills of project agents (PAs) to enable them to effectively market, sell, and deliver EE services on a commercial basis. Key stakeholders including project proponents (PPs) and financial service providers (FSPs) were also targeted. The overall training program and training materials were developed and conducted in the first year by the International Training Consultant. Case studies were developed for the training in Hanoi and in Ho Chi Minh City in both manufacturing and service industries. From the second year, training was conducted by local trainers with the support from international trainers.

B. Subproject audit and investment grant. The program provided grant incentives to promote energy efficiency investments. The grant was paid to PPs to cover part of their investment while PAs were paid through PPs based on the upfront agreement or contract.

C. Program marketing, monitoring, and administration. This program included program marketing, administration and monitoring, and technical assistance to implementing units. A comprehensive operation and procedure manual that guides all the stakeholders in implementation of the CEEP was prepared, put in operation, and revised annually. In addition, a program website was established to disseminate program information and a database was created to monitor the program activities and results.

D. Two pilot programs and technical advice (using reallocated fund from EVN). The additional activities included (i) Development and implementation of two pilot programs on solar water heater and standard and labeling for air conditioners; (ii) Technical assistance for policy development and capacity building for the EECO.

Table A2-3 summarized the program results and Table A2-4 presents the detailed outputs under the CEEP.

Table A2-3: Summary of CEEP Results

Performance Indicator	Goal	Actual Result
No. of Projects	200	118
Total Project Investment	$6.41 million[10]	$5.3 million
No. of PAs Operating	5	>10
Grants Provided	$1.2 million	$0.81 million
Energy Savings	302 GWh	353 GWh
Carbon Savings	362,252 Tons	423,170 Tons

[10] The total investment target was recorded at US$7.32 million in the PAD, which included both investments from CEEP and non-CEEP participants. Because the indicator only measures the investment from CEEP participants, by checking original files and calculations for energy savings, the ICR team found that the original investment target for CEEP participants was US$6.41 million.

Table A2-4: Outputs of the CEEP

Activities	Input Indicator	At appraisal	At completion	% Appraisal
Training Program	Training programs developed and delivered		9 training programs developed and delivered. Customized TA provided to PAs	N/A
	Number of trainees awarded with certificates		569	N/A
	Number of PAs and PPs attended training		110	N/A
	Number of PAs eligible to conduct EE project in CEEP		171	N/A
	Number of FSP attended training		28	N/A
	Number of energy audit kits available to PAs		4	N/A
Subproject audit and investment grant	Number of projects approved and received grant	200	128	64%
	Total investment of approved projects:	$6.41 mil	$5.34 mil	68%
	Total committed grant for approved projects	$1.15 mil	$0.81 mil	70%
Marketing, Monitoring and Administration Program	Number of marketing events to launch the CEEP Program		3	N/A
	Number of Energy Efficiency News Letters with thousands of copies were circulated		4	N/A
	Talk Show on national channel VTV1 introducing CEEP		1	N/A
	Program Website developed and published		Yes	N/A
	Networking activities between PMB, PAs, PPs and FSPs		Yes	N/A
	Number of participants in international workshops and study tours		244	N/A
Pilot Programs and Technical Advice (using reallocated fund from EVN's component)	Solar water heater program		300 customer and 9 manufacturers surveyed. SWH technical standard reviewed. 150 SWH installed, monitored and evaluated. Promotion activities undertaken. Energy saving: 410,625 kWh	N/A
	Standard and labeling of air-conditioner		Market survey completed. Product technical reviewed. Workshop for manufactures and promoting activities completed.	N/A
	Technical assistance		Supported in finalization of EEC Law. A study tour to EU undertaken.	N/A

Annex 3. Economic and Financial Analysis

EVN's DSM Component

At appraisal, a cost-benefit analysis was conducted for the DSM component based on the assumption that the overall component benefits were 120.5 MW in peak load reduction and total energy savings of about 496 GWh (303 GWh from CFL program and 193 GWh from FTL program) at a total project cost of US$8.22 million. The methodology was based on the principles of avoided costs, in other words, DSM costs were compared with the alternative least-cost supply option. The overall cost-benefit results for the whole program and the CFL program were presented in Table A3-1.

Table A3-1: Cost-Benefit Analysis for All DSM Programs (including supporting activities) and the CFL program at Appraisal

Perspective	Economic Analysis (in USD million)			
	Overall DSM Program		CFL Program	
	NPV	Benefit Cost Ratio	NPV	Benefit Cost Ratio
EVN (Financial)	76.89	4.9	14.30	2.7
Customers (Financial)	6.18	8.2	12.47	6.2
National (Economic)	80.74	11.3	24.87	9.7

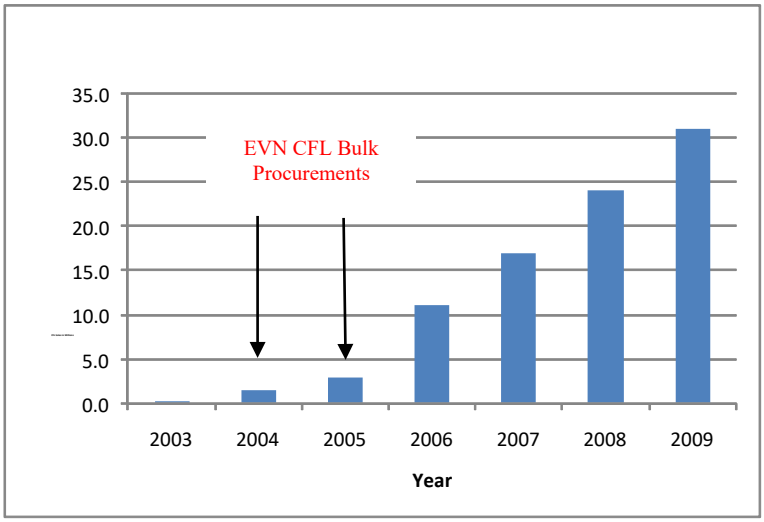
Source: PAD (2003) and calculation file "EVN Proposal Benefit Cost Analysis" (2003).

Because only the energy saving indicator from the CFL program was collected, the cost-benefit analysis for the aggregated DSM component was not possible. The following provides financial and economic analysis for the CFL program. For illustration purpose, a simulation analysis was also conducted for the FTL program.

CFL Program

Since there was no time series data to compare with original NPV indicator, benefit cost ratio for CFL sales in 2006 was used. The results showed that the CFL program was extremely cost effective to both EVN with the benefits to EVN around 99 times of the costs (versus original estimate of 2.7), and the customers with benefits 8.4 times of the costs (versus original estimate of 6.2). The detailed assumptions and cost benefit analysis was presented in Table A3-2. The EVN benefits are much higher than expected at appraisal because the system impact of the CFL program was much higher than projected. As shown in Figure 1 CFL sales in Vietnam, there was a significant increase in CFL sales after the EVN bulk procurement. In particular, the sales in 2006 were more than 6 million, 15 times what was projected at the appraisal stage under the GEF scenario. This market transformation resulted in significant total energy savings and reduction of peak load. From sales of two major CFL suppliers, it was estimated that the total system load reduction was around 310.1 MW, which is more than nine times of peak reduction target (33.4 MW) at appraisal. Therefore, EVN had significant higher benefits from avoided energy supply costs (including both building new capacity and electricity generation).

Figure A3-1: CFL Sales by Year in Vietnam



Source: EVN data from CFL manufacturers.

The economic cost benefit ratio will be even higher for both EVN and customers if consider global environment benefits and local environment benefits. If assume market carbon price is $10/t-CO2, the CFL program would generate a total of $27 million global environment benefits from the lifetime energy savings.

Table A3-2: Assumptions and Cost Benefit Analysis of the CFL Program on System

Assumptions	**Unit**	**Lamp Types**				**Total**
Type of Replaced Lamp	Ln/FL	In	In	In	In	
Wattage of Replaced Lamp	Watts	40	60	75	100	
CFL Wattage	Watts	9	11	15	20	
No of Lamps Replaced	#	882,220	3,297,513	441,446	1,504,030	6,125,209
CFL Power Factor	%	50%	50%	50%	50%	
CFL Life	Hours	6,000	6,000	6,000	6,000	
Average Usage	Hours/day	3.1	3.1	3.1	3.1	
CFL life	Years	5.3	5.3	5.3	5.3	
Network Losses	%	11	11	11	11	
Ave Customer Tariff	VND/kWh	700	700	700	700	
Demand Savings at Customer Level	Watts	31	49	60	80	
Peak Savings per Unit	Watts	22	38	45	60	
Cost of CFL	VND	25,000	25,000	25,000	25,000	
Avoided Energy Costs	c/kWh					6.15
Avoided Capacity Costs	$/kW					1,500
Carbon Price	$/t-CO2					10

Emission Factor	t-CO2/GWh					1200
						Cost Benefit Analysis
Indirect Impacts on Peak Load Reduction	MW	22.8	134.6	22.1	100.3	**279.8**
Direct Program Impact on Peak Load Reduction	MW					**30.1**
Total Impact on Peak Load Reduction (direct+indirect)	MW					**309.9**
Energy Savings per Unit	kWh/yr	35.1	55.4	67.9	90.5	
Lifetime Energy Savings per Unit	kWh	186	294	360	480	
Total Energy Savings	GWh/yr	34.8	205.4	33.7	153	**426.8**
Total Energy Savings	MVND/yr	24,360	143,780	23,590	107,100	298,830
Total Lifetime Savings	GWh	184.4	1,089.30	178.6	811.2	**2,263.40**
Total Cost of CFLs	MVND	22,056	82,438	11,036	37,601	153,130
Financial Discount Rate	%	7	7	7	7	
Customers Present Value of Benefits	MVND	104,911	619,214	101,594	461,245	1,286,964
Customer Benefit/Cost Ratio		**4.76**	**7.51**	**9.21**	**12.27**	**8.40**
EVN Benefit/Cost Ratio						**99.10**

FTL Program

Although the marketing and promotion program and school demonstration program under the FTL program was successfully completed, unfortunately, neither costs nor energy savings data were collected. Therefore, financial and economic analysis could not be conducted directly for this program. For illustration purpose, a simulation analysis was conducted using the data from a similar school lighting project in Hai Phong City under Vietnam Energy Efficiency Public Lighting (VEEPL) project implemented by UNDP[11].

Assumptions:

- The size of classroom: 7.2m*6.0m*3.5m
- Tariff: 1000 VND/kWh
- Lifetime of lighting: 4 years
- Old lighting system:
    - 4 incandescent lamps of 100 W and 6 fluorescence lamps T10-40 W.
    - Average illuminance: 78 lux, under the lighting standard (E>300 lux)
    - Energy consumed for one hour: 712 W

[11] Source: Report on Evaluating Current Status of Lighting at all Schools in Hai Phong City, Vietnam Energy Efficiency Public Lighting (VEEPL) Project. December 2008.

- New lighting system to achieve the lighting standard (E>300 lux)
    - If use old model T-10
        - Number of lamps needed: 12 sets
        - Energy consumed for one year: 2,530 kWh
        - Expenditure for the equipment: 12*204,680VND=2.46 MVND
    - If use new model T-8
        - Number of lamps needed: 12 sets
        - Energy consumed for one year: 2,277 kWh
        - Expenditure for the equipment: 12*238,000VND=2.86 MVND

Financial and Economic Analysis

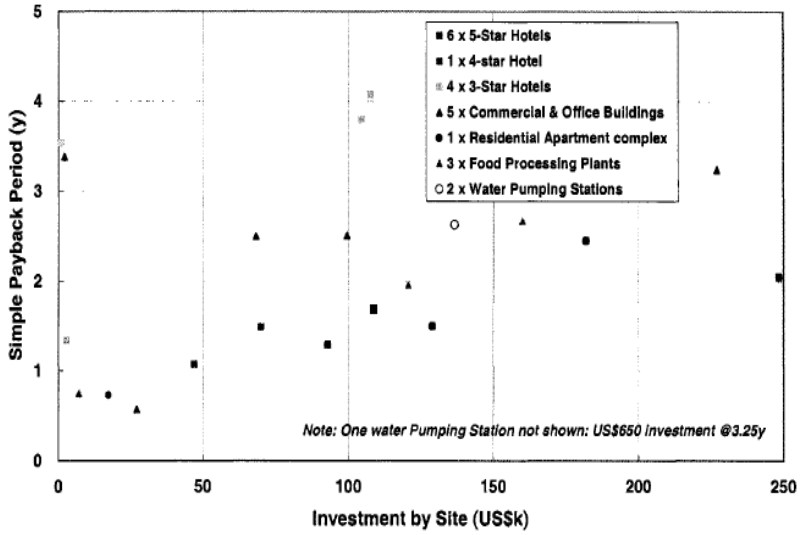
To achieve the same level of illuminance, compared to the old model T-10, the new model T-8 can save a total of 0.25 MVND from annual energy savings while the incremental investment is only 0.4 MVND. Thus, the simple payback period is only 1.6 years and the FIRR is 51 percent, which demonstrate significant financial benefits of the FTL program. More importantly, as the old lighting system before improvement was substandard, the school lighting program contributed to a better learning and teaching environment and better health for pupils, which has significant social and economic benefits.

CEEP Subprojects

Financial Analysis

At appraisal, a review of 20 potential subprojects was conducted through interviewing with existing and potential project agents and walking-through audits in a range of customer classes. The review showed that all investments were under US$250,000 with a simple payback period between one and four years. The review results are presented in Figure A3-1.

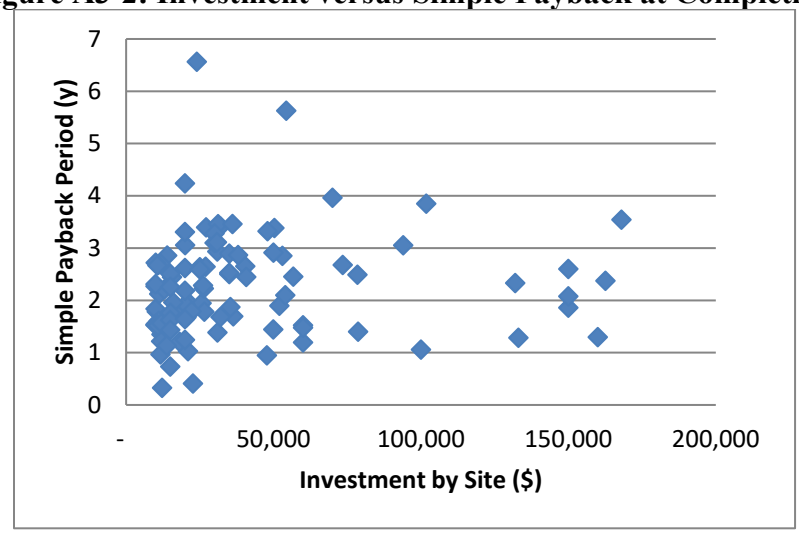
Figure A3-1. Investment versus Simple Payback at the Appraisal



Source: PAD (2003)

On project completion, a review of 95 completed subprojects[12] showed that the project size and simple payback periods were basically consistent with the previous estimates. The investment size was between $10,000 and $168,000 with an average of $40,247. Most projects were clustered under $50,000. The simple payback period is between 0.3 year and 6.6 years with an average of 2.26 years. Figure A3-2 presents the results on investment versus simple payback at completion.

Figure A3-2: Investment versus Simple Payback at Completion



Economic Analysis

Financial internal rate of return (FIRR) and economic rate of return (EIRR) were not estimated for potential subprojects at the appraisal stage. A review of 95 completed subprojects showed that the FIRR ranged from 13 percent to 306 percent with an average of 43 percent. Even the lowest bound 13 percent is higher than the commercial lending interest rate of 12 percent. If assume a market rate of $10/t-CO2 and do not consider other local environmental benefits, the EIRR of the 95 subprojects ranged from 17 percent to 372 percent with an average of 53 percent, demonstrating higher benefits to the society. Therefore, all completed subprojects were financially and economically sustainable.

[12] Actual project data on investment costs (in US$), annual energy savings (in kWh), and CO2 reductions (in tons) were obtained from ERAV. Due to lack of detail tariff information for each subproject, an average tariff of $0.054/kWh was applied to calculate the simple payback periods and other financial and economic indicators.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending (from Task Team in PAD Data Sheet**)**			
Peter Bassett	Consultant	EASTE	EE market Development
Hung Viet Le	Financial Management Specialist	EASVS	
Dilip Limaye	Consultant	EASTE	DSM
Anil Malhotra	Regional Energy Advisor	EASTE	
Thang Chien Nguyen	Senior Procurement Specialist	EASVS	
Anh Nguyet Pham	Operations Officer	EASVS	
Hung Kim Phung	Senior Finance Officer	EASVS	
Jas Singh	Energy Efficiency Specialist	EASTE	
Barry Trembath	Lead Power Engineer	EASTE	
Mei Wang	Legal Counsel	LEGES	
Supervision/ICR (from Task Team Members in all archived ISRs**)**			
Alberto Ang Co	Senior Energy Specialist	EASIN	
Hung Viet Le	Sr Financial Management Specialist	EAPCO	
Dung Kim Le	Team Assistant	EACVF	
Dilip R. Limaye	Consultant	AFTEG	
Thuy Thi Bich Nguyen	Team Assistant	EACVF	
Anh Nguyet Pham	Sr Energy Spec.	EASVS	
Cung Van Pham	Sr Financial Management Specialist	EAPFM	
Richard Jeremy Spencer	Country Sector Coordinator	EASVS	
Kien Trung Tran	Senior Procurement Specialist	EAPPR	
Ky Hong Tran	Energy Spec.	EASVS	
Mai Thi Phuong Tran	Financial Management Specialist	EAPFM	
Yabei Zhang	Energy Economist	EASIN	

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY01	4	57.71
FY02		62.60
FY03		65.07
Total:	4	185.38
Supervision/ICR		
FY04	6.6	56.91
FY05	22.43	61.56
FY06	21.43	69.72
FY07	31.38	61.27
FY08	5.23	26.64
FY09	12.23	67.94
FY10	17.58	27.31
FY11	12.31	29.34
Total:	128.99	400.70

Annex 5. Beneficiary Survey Results

CFL Program Beneficiary Survey

CFL program Survey, which was conducted in 2007 as part of the program evaluation, captured 300 responses from randomly selected participating customers in all 9 PCs for the Phase 2 of the program. The following is a summary of survey findings:

- Around 79% of the participating consumers opted to purchase the maximum number (2) of lamps. A significant percentage (82%) of the participants was found to be new users of CFLs and a small number (12%) have since purchased CFLs outside the EVN program.
- The EVN marketing strategies were proved to be effective with EVN Notices at Branch offices, TV advertisements, brochures and banners being the most popular. All respondents believed that the marketing material provided by EVN was easy to understand.
- The overall failure rate of the CFLs was less than 0.5% and the failed lamps were replaced by EVN under the program warranty. The lamp failures mostly occurred within the first 6 months after purchase.
- Overall satisfaction with the performance of the CFLs was very high (~92%) and the key factors that influenced consumers to participate in the program was saving potential and discounted price offered by EVN. The unsatisfied consumers stated light quality and level of savings as the primary reasons.

School Lighting Demonstration Program Beneficiary Survey

User survey, as part of the school lighting demonstration program evaluation, was conducted in 2007 that 3,374 questionnaires were distributed for pupils and 405 questionnaires for teachers. The survey covered:

- Pupil's evaluation of the lighting system before and after the upgrading
- Teacher's evaluation of the lighting system before and after the upgrading
- Comparison of the vision on board and on desktop before and after the upgrading
- Eye fatigue feeling after each session before and after the upgrading

The survey found that the pupils and teachers were highly satisfied with lighting improvements.

CEEP Beneficiary Survey

CEEP beneficiary survey was conducted in fall 2010 and captured responses from 8 PAs and 37 PPs. The major lessons learned from the survey are:

- A number of new PA businesses were established as a result of the CEEP program. The PAs surveyed unanimously confirmed that:

  - The CEEP program helped them enter the energy services business.
  - The CEEP training was useful or very useful to their businesses.
  - The CEEP training enhanced their capacity in technical, marketing, financial, and operational aspect of their businesses.
  - The CEEP program made it easier to develop new projects.

- In addition 80% of the PA respondents believed that CEEP helped PPs get a better understanding of energy efficiency.
- All of the PPs responding to the survey reported that the CEEP subsidy was an important (75%) or very important (25%) factor in their decision to implement the energy efficiency project and a vast majority (89%) reported that the CEEP training helped them get a better understanding of energy efficiency.
- All PPs reported their appreciation to PAs for their EE services and indicated that they would continue to implement additional EE projects with PAs after the CEEP.

Annex 6. Stakeholder Workshop Report and Results (if any)

Not Applicable

Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR

Summary of Borrower's ICR

EVN's DSM Component

Summary of Results

The goals of the EVN Phase 2 DSM program were to achieve 120.5 MW in peak load reduction and 496 GWH in energy savings. The goals versus the actual results are summarized in Table 1.1 below:

Table 1.1: Comparison of Program Goals and Results

Program	Goals	Results	Comments
Time-of-Use Tariffs (TOU)	69.7 MW	45 MW	Estimated savings are between 0 to 90 MW
Compact Fluorescent Lamps (CFL)	33.4 MW 303 GWH	310.1 MW 2506 GWH	Includes direct effects of CFL program (30.1 MW and 243 GWH) plus indirect market transformation impacts (estimated to be 280 MW and 2263 GWH)
Direct Load Control (DLC)	3.1 MW	0.0 MW	Program was cancelled
Efficient Fluorescent Tube Lamps (FTL)	14.4 MW 196 GWH	N/A	Savings were not estimated. Marketing and promotion program and School Demonstration program successfully completed

With respect to the specific objectives of the Phase 2 TA, Table 1.2 shows a comparison of the objectives of the TA assignment and the actual accomplishments of the TA activities. This table points out that the objectives of the TA effort have been successfully accomplished.

Table 1.2: TA Objectives vs. Accomplishments

TA Objectives	TA Accomplishments
Develop enhanced capabilities in the DSM Cell	Substantial training and capacity building activities and two study tours resulted in enhanced capabilities of DSM Cell staff
Prepare specifications for procurement of equipment and services	Procurement packages were completed and executed for a large number of procurements of equipment and services
Assist in development and execution of program implementation plans	Implementation plans were developed and executed for the various programs and supporting activities
Assist DSM Cell in coordinating program	Substantial assistance was provided to

implementation activities with other EVN departments and PCs	coordinate activities as needed
Assess additional DSM options and design pilot programs	DSM screening and analysis conducted and two pilot programs identified and designed
Provide assistance and support in the establishment of DSM as an integral part of the EVN resource planning process	Prepared the DSM chapter of EVN's long-term power plan describing the role of DSM as an integral part of resource planning
Provide training and technical assistance in the Phase 2 load research program	Substantial training and TA provided related to LR planning, sample design, data collection and analysis, hardware and software procurement, etc.
Provide other technical assistance as needed by the DSM Cell	Technical assistance was provided for the long-term power plan, pilot programs, and plan for DSM Center.

Lessons Learned

The major lessons learned are summarized below:

CFL Program

The EVN CFL Program has proved to be very successful. It has accomplished the objective of installing one million CFL and has led to substantial market transformation that has resulted in estimated savings of about 280 MW.

The marketing and promotion activities undertaken by EVN proved to be effective in promoting the use of CFLs. However, maximum benefits of CFLs are only accrued if they are used as replacement of existing incandescent lamps of the right wattage in areas of high usage. Hence, future consumer awareness programs should be refined to include the following:

- CFLs to be used as replacement of incandescent lamps that are located in high usage areas (in excess of 4 hours per day).
- The wattage of the replaced incandescent lamp should be 60W or greater.
- Existing 20W / 40W fluorescent lighting should not be replaced with CFLs

The Phase 1 and 2 programs procured 20W CFLs which are equivalent to a 100W incandescent lamp. However, the surveys indicated that the majority of the incandescent lamps replaced were below 60W. Hence, offering consumers CFLs of a range of wattages would maximize savings.

The EVN program used a sole supplier and ensured that the product met the required technical specifications. The surveys indicated that there are many CFLs currently in the market which are of lower quality and cheaper than the lamps offered by EVN. The two key responses from non-participants and non-users for opting not to participate in the EVN program was high cost and bad experience in using CFLs. These responses indicate

that cheap low quality lamps are readily available in the market. Hence product quality is an issue that EVN should address for a sustainable CFL program.

TOU Program

EVN has successfully implemented the TOU program. However, due to the fact there was no monitoring of the peak demands prior to the installation of the TOU meters, it is not possible to accurately estimate the peak demand savings. The main conclusion is that there has been a reduction of demand in the peak period due to the TOU tariff of a maximum 90 MW; however, it is more likely that there is less or no TOU impact since the analysis on accumulated monthly sales data for industry and commerce as well as analysis on customer segments show no influence.

FTL Program

The key lesson learned from the FTL program is that successful market transformation can be achieved with an aggressive cooperative marketing and promotion campaign in cooperation with suppliers and with demonstration programs. In particular, EVN's school lighting demonstration program was very effective in demonstrating the benefits of efficient FTL. EVN's marketing, promotion, and demonstration activities resulted in a significant positive response from the residential and commercial consumers as well as from stakeholders such as lighting specifiers, designers, architects, and FTL distributors. With the advertising and promotions campaign directly addressing the barriers such as lack of customer knowledge and lack of effective supplier promotion, it is reasonable to expect that a market transformation from fat FTLs to thin FTLs is going on in Vietnam.

Load Research

The Load Research (LR) activities conducted during the course of this project pointed out the many complexities related to LR planning, data collection, hardware and software procurement and data analysis. Another major lesson was that substantial commitment of staff resources needs to be made to embark upon a major LR program. Also, while many training and capacity building activities were conducted as a part of this TA project, it is clear that additional such activities need to be implemented for the staffs of EVN and the PCs.

DSM as a Strategy in Long-Term Power Planning

The efforts related to the development of the DSM chapter of EVN's long-term power plan demonstrated that DSM could have an important role in the resource planning process. DSM programs such as TOU, CFL, efficient refrigerators and air conditioners, and energy auditing could contribute significantly towards meeting the future electricity growth needs. National public awareness is important to stimulate the adoption of DSM programs. This should be a primary responsibility of the DSM function -- to develop promotional campaigns and to stimulate public education. Large-scale promotion and attractive marketing programs on DSM through mass media will be necessary in order to raise awareness of the Vietnamese people and to empower the DSM Units at the PCs.

Staffing for DSM

A very important lesson learned is that to effectively design and implement DSM

programs, substantial commitment of staff and other resources needs to be made. While DSM can be a major contributor to meeting the future electricity needs, it requires substantial commitment of dedicated resources by EVN and the PCs. EVN has recognized that its current DSM set-up is inadequate to achieve its DSM targets. One major activity completed in this TA effort, at the direction of the President of EVN, was the plan for an EVN DSM Center, with expanded staffing, increased autonomy, and the budget resources needed to plan and oversee a strong, nationwide DSM effort.

DSM Incentives and Regulation

The key lesson learned from the assessment of existing DSM incentives and regulation is that EVN does not require any financial incentives to undertake DSM programs. There are cost-effective DSM options based on the fact that DSM provides a lower cost mechanism for equilibrating supply and demand, or in other words that the avoided system costs more than cover the costs of the DSM programs. However, as far as the PCs are concerned, there is no financial motivation to implement DSM except for a few special cases, e.g. to low-income customers of the urban PCs. Therefore EVN needs to develop the appropriate internal mechanisms and procedures to provide incentives to PCs that are analogous to those for EVN.

CEEP Component

In general, the CEEP Program has obtained its objectives, particularly:

- Support the creation of national EE market through training for 81 PAs, of which 26 have already been implementing EE projects, attracting industrial enterprises to invest in EE measures, attracting financial institutions to finance EE projects;
- Electricity savings and CO2 reductions of implemented EE projects surpassed the designed targets of CEEP Program;
- Some EE projects have been implemented without grant support from the CEEP Program, implying better awareness of the industries and initial development of the commercial EE market.

The outputs could have been improved in terms of EE investment if the procedure would have been adjusted toward:

- More simple and standardized procedure;
- Lower grant for well known technical projects, at the same time allowing replication of energy audits to reduce time and cost
- Higher incentive for bigger projects
- High visibility and guarantee savings on technical solutions and equipments (e.g. via certification, labeling)

Assessment of Outcomes and Impacts

- **Changes in awareness and abilities for EE development**

Energy-intensive commercial and industrial end users have become more and more aware of EE necessity for their business, resulting from not only the participation in CEEP grant but also from its various marketing and self-investment activities.

One of the major results of the CEEP program was to standardize some EE actions, especially for lighting and motors/pumps which are very replicable from a project to another. Thus, audits and validation tests seem to have been shortened from the beginning to the end of the CEEP program.

Energy-intensive commercial and industrial end users became confident with foreign EE technology. The development of national EE technologies could be reinforced by:

- a better legislative support on energy efficiency will constitute a decisive incentive for EE comprehension among PPs, and
- an increased visibility on technologies and performances (e.g. certification, labeling).

PPs also developed internal abilities to manage EE projects: electrical engineers generally manage projects, and directors have been made sensitive to these projects. In biggest manufactures, procedures have been introduced to manage energy savings among the different factories and services.

- **EE Market development**

The EE market development impact of CEEP Program presents in three aspects:

➢ Contribute to the development of a new business on EE equipment and service provision, including (1) Energy audit providers, (2) Energy services providers (ESCO), and (3) EE financing/leasing institutions;

➢ Introduce and promote efficient EE business models that gradually accepted by the industries on the commercial ground: (1) Turn-key model (so far still the most popular model), (2) Saving guarantee model, and (3) Saving sharing model.

➢ Bring key players in EE markets, namely service/equipment providers – investors – financial providers, together through training and networking activities.

- **Capacity building**

The program was successful concerning the fact that Vietnamese institutional actors have gained knowledge in EE. ERAV have gained a significant know how in the field of energy efficiency and should continue to develop after the program. The AU also believes the CEEP program has increased their staff knowledge in energy efficiency, especially the direct management staff. The direct results from Techcombank's participation in CEEP is to consolidate customers' relation as the Bank, through its grants, offers interesting incentives.

A further strategic benefit is the gain of experience in the energy efficiency field. Techcombank is now able to answer customers' recent preoccupation regarding energy

savings. The participation of the AU staff in several CEEP trainings and marketing events guaranteed internal capacity building.

ERAV staff in the PMB has worked closely with its partners, and informal exchanges were done regularly to discuss the program process. Currently, ERAV still needs support from international consultants. Their staff have gained a significant know how in the field of energy efficiency. PMB is capable to manage future projects with no/low percentage of international consultants.

Technical works have been mostly externalized during the program implementation to international and local consultants and to the technical experts from AU though which their technical skills have increased.

Lessons Learned

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.

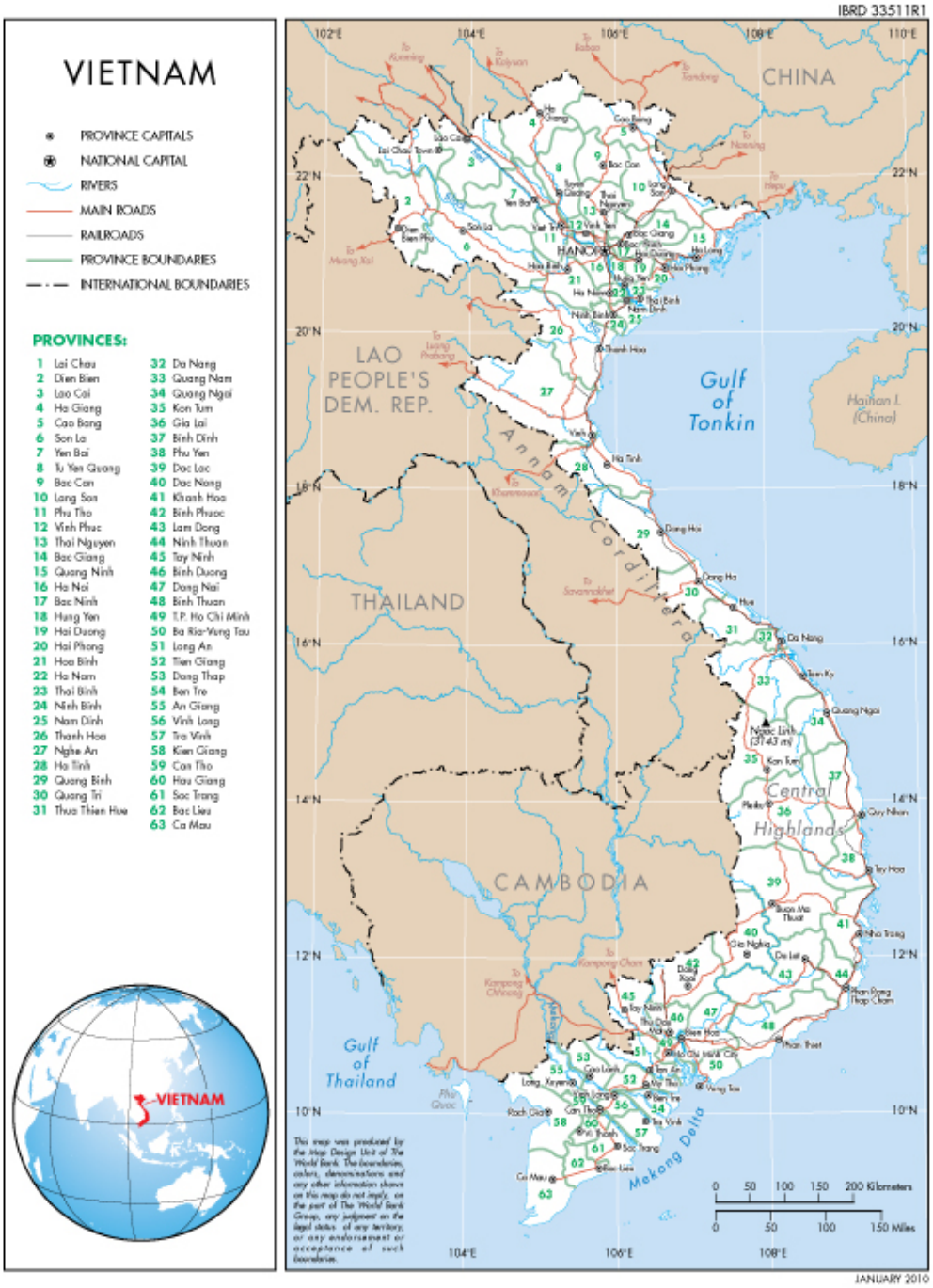
Support may be required in the future to facilitate commercial financing of EE projects, but these future operations would develop local commercial lending and, thus, eventually replace the need for any further Bank/GEF support in this market. Further reforms on electricity tariffs, banking lending and SOE equitization would allow these initiatives to develop further, with less reliance on grant support.

Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders

Not Applicable

Annex 9. List of Supporting Documents

1. Project Concept Note
2. Project Appraisal Document, May 2003
3. Mid-Term Review Reports (CEEP, EVN component), May 2006
4. Aide Memories for Supervision Missions from December 2003
5. Implementation Status Reports (ISR) from December 2003
6. Incremental Analysis Spreadsheet used for the PAD, December 2002
7. Review of Existing Legal and Institutional Framework for DSM in Vietnam, 2002
8. EVN Proposal Benefit Cost Analysis, 2003
9. Report on Evaluating Current Status of Lighting at all Schools in Hai Phong City, Vietnam Energy Efficiency Public Lighting (VEEPL) Project. December 2008
10. CFL Program Evaluation Report, 2007
11. FTL program Evaluation Report, 2007
12. TOU Program Evaluation Report, 2005
13. TA for EVN Phase II DSM Program Final Report, 2008
14. CEEP Operations Manual, 2007
15. CEEP Completion Report, 2010
16. CEEP Impacts Evaluation Report, 2009
17. CEEP Project Database, 2010
18. Pilot Program on Energy Standard and Labeling, Final Report, 2010
19. Pilot Program on Solar Water Heaters, Final Report, 2010


IBRD 33511R1
VIETNAM
PROVINCE CAPITALS
NATIONAL CAPITAL
RIVERS
MAIN ROADS
RAILROADS
PROVINCE BOUNDARIES
INTERNATIONAL BOUNDARIES
PROVINCES:
1 Lai Chau
2 Dien Bien
3 Lao Cai
4 Ha Giang
5 Cao Bang
6 Son La
7 Yen Bai
8 Tu Yen Quang
9 Bac Can
10 Lang Son
11 Phu Tho
12 Vinh Phuc
13 Thai Nguyen
14 Bac Giang
15 Quang Ninh
16 Ha Noi
17 Bac Ninh
18 Hung Yen
19 Hai Duong
20 Hai Phong
21 Hoa Binh
22 Ha Nam
23 Thai Binh
24 Ninh Binh
25 Nam Dinh
26 Thanh Hoa
27 Nghe An
28 Ha Tinh
29 Quang Binh
30 Quang Tri
31 Thua Thien Hue
32 Da Nang
33 Quang Nam
34 Quang Ngai
35 Kon Tum
36 Gia Lai
37 Binh Dinh
38 Phu Yen
39 Dac Lac
40 Dac Nong
41 Khanh Hoa
42 Binh Phuoc
43 Lam Dong
44 Ninh Thuan
45 Tay Ninh
46 Binh Duong
47 Dong Nai
48 Binh Thuan
49 T.P. Ho Chi Minh
50 Ba Ria-Vung Tau
51 Long An
52 Tien Giang
53 Dong Thap
54 Ben Tre
55 An Giang
56 Vinh Long
57 Tra Vinh
58 Kien Giang
59 Can Tho
60 Hau Giang
61 Soc Trang
62 Bac Lieu
63 Ca Mau
VIETNAM
CHINA
LAO PEOPLE'S DEM. REP.
THAILAND
CAMBODIA
HANOI
Gulf of Tonkin
Gulf of Thailand
Annam Cordillera
Central Highlands
Hainan I. (China)
Mekong Delta
Ngoc Linh (3143 m)
102°E
104°E
106°E
108°E
110°E
22°N
20°N
18°N
16°N
14°N
12°N
10°N
0 50 100 150 200 Kilometers
0 50 100 150 Miles
JANUARY 2010