INTERNATIONAL INSTITUTE FOR ENERGY CONSERVATION (IIEC)

Vietnam Demand Side Management and Energy Efficiency (DSM/EE) Project

MONITORING AND EVALUATION CONSULTANCY SERVICES FOR EVN'S DSM PHASE 2 PROGRAM

OVERALL EVN DSM PHASE 2 PROGRAM MONITORING AND EVALUATION REPORT

Prepared for

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EXECUTIVE SUMMARY

DSM has a potentially significant role to play in managing the growth of electricity demand in Vietnam which is estimated to triple from 26,600 GWh in 2000 to 70,400 GWh in 2010, growing annually between 10 – 13 percent. The maximum demand is projected to increase from 6,100 MW (in 2000) to around 17,000 MW by 2010, requiring a corresponding capital investment in generation capacity of around US$18 billion. These were the findings of the DSM Assessment Study commissioned by EVN in 1997.

The DSM Assessment Study recommended a two-phased approach for implementing DSM, which would save an estimated 680 MVA of capacity and more than 3,550 GWh/yr (about 5 million TOE) by the year 2010. Phase 1 established a DSM Cell within EVN, developed an energy efficiency (EE) building code, and introduced EE standards for appliances including lighting and industrial motors.

Under Phase 2 of the DSM program, EVN implemented a number of initiatives aimed at reducing peak load demand on the electricity network. The main components of the EVN DSM initiative are: (a) promotion of compact fluorescent lamps (CFLs); (b) transformation of the fluorescent tube lamp (FTL) market to efficient, "thin-tube" (T8) lamps; (c) an expansion of the time of use (TOU) metering; (d) a pilot direct load control (DLC) program; (e) and supporting programs. The supporting programs included load research activities; a study of the DSM regulatory framework and business opportunities; DSM screening and implementation of pilot programs; and a consultancy on program monitoring & evaluation.

The International Institute for Energy Conservation (IIEC) was engaged to conducted program monitoring and evaluation of the components of the DSM Phase 2 Program, which included the following programs:

- CFL Program
- FTL Program
- Load Research program
- TOU Program

In addition, there are evaluations of the overall implementation, as outlined in the EVN DSM Phase 2 Action Plan, including the Direct Load Control Program, the training on the DSM planning and screening software, up to two pilot DSM programs, DSM training and capacity building activities, the DSM regulatory framework and business opportunities consultancy, long term DSM planning activities, and the staffing and procurement plans.

This report details the evaluation of all the components of the Phase 2 DSM Program. Individual DSM program evaluations on the CFL Program (Phase 1 and 2), FTL Program and TOU Program were conducted as a part of the M&E program and the results have been provided in separate reports.

The results of the ***impact*** evaluation are expressed in annual energy (kWh) and peak (kW) demand savings from each program as well as in total for all of the Phase 2 DSM programs. In addition, ***process*** and ***market*** evaluation indications are also provided, such as customer satisfaction with new energy efficient products, number of new vendors of thin tube fluorescents, which marketing approaches are the most effective, potential for more DSM, and actual values that can be used in future estimates of DSM savings - for example, estimates of savings per home.

1. CFL Program

The overall objective of the CFL Program was the procurement and distribution of 1 million CFLs over the three-year period of the Phase 2 DSM program (2004-2007). The original intention was to procure 300,000 lamps in year 1, 400,000 lamps in year 2 and 300,000 lamps in year 3.

The projected impact of the CFL program through the end of 2006 was expected be 33.4 peak MW savings and 40 GWh/year saving on energy.

The program was implemented in two phases, 300,000 and 700,000 CFLs respectively. The final evaluation of the CFL Program yielded the following results:

Type of Evaluation	*Summary of Findings*
Impact Evaluation	❖ *Energy Savings of 45,900 MWh/yr* ❖ *Lifetime Energy Savings of 243,300 MWh* ❖ *Demand Saving of 30.1 MW* ❖ *The demand savings could have been higher if the right wattage of incandescent lamps was replaced with the CFLs. The program design was based on a 75W incandescent lamp being replaced by a 20W CFL, however, in reality lower wattage incandescent lamps and a significant number of fluorescent tube lights have been replaced by the CFLs.* ❖ *The indirect demand reduction through CFL market transformation is estimated to be around 280 MW based on sales information obtained from some leading CFL manufacturers. This is the result of significantly high increase in CFL sales commencing in 2005 (the year of the launch of the EVN CFL program) and maintained in 2006.* ❖ *The average bill savings for consumers was estimated to be 15.2%*
Process Evaluation	❖ *Around 79% of the 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 and 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.* ❖ *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.* ❖ *The overall failure rate of the CFLs was less than 0.5% and the failed lamps were replaced by EVN under the program. The lamp failures mostly occurred within 6 months after purchase.*
Market Evaluation	❖ *All suppliers have experienced a significant increase in sales in 2005 and the trends in 2006 are even higher. All have attributed the overall increase in awareness of CFL as a contributory factor in the increased sales.* ❖ *The significant increase in CFL sales immediately after the launch of the Phase 1 EVN CFL program is an indication of widespread adoption in the use of CFLs.* ❖ *The significant increase in CFL sales ranging from 80% to 150% during the first year of the EVN program indicates that the program had a significant*

Type of Evaluation	*Summary of Findings*
	impact in the growth of the use of CFLs in Vietnam. ❖ *There is strong evidence of increased awareness of the benefits of CFLs amongst consumers and as a consequence a substantial increase in market penetration could be expected in the coming years.*
Recommendations	❖ *Future consumer awareness programs should emphasise the use of CFLs as replacement of incandescent lamps (60W or greater) which is located in high usage areas, and it should not be used to replace 20W or 40W FTL* ❖ *Consumers should be offered a range of wattages for maximise savings* ❖ *Introduce minimum technical efficiency standards for CFLs that are imported and manufactured locally.* ❖ *Following the success of involving EVN's regional offices – RPC, PPC, and DPC as distribution channels for CFL, it is envisaged that the time is right for a market driven program but with endorsement from EVN*

2. FTL Program

The overall objective of the Thin FTL Program is to spur a market transformation from "fat tube" T-10 lamps (20 and 40 W) to "thin tube" T8 lamps (18 W and 36 W) in urban area, while also increasing the share of energy-efficient, "low-loss" ballasts. Under the FTL program, an advertising and promotion campaign is designed to support the increased sales of thin FTLs and low-loss ballasts. A high-profile demonstration project for high-efficiency lighting is also implemented at schools around the country.

The program was expected to increase the purchase of thin (T8) FTLs by 6 million FTLs within the period (2005-2007), with peak saving of 14.4 MW; and energy saving of 25.2 GWh/year.

Initially there were six procurement packages under the FTL Program but there were changes during the implementation of the Phase 2 program. As a result, the scope of the evaluation of FTL program was revised to include only two procurement packages, namely, Package 4A (Design of Advertising and Promotion for FTL/Ballasts) and Package 4C (School Lighting Demonstration Program). The evaluation focused on the deliverables submitted by the respective consultants selected for implementation.

Review of the deliverables for the Development and Implementation of Advertising and Promotion Campaign (Package 4A) and School Lighting Demonstration Project (Package 4C) have concluded that the targets set in the Terms of Reference were achieved. An evaluation of the system demand and energy impacts was not conducted due to the unavailability of sales data from the lighting suppliers.

All the major tasks under the **Advertising and Promotion Campaign** were generally met. Weaknesses found are but minor and did not affect the end result of the procurement package which was to successfully launch an advertising and promotional campaign for thin FTL and electronic ballasts.

Results from each of the marketing activity detailed above indicate that the campaign invoked an significant 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.

All major tasks under the **School Lighting Demonstration Project** were met. The minor comments we made on each task is the review of lighting programs and on the program implementation itself did not affect the overall achievement of the targets.

DESIGN OF ADVERTISING AND PROMOTION FOR FTL/BALLASTS (PACKAGE 4A)

This package was procured by EVN from Pham & Partners. The task was to design, produce, and implement an advertising and promotion campaign for EVN to spur a national market transformation from fat FTLs to thin FTLs, with an initial focus on urban areas. The campaign is also geared towards increasing the share of energy efficient, "low-loss" ballasts.

Overall, the requirements set in the Terms of References have been achieved. An advertising and promotion campaign ran from mid-October 2007 to early December 2007. Minor weaknesses found in the evaluation in each of the tasks did not affect the successful delivery of the major output of the consultants which was to launch an advertising and promotion campaign.

The campaign was based on the Marketing and Promotion Strategy that was earlier designed by the consultants. The activities in the marketing plan such as TV commercials, advertorials in newspapers and magazines, brochures and leaflets were implemented as planned. Workshops were also conducted in Hanoi, Ho Chi Minh, and Danang. Separate workshops were conducted for lighting specifiers and for FTL marketing personnel. As a social marketing activity, road-shows were also organized in the 3 cities.

Key Accomplishments

- *The range of marketing activities recommended by the consultant was comprehensive.*
- *Prior to developing a marketing and promotion strategy for 2007, the consultant reviewed the marketing activities in 2006 and the international best practices for FTL promotion. They also carried out a supplier and consumer survey. The surveys were found to be comprehensive and substantial. The marketing and promotion strategy developed focused on meeting the needs of:*
  - *Consumers – To inform them on the benefits of using thin FTL and encouraging them to change to FTL*
  - *Distributors, retailers and lighting experts – To switch production or merchandising to FTL*
- *The consultants categorized the target audience into 2 groups: residential and commercial. This is a sound strategy so that specific campaigns could be appropriately launched to each target group. They also had identified key stakeholders in the program such as: the 5 FTL brands, its distribution networks, and the lighting experts. The 5 FTL brands and its distribution network are seen as conduits in launching a campaign for residential consumers. On the other hand, the lighting experts are seen as allies in transforming the commercial consumers.*
- *Furthermore, consultants focused on 3 main cities in Vietnam which is Ha Noi, Ho Chi Minh, and Da Nang. The cities were chosen due to their*

	stable voltage supply wherein FTL/ballast performs well.
Needed Improvements	❖ *The review of international experience should have included a discussion as to which particular aspect of the Thailand and Sri Lanka programs was suitable or not for Vietnam and why. It should also include a comprehensive discussion comparing and contrasting the circumstances of the 2 countries to Vietnam.* ❖ *While the review of international experience covered promotion strategies of government utilities, it seems to be limited in scope. Specific marketing and promotion activities of the private sector, i.e. manufacturers and suppliers should have been included.* ❖ *There was no review of government procedures for procuring lighting equipment and no assessment of the potential for using government agencies as an important lead "purchaser" for thin FTLs and ballasts* ❖ *Brochures and Leaflets – These media need to specifically address the financial aspects of FTL/ballast, i.e. how much VND can be saved per month, how long initial FTL cost can be recouped, etc.* ❖ *Workshop and Training – Simply capacitating experts, retailers and salespersons does not give the assurance that these people promote FTLs to their clientele. An incentive system built within the FTL/ballast market will address this gap.*

SCHOOL LIGHTING DEMONSTRATION PROJECT (PROCUREMENT PACKAGE 4C)

The School Lighting Demonstration Project or Package 4C was procured by EVN from Rang Dong Light Source and Vacuum Flask Joint Stock Company (RALECO). The task of RALECO was to retrofit 405 classrooms in schools nationwide. The demonstration project installed efficient luminaries, thin-tube tri-phosphor FTLs, and high efficiency ballasts.

Overall, the project met the target of installing an efficient classroom lighting model that ensures the comfort of pupils and teacher's vision and uses energy efficient equipments. The School Lighting Demonstration Project has:

- Designed and installed energy efficient lighting system for 405 classrooms at 135 schools in 127 provinces and cities nationwide
- Designed propaganda documents and videos for broadcast on radio and television stations
- Organized 28 seminars and promoted the program to education officers in 28 provinces and cities nationwide

Key Accomplishments	❖ *A review of existing school lighting programs was found to be comprehensive and have covered all the necessary aspects.*

- *A standard retrofit package was developed and designed. A detailed dossier of artificial lighting design for classrooms has been developed by the consultant which describes:*
  - *the required illuminance*
  - *the light sources*
  - *type of fixture*
  - *height of luminaries*
  - *number of lamps and lighting power*
  - *arrangement of luminaires*
- *Lighting equipments were installed as specified in the plan.*
- *User survey has been conducted where 3,374 questionnaires were distributed for pupils and 405 questionnaires for teachers.*
- *An impact assessment has been conducted which finds lighting at schools considerably improved in terms of illuminance, uniformity, glare, colour quality, and shade*
- *Power consumption has increased in spite of the use of energy efficient lighting equipments. The reason cited is that the newly installed lighting system used more equipment to achieve better lighting quality.*
- *A4 fliers and A3 posters were designed to provide the community with brief project information, status of lighting at schools, standard lighting models, and the standard lighting equipment.*
- *A User's Manual for the application of energy efficient lighting model at schools has been developed*
- *A Documentary Film has been developed*
- *Seminar programs have been conducted in 27 provinces and cities with participants coming from different sectors*
- *A summary report was prepared by the consultants summarizing the project and evaluation results.*
- *A 1-day seminar-workshop was also held in Hanoi to wrap-up the project and attended by different stakeholders*

Needed Improvements

- *The review of existing school lighting programs did not include a review of the retrofit costs and estimated savings*
- *From a technical point of view, the standard retrofit package is satisfactory except that it did not include detailed budget and associated installation costs*
- *Range of retrofit cost and average retrofit cost for the 405 classrooms are not reported*
- *Total costs and total savings are not well documented. While there were no savings but increased energy consumption as a result of the project, the consultant should have provided an estimate of the electricity cost increase in VND.*

3. Load Research Program

The Load Research Program was aimed to 1) develop a load research methodology and step-by-step implementation plan; 2) Collect and analyze load data at the facility and end-user level, and 3) Use this data to understand load growth and to guide the design of future DSM programs.

Evaluation of Load Research Program is pending due to delay in program implementation. Evaluation was subsequently cancelled at the request of EVN.

4. Time of Use (TOU) Tariff Program

The objective of this program was to reduce needed peak capacity using a TOU tariff to encourage eligible (primarily large commercial and industrial) customers to shift some of their demand to off-peak and low-load hours. The projected impact of the TOU program was 69.7 peak MW peak demand reduction.

The scope of the program evaluation by IIEC included survey of selected customers who originally transferred from the old tariff to the new TOU tariff. The nature of the evaluation is a process evaluation which aimed to evaluate how consumers have responded to the TOU tariff and their satisfaction. The survey was qualitative in nature and the evaluation was based on the responses received from 37 customers.

Process Evaluation	❖ *75% had shifted load at varying extents. Most of the load shifters come from Tariff I category or the production or manufacturing firms. This can be attributed to the flexibility of most firms to alter their existing operations to respond to economic incentives in the TOU Program.* ❖ *Around 62% of the customers indicated that they had benefited from the TOU Program. The majority of the customers who had not benefited were the ones who do not have the flexibility to shift operations to suit EVN's off-peak and low-peak periods.* ❖ *The surveys highlighted how TOU participants perceive the logic of the program. All respondents said they were given TOU information prior to implementation and all of them indicated that the information was easy to understand.* ❖ *The strength of the program logic is also demonstrated on the cause-effect relationship of each respondent load shifting action and the lowering of electric bills. Most respondents who evaluated their existing operations and adopted load shifting report lower energy usage in their electric bills. This confirms that the 3-tiered TOU Program consisting of peak, off-peak, and low periods is viewed by most TOU customers as applicable to their operations.*
Market Evaluation	*Customer Satisfaction* ❖ *Two-thirds of the customers reported satisfaction to the program. Most of them view the immediate benefits in the form of reduced electric bills.* *Customer Reaction* ❖ *The program urged many customers to evaluate their existing operations to*

	suit to the TOU Program. The TOU Program was considered a success given that 73% of the survey respondents evaluated their existing operations for the TOU.
Recommendations	*Whether the TOU Program would result to the objectives of reduced investments in system expansion, reduced system losses at peak hours and improved system stability is indicated by customers' responses as to whether they have intentions to make long-term changes in their existing operations. Long term changes in existing operations render load shifting more permanent and this minimizes the need for future EVN investments.* *Survey results show that 65% of customers intend to make long term changes. Currently, It is quite interesting that progress is made by customers in terms of intended long term EE measures. While most of the initial responses at the start of the TOU Program were simple low cost operational improvements, i.e. work scheduling or load shifting, long term EE measures involve installation or use of new EE technologies entailing huge capital investments.* *These measures will address EVN's objective of reduced investments in system expansion, reduced system losses at peak hours and improved system stability.*

5. Direct Load Program

The objective of Direct Lad Control Program was to provide targeted load control for urban buildings areas with high demand and peak congestion, using DLC technology and "ripple control" of electric loads at customer facilities. The projected impact of the DLC program at the end of 2006 was a 3.1 MW reduction in peak demand.

EVN in collaboration with PC HCMC and PC Hanoi was supposed to implement a pilot direct load control (DLC) program using ripple control systems to curtail demand of about several thousand customer end-use loads (e.g., air conditioning and water heating systems) on a voluntary basis.

As per Mid-term Review, there has been no progress with the two DLC pilot programs in PC Hanoi and PC HCMC, and EVN believes that there is a lack of customer interest in a DLC program. EVN has therefore proposed to cancel the DLC program and has sent a formal notification to the World Bank to this effect. Since the DLC program is being cancelled, there are no anticipated program benefits.

6. DSM Screening and Pilot Program

This program screened and selected DSM options for implementation of two DSM pilot projects. The DSM Action Plan proposed to use Save-X planning model as a flexible tool for screening and assessing the cost effectiveness of DSM options to select DSM pilot projects.

Based on the results of the DSM screening, and the fact that EVN was already committed to implementing a large-scale CFL program, the following DSM measures were recommended for implementation during 2006 and early 2007 as EVN's new pilot programs:

a. **Solar Water heaters:** Solar water heaters (as a back-up for electric water heaters) have highest single savings potential in the residential sector. While the transactions costs for the installation of each solar water heater are higher than the purchase of household appliances such as refrigerators, electric fans, or air conditioners, there is a good opportunity for EVN and PCs to develop standard turn-key installations.

b. Energy audits: Energy auditing is a critical DSM measure, since the industrial sector accounts for half of Vietnam's electricity consumption and in the future the industrial sector will be the main contributors to the noon-time system peak. In addition, the DSM potential in the industrial sector is quite large and significant savings can be achieved relatively easily.

Detailed implementation plan for the pilot program to promote solar water heaters was prepared by the DSM Consultant (DEM). However, EVN decided to cancel the pilot. The rationale was that a similar program is planed for MoI under the ESP. The Medium Term Review supported EVN decision to cancel the solar water heater program and proposed to reallocate the remaining funds of the DSM Phase 2 to MoI to execute this pilot and other programs consistent with ESP.

No Monitoring and Evaluation has been conducted due to cancellation of the both Solar Heater and Energy Audit Program. During June-August, 2006, the DSM consultant designed audit program (renamed TOU Enhancement to focus on TOU customers and avoid overlap with MOI CEEP), which EVN decided to cancel in August 2006.

7. DSM Training and Capacity Building Activities

Recognising that training and capacity building are important part of DSM / EE project, an emphasis was been put on the development of the skills and capacity within EVN to effectively advocate for DSM as an important new business area within EVN.

Below is a summary of the accomplishments and evaluation findings for the DSM Training and Capacity Building Activities:

DSM Staffing and Training Plan	*The plan focuses on steps to build capacity in the areas of management strategy and human resource development and had made the following recommendations:* *1. EVN should add 2-3 DSM staff* *2. DSM Cell Leader be a full-time position* *3. Full time DSM position in each PC* *4. Establish Task Manager positions* *5. Additional training need*	*Compliant with the Action Plan*
Baseline DSM Training Course	*The course was attended by 40 participants from EVN's DSM Cell, other EVN departments, and EVN's subsidiary power companies (PCs). The course provided the participants with:* • *a broad understanding of DSM*	*Based on the detailed course evaluation, the training course was quite successful. Of the 25 completed evaluation forms, 18 participants responded that the course met their expectations, and 7 said it exceeded their expectations. On average, the*

	concepts and how DSM programs affect and benefit the mission of EVN and the PCs; • *knowledge and sufficient understanding about the DSM programs in Vietnam, including the technologies, equipment, and tools (i.e. incentives) used in the programs;* • *analytical skills in the areas of benefit-cost analysis for DSM and energy-efficiency measures; DSM program screening; and program monitoring evaluation;* • *awareness of the nature and the significance of DSM market, and capability to design strategies for marketing DSM programs; a clear idea of the relative roles of activities of EVN and the PCs in all aspects of DSM program design, implementation, monitoring, and evaluation.*	*participants rated all aspects of the training as a 4+ (median 4) out of 5.*
DSM Refresher Course	*The course provided the participants with:* • *Enhanced knowledge and understanding of DSM from the Baseline DSM Training and shared their post-workshop work experience* • *A broad understating of M&E, and particularly for DSM programs being implemented by EVN and PCs;* • *Opportunity to participate in the process of DSM program design for Vietnam; and* • *Knowledge on the roles of EVN and the PCs in the upcoming activities, e.g., in the M&E and promoting CFL programs.*	*On the session on "DSM Baseline Training review", most of the participants responded that they applied lessons learnt form the workshop at the work. However, changes in the PCs, the lack of interest of top management in DSM could result in insufficient support to the promotion of DSM.* *Overall, the participants rated the training very positively (good and very good) in its usefulness, practicality, interesting, the quality of training team presentation, the quality of group exercise, hand-outs and supporting factors, such as the meeting facility and interpreters. Participant evaluated that the workshop met their expectations.*
DSM Study Tour to Thailand	*The purpose of the 8-day study tour exposed the EVN and PC delegation to both the theory and practices of DSM, by targeted meetings with DSM officials and related stakeholders in Thailand, which has been*	*Knowledge and confidence gained from this study tour was used as a springboard in the implementation of EVN's DSM programs, and supporting activities such as load research, DSM*

	implementing DSM programs since 1994	*screening, data collection and analysis, short- and long-term DSM planning, and monitoring and evaluation.*

8. DSM Regulatory Framework and Business Opportunities Consultancy

The objective of this program was to analyze and develop a broad framework for the future of DSM that encompasses both regulatory aspects and financial incentives for the utilities to pursue DSM as well as potential business opportunities for EVN in providing DSM and energy-related services to customers.

EVN planned to procure the services of a consultant to make specific and detailed recommendation on DSM regulatory structure and incentives as part of an overall review of the DSM regulatory framework and business opportunities.

As per Mid-Term Review, the WB Consultant prepared a very detailed Mid-Term report identifying the financial impacts of DSM on EVN and the PCs as well as on the customer and the national economy. Different possible financial incentives have been identified to make it attractive for the PCs to engage in DSM and the financial impacts of each have been calculated. The discussion of the regulatory principles was also useful but was somewhat limited by the fact that ERAV has not yet formulated the policies for addressing DSM in the regulatory framework. Some of the assumptions used by the Consultant need to be reviewed and modified by EVN to refine the conclusions of the analysis, but this can be easily done as the calculations are described in detail.

The TOR for Business Opportunity study was prepared. However, EVN proposed to cancel the assignment because of inadequate implementation time. This study on Business Opportunity should be carried out later when the regulations on DSM provided ERAV will develop the regulation framework for DSM activities that provide adequate incentives for EVN and Power Companies to undertake DSM activities.

9. Long Term DSM Planning

Long term DSM planning is important in order to effectively identify and exploit available DSM resources. The action plan proposed EVN and the PCs to develop a Long-Term DSM plan to guide DSM programs and activities in the future (Phase 3 and beyond) with assistance from the DSM Consultant (DEM).

Work is under progress by the consultant and has not been completed up to date. Much of the basic analysis work has already been done in the DSM Chapter on EVN Master Plan, which was included in the 2006 Power Development Plan. As per Mid-Term Review, the report was found to be very useful in placing the DSM activities initiated by EVN in the context of EVN's long-term resource planning. It provided a good summary of international DSM experience and the benefits of DSM to utilities. Further it identified why DSM is important for Vietnam and how it can help EVN in planning its future resource mix to meet the substantial increase in demand.

Evaluation of the program was not conducted since the DSM Planning work has not been completed.

1 INTRODUCTION

Over the last decade, Vietnam experienced unprecedented economic growth; averaging 8.2 percent annually from 1992 to 1997. During this period, energy demand grew 30% faster than GDP and the demand for electricity was 70% faster than GDP. Such significant economic growth will require substantial expansion of the energy sector and, in particular, the electric power sector. It is estimated that the power utility, Electricity of Vietnam (EVN), will face a threefold increase in demand over the next 10 years, from 26,600 GWh in 2000 to over 70,400 GWh by 2010, with annual demand growth of 10-13 percent. The maximum demand is projected to increase from 6,100 MW (in 2000) to around 17,000 MW by 2010, requiring a corresponding capital investment in generation capacity of around US$18 billion.

A "Demand-Side Management Assessment for Vietnam" study was commissioned by EVN in 1997, with World Bank assistance, to determine the potential for demand-side management (DSM) in meeting the country's future power resource requirements. The DSM Assessment concluded that DSM had a potentially significant role to play in managing the growth of electricity demand in Vietnam and identified important opportunities for cost-effective electricity savings in a number of sectors and end-use applications. It recommended a two-phased approach for implementing DSM, which would save an estimated 680 MVA of capacity and more than 3,550 GWh/yr (about 5 million toe) by the year 2010. Under the scope in the first phase, supported by a grant from SIDA (about US$3.0 million), a DSM Cell was established within EVN. The functions of the DSM Cell included building load research capability, implementation of a pilot load management and several other pilot DSM programs, development of energy audit capability within EVN, and development of a policy framework for initial and future DSM activities. In addition, Phase one also included the development of a energy efficiency (EE) building code and the introduction of EE standards for appliances including lighting and industrial motors. The DSM Project Management Board of the Ministry of Industry (MOI) managed this phase.

Under Phase 2 of the DSM program, EVN implemented a number of initiatives aimed at reducing peak load demand on the electricity network. The main components of the EVN DSM initiative are: (a) promotion of compact fluorescent lamps (CFLs; (b) transformation of the fluorescent tube lamp (FTL) market to efficient, "thin-tube" (T8) lamps; (c) an expansion of the time of use (TOU) metering; (d) a pilot direct load control (DLC) program; (e) and supporting programs. The supporting programs include load research activities; a study of the DSM regulatory framework and business opportunities; DSM screening and implementation of pilot programs; and a consultancy on program monitoring & evaluation.

The International Institute for Energy Conservation (IIEC) was engaged for the provision of consulting services for the design and implementation of a program monitoring and evaluation framework in compliance with the objectives of EVN management (cost-effectiveness and efficiency) and that of the GEF (environmental and climate change benefits).

This report provides details of overall evaluation of the DSM Phase 2 Program implemented by EVN.

1.1 Project Objectives

The overall objective of this assignment was to meet the requirements of EVN and the GEF requirements for program monitoring and evaluation of the DSM Phase 2 Program while simultaneously building sustainable capacity within EVN to continue or outsource program M&E activities in the future.

The key tasks and objectives are:

- Provide evaluations of EVN's activities with respect to specific DSM programs as well as other activities associated with the DSM Action Plan.

- Develop an overall M&E Plan for the DSM Phase 2 Program, indicating key milestones for institutional development of EVN DSM Cell and other departments for current and future phases.
- Build capacity in EVN, PCs and other agencies to conduct DSM program evaluations.
- Develop a program monitoring and tracking system for DSM Programs, including appropriate performance indicators.
- Assist EVN in the collection and reporting of data for measuring defined performance indicators on an on-going basis.
- Conduct detailed program evaluations, both Mid-term and Final
- Conduct formal and on-the-job training of EVN staff in all aspects of program monitoring and evaluation.
- Through effective accomplishment of the M&E tasks, provide a sound basis for technical and financial accountability to EVN Management

1.2 DSM Programs Covered by Evaluation

The programs covered by this M&E Plan are:

- CFL Program
- FTL Program
- Load Research program
- TOU Program

In addition, there is evaluations of the overall implementation including the Direct Load Control Program, the training on the DSM planning and screening software, up to two pilot DSM programs, DSM training and capacity building activities, the DSM regulatory framework and business opportunities consultancy, long term DSM planning activities, and the staffing and procurement plans.

1.3 Program Evaluation Approach

The program evaluation approach attempted to answer the following:

- Is the program achieving its objectives?
- How is the program achieving its objectives?
- Why is the program achieving its objectives?

The evaluation will indicate if the DSM resource can be relied upon and also indicates how well the program has worked, what has been its impact, can the program be replicated, and should it be adjusted. The results of the evaluation are expressed in annual energy (kWh) and peak (kW) demand savings from each program as well as in total for all of the Phase 2 DSM programs. In addition, there can be other *process* and *market* evaluations indications, such as customer satisfaction with new energy efficient products, number of new vendors of thin tube fluorescents, which marketing approaches are the most effective, potential for more DSM, and actual values that can be used in future estimates of DSM savings - for example, estimates of savings per home.

There are three types of evaluations:

- **Impact** - how much energy (and demand/capacity) was saved?
- **Process** - how well is the program working, can it work better?
- **Market Effects** - what changes have occurred in the market?

2 SUMMARY OF MID-TERM REVIEW

In December 2006, the World Bank completed Mid-Term Review (MTR) to assess performance of (i) EVN's implementation of the four main Phase 2 DSM programs and the supporting activities; and (ii) MoI's implementation of the Pilot Commercial EE Project, with respect to GEF grant for DSM and EE. However, since the EVN DSM Phase 2 Program is partly financed by IDA fund from the SEIER project, the performance of those programs that are financed by IDA is also discussed in this report. The MTR also reviewed and assessed the progress relative to the key performance indicators identified in the Project Appraisal Document (PAD).

Based on this review and assessment, the MTR provides recommendations on revisions and restructuring the project design. A summary of the MTR is given below.

PROGRESS RELATIVE TO KEY PERFORMANCE INDICATORS

Due to the substantial delays in many of the program activities, there is very limited progress relative to the major Performance Indicators at the Mid-Term Review.

The following discussion presents a summary of the project progress relative to the Key Performance Indicators defined in eth Project Appraisal Document and listed in Annex 1.

Indicator - Peak load reduction of 70 MW and energy savings of 153 GWH by Mid-Term Review

The total estimated savings to date are 59 MW, shown below by Program:

- CFL - 14 MW
- TOU - 45 MW
- DLC - 0 MW
- FTL - 0 MW

The estimated annual energy savings (only from the CFL Program) are 27.7 GWH.

Indicator - Peak load reduction of 120 MW and energy savings of 496 GWH by end of the Project

- CFL - It is likely that the total MW savings from the CFL program will be about 46 MW which will exceed the goal of 33.4 MW, and the market transformation effects will provide additional savings. Such additional savings cannot be determined until an assessment of the market impacts is made by the M&E Consultant.
- TOU - The TOU impacts are likely to remain at 45 MW compared to the goal of 69.7 MW.
- FTL - If EVN implements the FTL program in the near future, it may be able to meet the goal of this program (14.4 MW) will be met.

There will be no savings form DLC as it is being cancelled. The total savings will therefore be about 105 MW (not including the market transformation benefits), which compares well to the goal of 120.5 MW.

Indicator - Four full-scale and two pilot programs designed and launched by December 2004

There have been significant delays in implementation of some of the programs. Due to these implementation delays, only the CFL and TOU programs had been implemented by December 2004, and the same situation exists at the time of the MTR. It is expected that the FTL program will be launched before the end of 2006 and one or two pilots will be launched in early 2007. The program evaluations are being initiated now and will be completed in 2007.

Indicator - One million CFL sold

Most of the first 300,000 CFLs have been sold and it is expected that by the end of the Program this goal will be achieved.

Indicator - 6 million T-8 FTLs sold

The FTL program is substantially delayed and has not been started yet. If EVN moves rapidly forwards and implements this program before the end of 2006, it may be able to meet this goal.

Indicator - DSM Business Opportunity Study Completed

This study has also been substantially delayed. EVN has prepared the TOR and expects to launch selection of consultants for the study by October 2006.

Indicator - Carbon dioxide emission reductions of 0.23 million tons from EVN and MoI programs by MTR and 0.95 million tons by end of Project

Savings achieved by EVN from the CFL program will have led to some carbon dioxide emission reductions, but no calculations have been performed to date. Assuming the energy savings are 27.7 GWH, the carbon dioxide emissions reductions would be about 0.033 million tons annually. This calculation does not include any market transformation impacts.

HOW WELL IS THE PROJECT WORKING?

Only the CFL Program appears to be working well. While EVN has made very good progress with the installation of TOU meters, due to the lack of any formal evaluation, it is difficult to gauge how well that program has worked. The other activities have experienced substantial delays and are therefore underperforming or not performing at all as of the MTR.

REASONS FOR IMPLEMENTATION DELAYS

The major recurring problem contributing to the very slow progress on some of the project elements is the inadequate staffing of the DSM Cell. A review of prior Aide Memoirs clearly shows that every prior Mission has emphasized the inadequacy of the existing staff and the need to expand the staff. Despite repeated assurances by EVN regarding adding staff capability, there has been little progress in this regard. The inadequate staff capacity has contributed significantly to delays in the various program components and also to the limited amount of training and capacity building activities by the TA Consultant. It is interesting to note that the CFL program benefited from having a dedicated staff member responsible for implementation.

The reasons behind the shortage of dedicated staffing in DSM cell were twofold: (i) first, despite the commitment of EVN top managers to the DSM program, the commitment was not adequately translated into actions by middle and lower levels of managers who are directly involved in the program implementation; and (ii) secondly, there was lack of clear understanding on human resource requirements for DSM programs which are different from execution of traditional utility investments.

Recently, two other factors, which cause negative impacts on EVN commitment to DSM on-going and future activities, have emerged. First, the power sector, including EVN, has been embarked on a long term reform program toward a competitive market. Looming changes in company structure, its ownership and new market orientation have diverted attention of EVN and PC management from DSM programs. Secondly, the regulations issued under the new Electricity Law does not clearly obligate EVN and power companies to carry out DSM and EE activities; instead, most of national programs for electricity saving

and efficient use under the Electricity Saving Program (ESP), approved by Prime Minister in April 2006, are to be financed by government budget and led by Ministry of Industry. Some of EVN DSM programs are overlapped with the ESP programs run by MoI. Combined, these factors have resulted in reduction of EVN's commitment on DSM programs. EVN recent decisions to cancel the pilot programs and postpone indefinitely the planned establishment of the DSM center are clear examples of the reduced committment.

WHAT NEEDS TO BE DONE?

The delay in project implementation by EVN, its reduced commitment to DSM activities and the increasing role of MoI as the leading agency for EE activities have resulted in the need to revise the scope of the DSM component:

Realignment of EVN Phase 2 DSM Program

EVN has confirmed that for the time being or close future it would not set up DSM center, commit more staff and or propose any effective institutional arrangement for DSM implementation. Given limited capacity of the DSM cell, it is unrealistic to expect EVN to successfully carry out all programs even if the implementation schedule were extended. Since an extension of the GEF grant's closing date will not be justified, the MTR suggested and EVN agreed to reduce the scope of the component. While EVN will continue and complete the two major assignments of the FTL program and the Load Research program, the remaining supporting programs which have not initiated, will be cancelled.

Pilot DSM and EE program implemented by MoI

The pilot programs, originally designed under EVN DSM Phase 2 Program, are better to be implemented by MoI for the following reasons: (i) MoI is a better position than EVN to carry out some pilot activities such as labeling and solar water heating; and (ii) the programs are consistent wit the ESP and can be served as capacity building exercise for MoI for ESP. The unused GEF fund of $510,000 from EVN component is recommended to be reallocated to MoI for execution of the pilots. The closing date of the Grant needs to be extended for two years until June 30, 2009 to allow completion of the pilot programs. An amendment of the Grant agreement will be required.

Revolving Funds for future DSM and EE activities

At the end of the CFL program implementation, EVN will have recovered from the sale of the CFLs to the customers the GEF funds of about $800,000 that were used for the CFL procurement. The proceeds will be put aside by EVN into an account called a CFL revolving fund. As specified in the Grant agreement, the revolving fund should be used for continuing the DSM and energy efficiency activities. The Government is required to prepare a plan for the use of the revolving fund and send it to the Bank. Implementing agency for the future program may be EVN or MoI or other entity.

MAJOR RECOMMENDATIONS AND ACTION ITEMS

The major recommendations of the MTR are presented below:

- EVN will accelerate implementation of the FTL School Lighting and FTL Promotion and Marketing assignments. It is expected that most of the activities under the two assignments will be complete by the closing date of the GEF grant of June 30,2007. EVN needs to discuss with the Bank on financing options for the remaining activities of the assignments after the Grant's closing date.
- EVN will speeds up implementation of the Load Research Program financed by IDA resources from SEIER;
- MoI will submit the implementation plan of the pilot programs, satisfactory to the Bank. State Bank of Vietnam will make a request for amendment of the GEF grant agreement to allow

reallocation of $510,000 to MoI for execution of pilot programs and an extension of closing date for this portion to June 30, 2009.
- EVN will make a proposal to the Bank to use the revolving fund from the sales of CFLs to continue its efforts on the future demand side management activities. Implementing agency for the revolving fund can be either EVN or MoI or other agencies that are endorsed by GoV.

PROJECT IMPACTS

If EVN and MoI implement these recommendations, it is expected that:
- The CFL Program will be completed by the end of 2007, and will exceed the peak reduction goal.
- The FTL Program may be completed by the end of 2007 and may achieve its goals.
- Better estimates may be developed of the market transformation impacts of the CFL program, and the load reduction impacts of the TOU Program.
- At least two pilot programs are scheduled to be completed by the end of 2008.

3 COMPACT FLORESCENT LAMP (CFL) PROGRAM

The CFL Program was designed during the Phase 1 of EVN DSM program based on a pilot program conducted in Phase 1. The pilot program indicated that there was a high percentage of use of incandescent lamps during the system peak period, households had an average of 2-3 incandescent lamps and had low awareness of CFLs. The results indicated that there were no major barriers for the implementation of a large scale CFL program in the rural sector and a high percentage (~80%) of consumers expressed their interest in purchasing CFLs in the future. Based on the evaluation of the Phase 1 program conducted in 2006, EVN made certain refinements in the implementation plan of Phase 2

OBJECTIVES

The objectives of the CFL program were consistent with EVN's overall DSM objectives in easing investment in system expansion as a result of rapid demand growth. The social objectives of the program were to provide assistance to rural people in reducing electricity costs and the objectives of GEF in reducing GHG emissions to improve the global environment.

The intended program strategies included the provision of a subsidy for CFLs to rural consumers, a signal to CFL manufacturers for increased sales and marketing and the promotion of market transformation from incandescent lamps to CFLs.

The overall objective of the CFL Program was the procurement and distribution of 1 million CFLs over the three-year period of the Phase 2 DSM program (2004-2007). The original intention was to procure 300,000 lamps in year 1, 400,000 lamps in year 2 and 300,000 lamps in year 3.

3.1 Review of Action Plan

The primary strategies for achieving the CFL program objective were:

- Subsidize CFLs for poorer rural customers;
- To provide a signal to manufacturers to increase their sales and marketing of CFLs; and
- To promote market channels—especially in Year 2 and 3 of the program—to help build long-term market for CFL sales.

The projected impact of the CFL program through the end of 2006 was expected to be 33.4 Peak MW saving; and 40.0 GWh/year energy saving.

The proposed steps to implement the program were as follows

Step 1: Year 1 CFL Procurement

Step 2: Finalize Detailed Implementation Plan

Step 3: Procure CFL marketing and promotion services and design campaign

Step 4: Test CFLs Printing and Production for Year 1

Step 5: Implement Program in year 1

Step 6: Revise Program for Year 2 Based on market channel survey

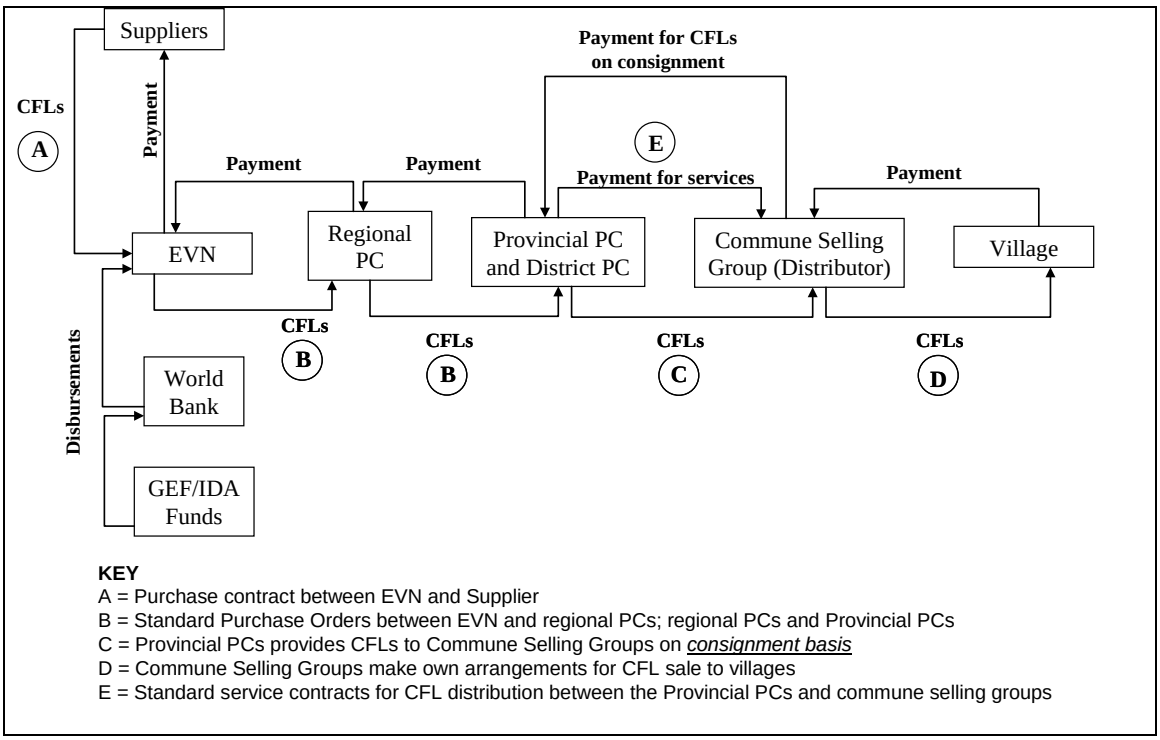
Step 7: Second Year Procurement and implementation

Step 8: Third-Year Procurement and Implementation

3.2 Review of CFL Implementation Plan

The aim of the Year 1 program was the procurement and distribution of 300,000 lamps. The procurement would involve the selection of one supplier from a bulk tender procedure. The distribution of the lamps was conducted through the Provincial PCs to the Commune selling Groups via the District PCs as shown in Fig 1.

The Phase 1 program was implemented using only 3 PCs (PC1, PC2 and PC3) and the distribution was through the District PCs. Hence, the Commune Selling Groups were not utilized in this Phase. The method of procurement and program design for Years 2 and 3 of the program will be reviewed based on the results of review of CFL program marketing experience.



The program included contracts for CFL Distribution Services, which were awarded by the Provincial PCs to the Commune Selling Groups participating in the CFL program. The contracts covered the costs for the cooperatives to distribute promotional materials, sell and distribute lamps, collect payments, service of warranties, etc. The program design included the provision of a subsidy to rural consumers, from 33% in Year 1 to 20% in Year 3. The subsidy was combined with marketing efforts to promote the use of the more efficient lamps in and outside the distribution program; this is an important point since a key long-term goal of the CFL program is to promote a market transformation toward the use of CFLs instead of incandescent lamps.

The payment terms for the consumers included an option of a single payment of the entire subsidized price or 50% initial payment with balance in three months (with 2% reduced subsidy). The design also included a limitation of 2 CFLs per household to prevent abuse of the subsidy and reselling lamps.

MODIFICATIONS TO ORIGINAL DESIGN

The Phase 1 CFL program included several changes to the original design which was aimed at achieving results in a short space of time. The basic design of Phase 1 continued in the Phase 2 of the program. The objective was to test the design and minimize risks by initially dealing with only EVN consumers. The key changes were as follows:

- There was no subsidy provided to consumers as the purchase price of CFLs (and hence, the selling price) was significantly lower that estimated;
- There were no provisions for payment in instalments and hence, required upfront payment of the total price.
- Eligible consumers were only the ones having an EVN electricity account in the three selected PCs in Phase 1 and all the 10 PCs in the Phase 2. The consumers were located in towns in the franchise areas of the District PCs
- The distribution of CFLs was done by the District PCs directly to the EVN consumers.

With these modifications EVN was able to achieve the sales targets of Phase 1 in a relatively short period of time.

The success of the Phase1 sales continued during the Phase 2 with the procurement of 700,000 CFLs using the same procurement process as Phase 1. Hence the DSM program target of 1,000,000 CFLs was met in Year 2 of the program. There are no plans of continuing the CFL program in Year 3.

Revisions to CFL Program Design

Original Program Design	Proposed Revision to Program Design	Rationale
Rural communes	Urban areas (provincial cities & towns)	Quicker distribution and lower costs.
Commune organizations used for distribution.	Distribution done by District PCs	Quicker distribution and lower costs.
Villagers have option of payback over 3 months.	All lamps sold on cash basis.	Reduce overhead associated with paperwork for loan or payback scheme.
Lamps to be priced at USD 1.06 plus distribution costs.	EVN will survey market prices and make sure that CFL price is not so low that it hurts existing market for CFLs (i.e. Rang Dong, Dien Quang, Philips)	EVN needs to "prime the pump" and avoid market distortions, building up long-term market.
CFLs sold in 200 communes around Vietnam.	CFLs will be sold in all 30 provinces – on average, about 10,000 lamps per province.	
Proceeds from CFL sales will go into GEF Revolving Fund.	No change.	
Monthly reporting from each commune to District PC => Provincial PC => Regional PC => EVN	Monthly reporting from District PC => Provincial PC => Regional PC => EVN	Reporting chain shorter and more manageable
EVN has to delegate to Provincial PCs to claim money from each participating commune.	EVN will collect money from District PCs through its internal company reporting structure.	Easier collection process since it is all "in house."

Source: EVN, Revised Implementation Plan for the CFL Program, 16 June 2005

3.3 Mid-Term Review

This section provides extracts from the Mid-Term Review, in relation to the CFL Program, conducted by the World Bank in December 2006

PROGRAM ACTIVITIES

The major program activities to date have been as follows:

Bulk Procurement of First 300,000 Lamps

EVN procured the first 300,000 CFLs using an International Competitive Bidding (ICB) process in 2005). OSRAM was the winning supplier and provided the CFLs at an average cot of $1.07 per lamp. This price represented a substantial discount from the current market prices of $2.00 to $3.00 per lamp. While EVN wanted to give customers the benefit of the lower cost of the bulk procurement, it did not want to undercut the existing suppliers and retailers in the market. EVN therefore established a market price of VND 25,000 (about $1.56) per lamp.

Distribution of First 300,000 Lamps

EVN started the distribution and sale of these 300,000 CFL in November 2005. The distribution covered 151 district towns and communes in 33 provinces. The primary distribution method was through the Provincial and District PCs. As of the Mid-Term review, over 75% of these lamps had been sold, and EVN expects that all would be sold by June 2006. Some delays in the distribution and sales of these CFL were encountered, resulting from inadequate supporting promotion and marketing activities, due to the fact that there were delays in the hiring of the CFL Marketing and Promotion Consultant and preparation of the Marketing and Promotion Plan.

Distribution Procedures

The detailed procedures used by EVN are summarized below:

On average, each provincial PC was responsible for selling 10,000 lamps; however, the actual number per province was weighted according to the population.

EVN released the CFLs to each provincial PC.

- The provincial PCs were responsible for collection of the sales price and repayment to EVN.
- The provincial PCs were also responsible for working with district PCs within their province to ensure proper sale and distribution of lamps, collection of payments, service of warranties, etc.
- The provincial PCs were also responsible for working with district PCs within their province to ensure proper marketing and promotion of the program (brochures, local advertisement, etc.)
- District PCs are responsible for direct distribution the CFLs to customers and implementation of marketing and promotion activities.
- The local marketing efforts were supplemented by a national advertising and promotion effort developed by EVN.

Procurement of Next 700,000 Lamps

EVN procured the second and third year CFL amounts of 700,000 using the ICB process. OSRAM was again the winning supplier with a price of VND 16,000 ($0.98) per lamp. EVN is now expecting to start the distribution and sales of these 700,000 CFL. EVN is planning to intensify and expand the geographic coverage of the promotion and marketing campaign for the distribution and sale of the 700,000 CFL.

Marketing and Promotion

EVN has hired a marketing consultant who is developing a marketing and promotion plan. The plan will include overall marketing of the program through public media at the national and provincial levels, led by EVN and carried out by EVN and the PCs with close coordination. The marketing materials for this campaign are also being developed.

At the local level, direct marketing, promotion, and sale of lamps will be carried out by Provincial and District PCs according to the plans developed by EVN and the Regional PCs and the standard agreements between EVN and the PCs. Materials for local promotion will be provided by EVN.

Lamp Warranty

EVN has set aside a number of lamps (5% of the order amount) for fulfilling the warranty and these have been given to the regional PCs to the Provincial PCs. Households that have defective lamps within the warranty period can have them replaced by returning the defective lamp to the village leaders or directly to district PCs. It is the District PCs responsibility to ensure that each customer receives a replacement CFL and that defective lamp are returned to EVN via the Provincial PCs. The PCs (district, provincial and regional) will include the warranty CFLs in their accounting of CFL distribution.

Program Management

EVN's DSM Cell is responsible for the overall management of the CFL program. The program management is being carried out by DSM Cell with assistance as needed (and requested) from a number of related functional departments within EVN. In addition EVN has established two important project management bodies: the DSM Steering Committee and a CFL Program Working Group. The Steering Committee is headed by the Vice-President of EVN in charge of business, and its membership includes the heads Business & Rural Electrification, Finance & Accounting; Bidding Management; Material & Equipment; Planning; Cost Estimation; and International Cooperation Departments.

The DSM Working Group includes EVN staff from the same EVN departments as the DSM Steering Committee. The Working Group will be responsible for tracking program progress and reviewing all monthly management and financial reports.

ESTIMATED PROGRAM BENEFITS

The estimated benefits of the Program (for the first year distribution of 300,000 CFL) are summarized based on calculations performed by the Phase 2 TA Consultant in Table 5 below:

Peak demand savings = 14.2 MW
Generation savings = 27,703 MWH/year
Benefit to EVN in terms of avoided losses = USD 969,623 per year

Table 5. Estimated Peak Load and Generation Savings from Year 1 CFL Program

A	Incandescent bulbs	75	W
B	Replaced with CFLs	20	W
C	Watt savings per installed CFL	55	W
D	Quantity	300,000	CFL
E	Number of hours during peak time	4	h/day
F	Average marginal cost	8.0	USD cent/kWh
G	Average marginal revenue from provincial towns	4.5	USD cent/kWh
H	Net loss on each provincial customer	3.5	USD cent/kWh
I	Coincidence factor (% on at peak)	75%	
J	T & D Losses	15%	
K	Generation savings (C*D*E*365*(1+J)/1,000,000)	27,703,500	kWh/year
L	Peak saving (C*D*I*(1+J))/(1,000,000)	14.2	MW
M	EVN's avoided marginal losses on sales to provincial customers(H/100*K)	969,623	USD/year

Source: EVN, Revised Implementation Plan for the CFL Program, 16 June 2005

The savings estimates in the above table need to be evaluated and verified by the M&E consultant. In particular, the savings per lamp may be higher since some customers replaced 100 watt lamps. Also, the assumed 75% coincidence factor may be low. Further, it is likely that the losses are higher than 15% in rural areas and during peak periods.

FUTURE ACTIVITIES

The future program activities include the following:

CFL Revolving Fund

EVN's accounting office will establish a special account to receive the proceeds of the CFL sales. This will essentially be the "Revolving Fund" described the Phase 2 DSM Action Plan and Procurement Plan. The Revolving fund will be used for future program activities. EVN will be working with the Phase 2 TA Consultant to define how to best use the Revolving Fund.

Selection of Target Cities, Towns and Villages

The next stage of the program will target cities, towns and villages throughout Vietnam. The allocation of lamps between northern, central, and southern Vietnam will be determined by the procurement process and the number of CFLs in the Haiphong, Danang, and Ho Chi Minh City distribution centers.

Monitoring and Evaluation

EVN has selected the Monitoring and Evaluation (M&E) Consultant, and the Consultant has developed the M&E Plan for all of the Phase 2 DSM programs. The plan includes a detailed evaluation of the CFL program impacts, benefits and costs. Also, the Consultant has designed a program tracking database.

CFL Testing

EVN has selected the organization for CFL testing and testing activities are expected to be initiated shortly.

KEY PROJECT ACCOMPLISHMENTS

The following are the key accomplishments of the CFL Program:

1. The bulk procurement has demonstrated a substantial reduction in the CFL price. The price in the first procurement was $1.07 per lamp and in the second $0.98 per lamp. After including allowances for EVN's distribution cost, EVN is selling the CFLs at a price of about $1.50 per lamp, which is substantially lower than the pre-procurement market price (shall we provide the market price here and mentioned that CFLs distributed by EVN were exempted from import tax).

2. The EVN procurement and distribution strategy appears to have worked well, with over 74% of the CFL successfully sole during the 5 months after procurement.

3. A site visit to one commune (Yen Dong) where CFLs had been sold by EVN pointed out that the cooperative effort among the district PC, the Local Authority, the People's Committee, and the Vietnam Women's Union was successful in selling the lamps in the commune. This distribution approach will be used for the next round of 700,000 CFLs. The customers visited were satisfied with the quality and performance of the CFLs installed and some had purchased additional CFLs from the market. It was reported that only a few households (less than 5%) with very low income did not purchase the CFL, and some households wanted to purchase more than the 2 allowable in the EVN program.

4. The failure rate of the CFLs has been very low and few warranty replacements have been made. In the Yen Dong commune, of the 3094 CFLs sold over the period January to May 2006, only 12 had failed accounting for 0.4%.

5. The predominant lamps replaced by the 20 watt CFL were 75 or 100 watt incandescents (Providing savings of 55 to 80 watts per lamp at the customer level), although some households also replaced fluorescent tubes. After these CFL have been installed there has been a measurable reduction in energy bills at the household level as well as at the commune level. The estimated commune level reduction was reported to be about 20,000 kWh per month. The commune has concluded that it considers the CFL program as very successful.

6. The lamps were sold at a price of 25,000 VND per lamp (about $1.56) and the average savings were reported to be about 5,000 VND per lamp per month, thereby providing a payback of 5 months.

7. In an informal market survey conducted during the MTR, it was noted the a wide variety of CFLs were being offered for retail sale in the market and that the prices of these CFL were significantly lower than the market prices prior to the launch of the EVN bulk procurement and distribution. When questioned, several retail shop owners reported that CFL sales were 50 to 70% of total sales. Also, EVN reported that one of the local manufacturers of CFLs, Rand Dong Lighting, had reported that they had sold a very large number of CFLs since the start of the EVN distribution program. These anecdotes suggest that there has been significant beneficial impact of EVN's CFL Program on the CFL market in Vietnam. The M&E Consultant will be conducting a more formal investigation of these impacts.

8. As a result of the success of the EVN CFL Program, the Government of Vietnam is considering a substantially expanded CFL program for about 20 million lamps. This program, currently being conceptualized, will be included as one of the programs under the recent Prime Ministerial Decision on the Approval of the Electricity Saving Program for the Period 2006 to 2010.

RECOMMENDATIONS

The major recommendations are:

1. While EVN has successfully distributed and sold most of the first 300,000 CFLs, the bigger job of selling the next 700,000 is just about to be started. To succeed in this effort, it will be necessary to have an aggressive and effective marketing and promotion plan. It is strongly recommended that EVN works closely with the marketing consultant to develop and implement such a plan as soon as possible.

2. The proceeds from the sales of the CFL are being collected by EVN. Upon completion of the sale of the CFLs from the two procurements (total of 1 million CFL), EVN will have in hand the GEF funds ($800,000) that were available for equipment purchase and for the revolving fund (also called a "learning grant"). EVN can use these funds for additional CFL sales and/or promotion. Potential uses for these funds were identified by the Mission in collaboration with EVN. These may include additional bulk procurement, cost-shared grants to manufacturers to improve CFL technology, additional marketing and promotion campaigns, capacity building of the DSM Center, etc. EVN should develop a plan for the most effective use of these funds.

3. The M&E Consultant should be asked by EVN to verify the savings assumptions made by the TA Consultant (shown in Table 5 above), particularly the savings per lamp, coincidence factor, and loss factor.

4. As indicated above, the CFL Program appears to have had a beneficial effect on the market. EVN should instruct the M&E Consultant to include a formal survey and assessment of the market transformation impacts of the Program.

ACTION ITEMS

The major action items are summarized below.

ACTION ITEMS - CFL PROGRAM

Major Program Activities	Summary of Progress	Comments	Action Items
Distribution and sales for second and third years	No progress	Procurement completed; distribution/sales planned for expanded area	Initiate distribution and sales by July 2006
CFL marketing and promotion	Some progress	Market survey completed; some promotional materials printed and distributed	Develop and implement a formal marketing and promotion plan
Program tracking database	Some progress	Design completed by M&E Consultant	Initiate program tracking as first year sales are completed
Use of GEF Revolving Fund	Good progress	The revolving fund will be recovered from CFL sales. Need to determine future use of funds.	Develop plan for funds use Submit to WB for approval

3.4 Summary of Results of Final Program Evaluation

The overall objective of the CFL Program was the procurement and distribution of 1 million CFLs over the three-year period of the Phase 2 DSM program (2004-2007). The original intention was to procure 300,000 lamps in year 1, 400,000 lamps in year 2 and 300,000 lamps in year 3. However, due to the higher than expected interest in Phase 1 the quota of lamps earmarked for Years 2 and 3 was combined (700,000 CFLs) and completed in Year 2.

The evaluation of the Phase 1 program considered all design and implementation aspects. Information for the evaluation was sourced from EVN, customer surveys and CFL suppliers. The customer surveys included Participating Users, Non Participating and Non-Users.

The final evaluation of the CFL program considered both Phases (1 and 2) covering 1 Million CFLs and determined the overall impacts of the program. The surveys focused on the Program participants and more emphasis was placed in determining the overall market impacts resulting from the EVN Program

IMPACT EVALUATION

A summary of the program impacts of the overall EVN CFL Program are given in the Table below.

Overall System Impacts and Benefits	
Energy Savings (MWh/yr)	*37,500*
Lifetime Energy Savings (MWh)	*198,900*
Demand Saving (MVA)	*12.3*
EVN Benefit / Cost Ratio	*19.5*
Consumer Benefit / Cost Ratio	*6.34*

The following is a summary of conclusions from the Impact Evaluation:

- The program was found to be extremely cost effective to both EVN and the consumers where the benefit to EVN was around 19.5 times more than the costs, while the consumer's benefits were 6.3 times more than the costs.
- The EVN benefits are high because the target consumers (residential) have subsidised tariffs (less than the avoided cost of supply).
- The demand savings could have been higher if the right wattage of incandescent lamps was replaced with the CFLs. The program design was based on a 75W incandescent lamp being replaced by a 20W CFL, however, in reality lower wattage incandescent lamps and a significant number of fluorescent tube lights have been replaced by the CFLs.
- The impact on the use of CFLs purchased for new fittings was treated as if they have otherwise used incandescent lamps on the basis that a holder suitable for either an incandescent lamp or CFL was already installed.
- The indirect demand reduction potential through CFL market transformation is estimated to be around 220MW based on sales information obtained from some leading CFL manufacturers. This is the result of significantly high increase in CFLs commencing in 2005 (the year of the launch of the EVN CFL program) and maintained in 2006.

PROCESS EVALUATION

The following is a summary of findings from the Process Evaluation for Phase 2:

- Around 79% of the 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.
- As in the case in Phase 1, there was a significant number (39%) who used the CFLs as replacement of existing 20W / 40W fluorescent tube lighting. This figure was even higher than in Phase 1 which was 23%. Additional follow-up questions were asked to confirm this fact in order to prevent misinterpretation.
- In addition, the wattage of the incandescent lamps replaced was much lower than the program design assumption of 75W. Around 18% opted to use the CFLs for new fittings and their impacts were based on the assumption that alternatively they would have used incandescent lamps.
- The EVN marketing strategies were proved to be effective with EVN Notices ant 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. The lamp failures mostly occurred within 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.
- The average bill savings for consumers was estimated to be 15.2%.

MARKET EVALUATION

The market evaluation focused on determining the impact of the EVN CFL program on the transformation of the CFL market in Vietnam. In the Phase 1 evaluation the market effects were determined from surveys of key market participants (manufacturers, distributors and retailers). In the Phase 2 evaluation, detailed CFL sales in formation were gathered from two major retailers and also the import-export data during the period 2003 – 2006.

The summary data of CFL imports and exports during the period 2003 to 2006 is given in Table below

Item	2003	2004	2005	2006
Import	4,433,213	9,447,391	1,259,557	1,806,474
Export	6,978,807	17,017,458	4,439,669	308,910
Total	11,412,020	26,464,849	5,699,226	2,115,384

The inferences from the above figures are:

- There has been a rapid decrease in the no: of CFLs exported since 2005, indicating that a significantly higher domestic demand since the introduction of the EVN program in 2005.
- The decrease in import numbers since 2005 could be attributed to the fact that the local manufacturers have increased their production and customer preference for local products.

A summary of the estimated system benefits based on sales information provided by leading local CFL manufacturers is given in the Table below.

	Unit	*Lamp Types*				*Total*
Type of Replaced Lamp	In / 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*	*2,016,956*	*1,722,003*	*1,504,030*	*6,125,209*
Peak Savings – System Level	MW	*16.2*	*63.9*	*64.6*	*75.2*	*219.80*
Total Energy Savings	GWh/yr	*34.8*	*125.6*	*131.4*	*153.0*	*444.70*
Total Lifetime Savings	GWh	*184.4*	*666.3*	*696.5*	*811.2*	*2,358.40*

The key findings of the market evaluation are summarised below:

- All suppliers have experienced a significant increase in sales in 2005 and the trends in 2006 are even higher.
- Rang Dong have experienced a growth of around 150% since the introduction of the EVN Program in 2005 and expects an annual growth of around 50% in 2007.
- Philips have experience a growth of around 80% since the introduction of the EVN Program and expects this trend to continue in 2007.
- All have attributed the overall increase in awareness of CFL as a contributory factor in the increased sales.
- There is strong evidence that the EVN program has had an impact in stimulating the CFL market in Vietnam. Experience in other countries (India and Sri Lanka) have shown that utility endorsement in a technology provides the confidence for consumers to adopt that technology.
- The significant increase in CFL sales immediately after the launch of the Phase 1 EVN CFL program is an indication of widespread adoption in the use of CFLs.
- The Table above shows a technical potential of around 220 MW from the sales of two major suppliers. It is difficult to predict the actual demand impacts on the EVN system.
- Increase in awareness of CFLs in the rural sector and a promotional campaign in the urban sectors are seen as options for maintaining the high growth in CFL sales.

- There is strong evidence that the EVN Program stimulated the market that has resulted in substantial increase in sales.
- The significant increase in CFL sales ranging from 80% to 150% during the first year of the EVN program indicates that the program had a significant impact in the growth of the use of CFLs in Vietnam.
- The results of EVN Phase 1 and Phase 2 program show that only a small percentage of eligible households participated in the program. The overall participation is around 10%.
- Following the completion of Phase 2, the awareness of the benefits of CFLs will increase significantly nation-wide and as a consequence a substantial increase in market penetration is expected in the coming years.

PROGRAM REFINEMENTS

Considering that the EVN CFL Program has been completed and there are no plans for extension of this program, it is expected that market transformation will take place via the private sector. This section outlines some refinements should EVN decide to implement a similar program in the future.

PROGRAM MARKETING

Overall the marketing 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

PRODUCT RANGE

The Phase 1and 2 program procured 20W CFLs which is 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.

PRODUCT QUALITY

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.

One way to address this is to introduce minimum technical standards for CFLs that are imported and manufactured locally. Product testing was included in the activities of the Phase 1 program but this need to be expanded and a regulatory framework set in place. This could be included as a part of the appliance standards and labelling program currently undertaken by the Ministry of Industry.

PROGRAM PROMOTION

There is strong evidence that the awareness level of CFLs is high in Vietnam especially since the launch of the EVN program. The Phase 1 (and Phase 2) involves the distribution of CFLs via EVN's regional offices – RPC, PPC and DPC. This approach was considered appropriate to initiate the program and it is envisaged that the time is right for a market driven program with endorsement from EVN. This will ensure that a competitive market will be established with quality products. There are several international examples of similar programs which EVN could consider for the future.

4 THIN FLUORESCENT TUBE LAMP (FTL) PROGRAM

The residential sector accounts for 60% of Vietnam's electricity use. Lighting accounts for 19.2% of residential electricity consumption – with 14.8% for florescent lighting, 4.3% for incandescent lighting, and 1% for compact fluorescent lamps.

The current national market for FTLs is approximately 40 million laps per year, and this is expected to increase by 10% per year, to about 45 million laps per year. At present, approximately 90% of FTL sales are of the T10 lamps ("fat FTLs"); and approximately 10% of sales are of the "thin FTLs" which consume 10% less energy (36 vs. 40 watts for 1200 mm lamps; and 18 vs 20 watts for 600 mm lamps). While thin FTLs have the same lumen output and retail price as conventional lamps, their sales are lower due to several barriers:

- Customers lack of knowledge about thin FTLs;
- Thin FTLs don not work at low voltages (below 170V), and this limits their successful application in some rural areas where the power quality is poor.
- Suppliers don not actively promote thin FTLs.

4.1 Review of Action Plan

During the Phase 1 DSM program, a pilot program was implemented to promote thin (T8) FTLs in Thanh Xuan District in Hanoi. After the pilot program, the share of thin-FTLs increased from around 7-9% to 27-31% of FTLs sold in that district. EVN expects that it can build on this success and launch a nationwide program to promote thin FTLs.

The lessons learned during the Phase 1 pilot prom is summarized as follows:

- If customers are provided information about thin FTLs, they will often select them instead of fat FTLs.
- Salespersons exert a large influence on the customers. However, these salespersons lack the capability and training to market thin FTLs to customers.
- There are a limited number of approaches currently being used to market and promote FTLs to customers.

The objectives of FTL program listed in action plan are as follows:

Overall Objective:

- Spur a market transformation from "fat tube" T 10 lamps (20 and 40 W) to "thin tube" T8 lamps (18 W and 36 W) in urban areas, while also increasing the share of energy-efficient, "low-loss" ballasts.

Specific Objectives:

- Develop enhance capacity among supplier marketing personnel to develop effective advertising and promotion materials and campaigns for Thin FTL and low-loss ballasts.
- Develop enhanced awareness and capacity among lighting specifiers to specify high-efficiency lighting for new construction projects in the government and private sectors.
- Develop a successful, high-profile demonstration project for high-efficiency lighting in at schools and around the country.
- Develop successful and exciting advertising and promotion campaign to support increased sales of thin FTLs and low-loss ballasts.

EVN will work with both Vietnamese manufacturers and distributors to promote the increased sales and purchase of thin-tube FTLs, compared to conventional FTLs. EVN will develop agreements with suppliers to co-fund advertising, promotion, and training activities. EVN will have three packages:

- Supplier Advertising, Promotion and Training
- School Lighting Demonstration Program
- Testing an Certification of FTLs and Ballasts

The program was expected to increase the purchase of thin (T8) FTL s by 6 million FTLs within the period (2005-2007), with peak saving of 14.4 MW; and energy saving of 25.2 GWh/year.

The main steps outlined to implement the program are as follows:

Step 1: Develop Implementation Plan

Step 2: Procure consulting services

Step 3: Design and Implement Thin FTL program.

4.2 Review of FTL Implementation Plan

The implantation plan outlines the program design. EVN will work with suppliers of FTL to promote the increased sales and purchase of thin-tube FTLs, compared to conventional FTLs. The program will also promote certifications and increased sales of low-loss magnetic ballasts, which typically have losses of 6 watts, compared to losses for ballasts in the market as high as ~12-15 watts.

The FTL program consist of six main steps:

Step 1: Set quality and EE levels for FTLs and low-loss ballasts

Step 2: Registration, Labelling, and Testing of Thin FTLs and Low-loss Ballasts

Step 3: Develop and implement advertising and promotion campaigns and training

Step 4: School Lighting Demonstration Program

Step 5: Ongoing monitoring of supplier sales data

Step 6: Final program evaluation by EVN's M&E consultant

4.3 Mid-Term Review

This section provides extracts from the Mid-Term Review, in relation to the FTL Program, conducted by the World Bank in December 2006

PROGRAM ACTIVITIES

The program design was finalized by EVN over a year ago and consists of the following elements:

- a demonstration program in 400 classrooms to install efficient luminaires, thin tube FTLs, and efficient ballasts;
- testing of efficient ballasts;
- development of marketing, promotion and training materials;
- production of marketing, promotion and training materials; and
- TV advertising and promotion.

Unfortunately there has been very little progress with respect to the implementation of this program. EVN is planning to work with Vietnamese FTL manufacturers and distributors to promote the increased sales and purchase of thin-tube FTLs, compared to fat FTLs. EVN will develop agreements with suppliers to co-

fund advertising, promotion, and training activities. EVN has identified three specific sub-projects but there have been substantial delays in the implementation of all of these. These delays have resulted mainly from the lack of dedicated staff assigned by EVN to this program and inadequate capacity to address procurement issues related to complying with World Bank procurement rules and procedures. Progress with each of the major sub-projects is summarized below

SCHOOL DEMONSTRATION SUB-PROJECT

This will be a turn-key package. The consultant will design and implement a program to retrofit 400 classrooms around the country with energy-efficient lighting systems. The objective of the demonstration program will be to install efficient luminaires; thin-tube tri-phosphor FTLs; and high-efficiency ballasts and implement a promotion campaign on school energy-efficient lighting nationwide.

The procurement issues with respect to the school demonstration project have now been resolved and the procurement of the Consultant for this project is expected to be initiated by the end of May 2006 by EVN.

MARKETING AND PROMOTION

EVN, in cooperation with FTL manufacturers, will design and implement cooperative advertising and marketing campaigns and training. This sub-project includes the design and production of marketing and training materials. EVN has combined services and goods into a single package, leading to some complexities in the procurement process. EVN has now prepared the procurement package and is awaiting World Bank approval of this package.

TESTING AND CERTIFICATION OF FTLS AND BALLASTS

This activity is proposed to be cancelled as it will be carried out within the pilot labeling program implemented by MoI.

ESTIMATED PROGRAM BENEFITS

The FTL program is expected to increase the purchase of thin (T8) FTLs over the period (2005-2007). The estimated program impacts are:

ITEM	VALUE
Increase in No. of Thin FTL	6 million
Peak Load Savings	14.4 MW
Energy Savings	25.2 GWH/year

FUTURE ACTIVITIES

The anticipated future activities are:

1. The RFP for the School Demonstration Sub-project is expected to be issued by the end of May 2006, and the demonstration is expected to be initiated by November 2006.

2. The marketing and promotion consultant is expected to be selected by October 2006, and the marketing and promotion program initiated by January 2007.

KEY PROJECT ACCOMPLISHMENTS

In view of the substantial delays encountered in project implementation, there have been no major project accomplishments except for the design of the School Demonstration.

RECOMMENDATIONS

The major recommendations are:

1. Initiate the School Demonstration Sub-Project as soon as possible

2. Resolve any remaining issues with the procurement package for the marketing and promotion consultant, and initiate the procurement so as to select the consultant soon. Initiate the marketing and promotion campaign by no later than January 2007.

ACTION ITEMS

The Action Items are summarized in the Table below:

ACTION ITEMS - FTL PROGRAM

Major Program Activities	*Summary of Progress*	*Comments*	*Action Items*
FTL promotion campaign	Very slow progress	Delays related to structuring of procurement package; RFP package has been sent for WB approval	Procurement decision needs to be made ASAP. Obtain WB approval and send RFP
School FTL demonstration program	Very slow progress	Delays due to combining various project elements in proc. package	RFP to be issued by end of May 2006
FTL testing and certification	Not yet initiated	Activity is cancelled	

4.4 Results of Program Evaluation

Evaluation of FTL program included a review of the deliverables submitted by the consultant to determine whether the requirements set in the Terms of Reference are met. There are six procurement packages under the FTL Program and two of them were covered in the monitoring and evaluation, namely: Package 4A and Package 4C.

- Package 4A is the Design of Advertising and Promotion for FTL/Ballasts and was procured by EVN from Pham & Partners. The task was to design, produce, and implement an advertising and promotion campaign for EVN to spur a national market transformation from fat FTLs to thin FTLs, with an initial focus on urban areas. The campaign was also geared towards increasing the share of energy efficient, "low-loss" ballasts.

- Package 4C is the School Lighting Demonstration Program and was sub-contracted by EVN to Rang Dong Light Source and Vacuum Flask Joint Stock Company. The sub-contractor was to provide the services to retrofit about 405 classrooms in schools nationwide. Specifically, the

objective of the demonstration program was to install efficient luminaries, thin-tube tri-phosphor FTLs and high efficiency ballasts.

DESIGN OF ADVERTISING AND PROMOTION FOR FTL/BALLASTS (PACKAGE 4A)

The primary objectives of this subcontract are:

- To conduct and present a review of international experience with promotion and marketing of FTL/ballasts (Task 1)
- To carry out market and consumer surveys of FTL/ballast producers and suppliers while also getting feedback on consumer acceptance of thin FTLs and energy-efficient ballasts (Task 2)
- To provide the results of the market and consumer survey to EVN and the PCs for review and approval (Task 2)
- To develop designs, produce promotional materials, and implement a marketing and promotion campaign for the overall FTL/ballast program (Task 3, 4, 5, 6)
- To develop and implement several public actions as part of a Social Marketing Campaign to support the overall Phase 2 DSM effort, and in particular the FTL/ballast program (Task 7)

Table **4.1** provides a summary of the review findings.

Table 4.1: Summary of Review Findings

Task	Accomplishments	Needed Improvements
Task 1	Task 1 appears to have met the requirements set in the Terms of Reference. The consultant's review of experience in Vietnam and FTL implementation barriers adequately covers the requirements. The limitations though are reasonable given the limited actual information available in the sector.	The given recommendations lack sufficient basis given that the review of international experience seems to have: o Focused only on FTL and Ballast Program Strategy in general and have missed the key specific requirement of this task which is promotion and marketing approaches. There was also no discussion as to how Vietnam can translate the lessons learned to actual promotional strategies and practices. o Concluded that the programs in Thailand and Sri Lanka provide valuable lessons for the EVN FTL Program. The reason cited is the similarity of the socio-economic and cultural backgrounds of the 2 countries with Vietnam. There is, however, no further discussion as to which particular aspect of the Thailand and Sri Lanka programs is suitable or not for Vietnam and why. There is no comprehensive discussion comparing and contrasting the circumstances of the 2 countries to Vietnam. For example, the consultant did not elaborate whether Vietnam should emulate Thailand and Sri Lanka's strategy of forging voluntary agreements with FTL suppliers to change production from T12 to T8. The consultant also did not discuss

Task	Accomplishments	Needed Improvements
		which promotional campaign practices are applicable to the Vietnam market. o covered only the promotion strategies of government utilities. Thus, the review seems to be limited in scope. Only general country program strategies were mentioned but specific marketing and promotion activities of manufacturers and suppliers were missed.
Task 2	Task 2 requires the consultant to carry out a supplier and consumer survey. IIEC finds the surveys comprehensive and substantial. Two FGDs were conducted in the cities of Ha Noi, Ho Chi Minh, and Da Nang. Respondents from the supplier and consumer sides are clearly defined thus the surveys yield the expected results.	There was just one requirement of the task which appears to have been omitted by the consultant, and that is: o There was no review of government procedures for procuring lighting equipment and no assessment of the potential for using government agencies as an important lead "purchaser" for thin FTLs and ballasts
Task 3	The expected output from this Task is a written strategy recommending the number of various media and materials to be developed, and the timing and distribution of these materials. Prior to developing a marketing and promotion strategy for 2007, the consultant reviewed the marketing activities in 2006. The consultant also reviewed the FTL/ballast resulting from the surveys undertaken in Task 2. The marketing and promotion strategy being developed focused on meeting the needs of: o Consumers – To inform them on the benefits of using thin FTL and encouraging them to change to FTL o Distributors, retailers and lighting experts – To switch production or merchandising to FTL The consultants categorized the target audience into 2 groups: residential and commercial. This is a sound strategy so that specific campaigns could be appropriately launched to each target group. They also had identified key stakeholders in the program such as: the 5 FTL brands, its distribution networks, and the lighting experts. The 5 FTL brands and its distribution network are seen as conduits in launching a campaign for residential consumers. On the other hand, the lighting experts are seen as allies	IIEC's minor comments are on: o Brochures and Leaflets – These media need to specifically addressed the financial aspects of FTL/ballast, i.e. how much VND can be saved per month, how long initial FTL cost can be recouped, etc. o TV Talk Shows and Game Shows – The timeline is too short and it does not give the assurance that a wide range of audience is reached. TV Talk Shows and Game Shows cater only to a certain customer segment and unlike TV advertisements, these are shown on one occasion only. TV advertisements offer repeated message to potential consumers at any time of the day. Workshop and Training – Simply capacitating experts, retailers and salespersons does not give the assurance that these people promote FTLs to their clientele. An incentive system built within the FTL/ballast market will address this gap.

Task	Accomplishments	Needed Improvements
	in transforming the commercial consumers. Furthermore, consultants focused on 3 main cities in Vietnam which is Ha Noi, Ho Chi Minh, and Da Nang. The cities were chosen due to their stable voltage supply wherein FTL/ballast perform well. Overall, Task 3 appears to be adequately addressed. The range of marketing activities recommended by the consultant is comprehensive.	
Task 4	Task 4 assigns the consultant the responsibility for the theme and message of the campaign, the detailed marketing language, and the detailed design and specification of all marketing materials for the program. Overall, the consultant came up with very detailed FTL/Ballast Marketing Plan and Materials which have been widely distributed at 3 cities in Vietnam. Most of the printed materials were distributed to outlets at the streets. Direct contact and bandwagon effects created a strong influence on the purchasing behaviour of consumers towards thin FTL.	Requirements set in the Terms of Reference are met.
Task 5	Task 5 requires the consultant to produce and procure the FTL advertising and promotional materials designed in Task 4. A successful advertising and promotion campaign that run from October to December 2007 indicate that the promotional and marketing materials described above were procured as specified.	Requirements set in the Terms of Reference are met.
Task 6	The consultant is expected to design and implement marketing workshops for 2 target groups namely manufacturers and distributors. 2 Training curriculum modules were designed, one for lighting specifiers and one for FTL distributors, namely: o **Lighting Specifiers Workshop** *concentrated on the technological aspects* o **FTL Distributors Workshop** *focused on the commercial aspects*	Workshops were to be delivered separately for lighting specifiers and FTL distributors in each city such as Hanoi, Ho Chi Minh, and Da Nang. This only happened in Hanoi. In Ho Chi Minh and Da Nang, there was only 1 workshop organized for both lighting specifiers and distributors. The reason given by the consultants is the difficulty in organizing 2 separate workshops in these cities given that not too many of the target participants pay attention to energy efficiency. Cutting the workshop into 4 instead of 6 (2 for each city of Hanoi, HCM, and Da Nang), however, did not affect the overall target of training 150 participants. Overall, a total of 248 participants attended.
Task 7	The consultant is tasked to design a Social Marketing Campaign to promote the benefits of thin FTLs and	Requirements set in the Terms of Reference are met.

Task	Accomplishments	Needed Improvements
	ballasts. 3 road-shows were organized in big supermarkets/commercial centres of Hanoi, Ho Chi Minh, and Da Nang. The road-shows which were supported by 4 FTL suppliers attracted thousands of consumers. A huge number of promotional materials were also delivered in these road-shows. Through interaction with Program Ambassador Chi Trung, the slogan "Thin better than Fat" becomes widely understood among consumers.	

SCHOOL LIGHTING DEMONSTRATION PROJECT (PACKAGE 4C)

The primary objectives of this subcontract are:

- To design and implement high-efficiency and high quality lighting systems in 405 classrooms nationwide
- To document the costs, savings, and user impact from the retrofits
- To develop case studies and promotional materials and carry out promotional campaign highlighting the benefits of the project
- To deliver promotional seminars to education officials and schools nationwide

Overall, the project met the target of installing an efficient classroom lighting model that ensures the comfort of pupils and teacher's vision and uses energy efficient equipments. It has been highly appreciated by beneficiaries (schools), local authorities (Education Department, Industry Department, etc.) and has widespread influence.

A summary of review findings is given in Table 4.2.

Table 4.2: Summary of Review Findings

Task	Accomplishments	Needed Improvements
Task 1	Overall, the review of existing school lighting programs is thorough. The review covers the current status of artificial lighting of: a) 15 schools (from among the 135 schools selected for the Project) and b) 9 schools (upgraded under other projects sponsored by foreign or Vietnamese agencies). Each of the 9 schools referred above were reviewed and as they were existing retrofit projects, their strong and weak points were identified. The findings were as follows: o the illuminance on the desktop and board is higher but still does not meet the Vietnam Standard. o the schools awareness on efficient lighting equipment is low Findings on the review of the 15 schools are enumerated as follows:	The review on the 15 schools was considered to be comprehensive and have covered all the necessary aspects. On the other hand, the review on the 9 schools appears to be thorough, however 2 key points required in the Terms of Reference were apparently missed: o Retrofit costs o Estimated savings The review findings on the 21 schools above were strongly considered by the consultants in coming up with a proposed lighting model for the

	o Most surveyed classrooms do not meet the quantitative and qualitative lighting criteria as per Vietnam Standard o Majority of the classrooms use T10 – 40W fluorescent lamps o Most schools do not use fixture o Board lighting is bad	project.
Task 2	The Detailed Implementation Plan is prepared in Vietnamese language and there is no English translation provided. Hence, we are unable to render our evaluation on this task.	
Task 3.1	A standard retrofit package is developed and designed. A detailed dossier of artificial lighting design for classrooms has been developed by the consultant which describes: o the required illuminance o the light sources o type of fixture o height of luminaries o number of lamps and lighting power o arrangement of luminaires	From a technical point of view, the standard retrofit package is satisfactory except that it did not include one of the key requirements which is: o Detailed budget associated and installation cost
Task 3.2	Lighting equipments installed as specified in the plan.	---
Task 3.3	An impact assessment has been conducted which finds lighting at schools considerably improved in terms of: o Illuminance o Uniformity o Glare o Colour quality o Shade The impact assessment has also included power consumption evaluation before and after the lighting system upgrade. Power consumption has increased in spite of the use of energy efficient lighting equipments. The reason cited is that the newly installed lighting system used more equipment to achieve better lighting quality.	While the impact assessment appears to have covered the key technical aspects, it has missed 2 other requirements in the Terms of Reference such as: o Range of retrofit cost and average retrofit cost for the 405 classrooms o Total costs and total savings While there were no savings but increased energy consumption as a result of the project, the consultant should have provided an estimate of the electricity cost increase in VND.
Task 3.4	User survey has been conducted where 3,374 questionnaires were distributed for pupils and 405 questionnaires for teachers. The survey covered:	User survey conducted is substantial and has fully complied with the Terms of Reference.

	o Pupil's evaluation of the lighting system before and after the upgrading o Teacher's evaluation of the lighting system before and after the upgrading o Comparison of the vision on board and on desktop before and after the upgrading o Eye fatigue feeling after each session before and after the upgrading	
Task 3.5	Requirements of the TOR have been fully achieved as indicated by the conduct of the following: o A4 fliers and A3 posters were designed to provide the community with brief project information, status of lighting at schools, standard lighting models, and the standard lighting equipment. o A User's Manual for the application of energy efficient lighting model at schools has been developed o A Documentary Film has been developed o Seminar programs have been conducted in 27 provinces and cities with participants coming from different sectors	Program promotion and school awareness campaign is comprehensive and has fully met the requirements of the Terms of Reference.
Task 4	As per our review, a summary report was prepared by the consultants summarizing the project and evaluation results. o A 1-day seminar-workshop has also been held in Hanoi to wrap-up the project and attended by different stakeholders	

4.5 Section Summary

Review of the deliverables for the Development and Implementation of Advertising and Promotion Campaign (Package 4A) and School Lighting Demonstration Project (Package 4C) suggests that the targets set in the Terms of Reference are achieved.

All the major tasks under the **Advertising and Promotion Campaign** were generally met, namely:

- Review of International Experience
- Market and Consumer Surveys
- Marketing Strategy
- Detailed Marketing and Promotion Design
- Procurement and Implementation of Marketing Activities
- Social Marketing Campaign

The comments made on each task are minor and did not affect the end result of the procurement package which is to successfully launch an advertising and promotional campaign fro thin FTL and

electronic ballasts. Results from each of the marketing activity detailed above indicate that the campaign invoked a 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.

All major tasks under the **School Lighting Demonstration Project** were also met. The minor comments made on the review of lighting programs and on the program implementation itself did not affect the overall achievement of the targets. The School Lighting Demonstration Project has:

- Designed and installed energy efficient lighting system for 405 classrooms at 135 schools in 127 provinces and cities nationwide
- Designed propaganda documents and videos for broadcast on radio and television stations
- Organized 28 seminars and promoted the program to education officers in 28 provinces and cities nationwide

5 LOAD RESEARCH PROGRAM

During the Phase 1 DSM Project, EVN and consultants carried out a number of Load Research activities, including design of sampling methodology; training for staff in the DSM Cell in load research sample design, management of load data, and load profile analysis; selection of a "judgmental" load research sample of 147 large TOU customers; collection of one year of interval data for this group of customers; indicate load profile analysis; and preparation of a long-term strategy for expanding EVN's load research capabilities.

This Load Research work was expanded during the Phase 2 DSM Project. The Load Research activities are essential to the DSM effort, as they will help EVN to understand characteristics of customer demand and to better target and plan its DSM activities. The activities are comprehensive and include gathering, collecting, storing and analyzing millions of pieces of data. The Load Research activities will also assist the DSM Cell and EVN managers in DSM program design, forecasting, load management, planning, and evaluation.

5.1 Review of Action Plan

DSM action plan lists following objectives for Load Research Activities:

- Develop a load research methodology and step-by-step implementation plan;
- Collect and analyze load data at the facility and end-use4 level.
- Use this data to understand load growth and to guide the design of future DSM programs.

The main steps to implement the program are as follows:

Step 1: Define load research objectives and plan

Step 2: Procure load research hardware and software

Step 3: Select sample for facility-level load research

Step 4: Develop load data analysis plan

Step 5: Carry out facility-level load research

Step 6: Develop and implement pilot end-use load research plan

Step 7: Develop long term strategy for load research activities

Step 8: Load research workshop

5.2 Review of Load Research Plan

Load Research Plan gives further details of steps to achieve objectives of Load Research activities. The objectives of Load Research Plan is as follows

- Present and appropriate load research (LR) methodology for EVN to organize its LR activities with nine power companies (PCs), focusing on collection and analysis of actual customer statistics; IT options; and need to understand the very fast growth in consumption and peak demand.
- Present a plan for step-by-step implementation of data retrieval; analyses of different kinds of data; and organization of the activities and training.

- Ensure that the retrieval of load data includes a representative sample of customers at both the facility and end-use levels, to support the design of cost-effective DSM activities.
- Recommend the LR include systematic analysis of data on quarterly or monthly basis, in order to track trend in load growth both at national level and sector level and for the most fast growing sub-sectors.
- Outline a load database that will form the basis for forecasting as well as assistance in design, planning and evaluation of DSM activities and Demand Response programs.

5.3 Review of and Integrated Load Research Approach for Vietnam

The Load Research Plan provided a road map for Phase 2 load research activities. This report builds on the Load Research Plan by presenting an integrated Load Research Approach for EVN and Vietnam that includes the following:

- Load research sample design
- Selection of customers for the samples
- Plan for end-use recording
- Plan for load data analysis

5.4 Mid-Term Review

This section provides extracts from the Mid-Term Review, in relation to the Load Research Program, conducted by the World Bank in December 2006

PROGRAM ACTIVITIES

The Load Research program is the most important of the "supporting programs" in the EVN Phase 2 DSM project. While some progress has been made on the definition of the load research objectives and plan and selection of the load research sample, in general the progress on this important program has been extremely slow. The most important reason for this is the inadequate staffing in the DSM Cell for the LR function. It was recommended in previous Missions that one or more dedicated staff be assigned for load research. Additional issues causing delays have included the following:

- Technical difficulties in retrieving data form the three different types of modems installed by EVN (ABB, Landis and Gyr, and Genesis)
- EVN's difficulties in complying with World Bank procedures related to the procurement of modems for the three types of meters
- Procurement issues with obtaining software that is capable of retrieving and analyzing data from all 3 meter types
- Delays in the development of the load research sample due to data issues.

The above issues (except for the inadequate staffing) have now been resolved and EVN is now ready to procure the modems and the software for load research.

Another component of load research is the end-use metering pilot program. The TA Consultant has provided EVN information on alternative end-use LR approaches and equipment. EVN is working with the TA Consultant to identify the best approach for end-use LR in Vietnam, and will request the Consultant to develop the technical specifications for procuring the end-use LR equipment and related software and training.

The TA Consultant has also developed a data analysis plan, which recommends collecting data from about 1000 customers for analysis. The data analysis will require dedicated staff and the current DSM Cell staff capacity is inadequate to effectively perform data collection, analysis and reporting.

ESTIMATED PROGRAM BENEFITS

Effective load research can develop and provide useful data for a wide range of utility functions including:

- DSM program design
- DSM program evaluation
- Load forecasting
- Tariff design
- System planning
- Transmission and distribution planning
- Profitability analysis of customer groups and specific customers.

FUTURE ACTIVITIES

The major activities anticipated in the near future are:

Load Research Hardware

Issue bidding document and procure modems

Load Research Software

Prepare and issue bidding document for software that will be capable of retrieving and analyzing data from all 3 meter types

Development of Load Data Analysis Plan

The Load data Analysis Plan will cover both facility-level and end-use load research. This Plan will clearly state the load data analysis priorities and provide a schedule for conducting analysis and preparing reports. The plan should identify how to construct the load data analysis and load profile – starting from the customer level, PC level, regional level, and EVN level.

Conduct Facility-level Load Research

This activity involves the installation and testing of modems and data collection software on the large and other customers that will be selected as the representative load research sample. Once the meters are working properly, EVN and the PCs will develop a regular routine of data collection, quality control, tracking, and analysis.

Develop and Implement Pilot End-Use Load Research Plan

Identify the major end uses that are likely to be the target of DSM activities during Phase 2. These end uses will be recorded and analyzed. They may include domestic lighting, commercial lighting, air conditioning, domestic refrigeration, and industrial processes.

Identify any existing end-use load shape data, the need for collecting data on specific end uses, and the best potential use of the 100 end-use load research meters to be procured in Phase 2.

Develop long-term strategy for load research activities

Development of a long-term strategy for load research based on the insights and lessons learned from the facility-level and end-use load research. The strategy will be used by EVN to guide its future investments in load research and analysis

KEY PROJECT ACCOMPLISHMENTS

The key project accomplishments to date are:

- Development of the load research objectives and plan
- Selection of the load research sample
- Solving the technical difficulties in retrieving the data from the three different types of meters
- Addressing procurement issues related to software procurement for data collection and analysis

RECOMMENDATIONS

The major recommendations are:

- EVN should proceed as rapidly as possible with the procurement of the modems and the software
- EVN should work with the TA Consultant to design the end use LR program and move forward with the procurement of end use LR equipment by June 2006.
- EVN should consider expanding the capacity of the load research function by adding dedicated staff for load research.
- EVN should plan to start the analysis of the data as soon as some initial data is received so that at least a preliminary report can be completed before the end of the Program in December 2007.

ACTION ITEMS

The Action Items are summarized in the Table below:

ACTION ITEMS – Load Research

Major Program Activities	*Summary of Progress*	*Comments*	*Action Items & Recommendations*
Sample design	Very slow progress	Encountered problems in customer data collection and analysis; now resolved	Select final sample for LR; install meters as needed where customers do not have them
Modem procurement	Very slow progress	Technical difficulties in data communications from meters; now resolved	Initiate modem procurement by June 2006
Software procurement	Very slow progress	Procurement issues led to significant delays; now resolved	Initiate RFP for software procurement by June 2006
End-Use meter procurement	No progress	Design of end-use LR plan completed by TA Consultant	Initiate procurement of end-use meters
Data analysis plan	Completed	Training needs to be provided to staff	Expand staff and assign dedicated staff to LR

5.5 Program Monitoring and Evaluation

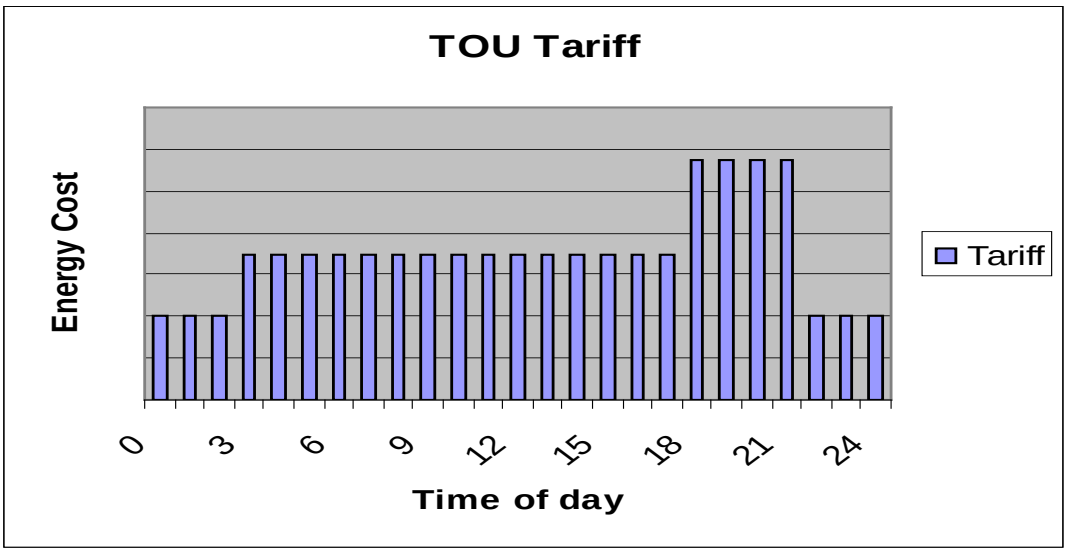
Evaluation of Load research program is pending due to delay in program implementation. Evaluation was subsequently cancelled at the request of EVN.

6 TIME-OF-USE (TOU) TARIFF PROGRAM

The TOU tariff was introduced by EVN in 1998 and at the end of 2004 there were a total of 45,000 TOU customers. The key objectives of the TOU tariff was to improve load factor of system for better and economical loading of generators, reduce investments in system expansion to meet system demand during peak times, reduce system losses at peak hours, improve system stability and provide an incentive for large customers to shift load.

The Program offered a three part tariff to large customers instead of the single tariff that was applicable prior to the program. The tariff categories were defined as:

- Peak: 1800 to 2200 hrs
- Off-peak: 400 to 1800 hrs
- Low: 2200 to 0400 hrs



6.1 Review of Action Plan

This program for the Phase 2 DSM effort was originally designed with the purpose of installing 5,600 TOU meters at new customers in the industrial, commercial, and agricultural sectors with transformers larger than 100 KVA. The objective of this program was to reduce needed peak capacity using a TOU tariff to encourage eligible (primarily large commercial and industrial) customers to shift some of their demand to off-peak and low-load hours. The projected impact of the TOU program is 69.7 peak MW peak demand reduction.

In line with a government Directive and Circular requiring implementation of a time-of-use (TOU) tariff, EVN in 2002 began to accelerate implementation of the TOU program. By end of May 2004, TOU meters had been installed at 40,713 customers. Eligible customers must have a average monthly electricity consumption of at least 5,000 kWh, or transformer sized larger than 50 kVA. For these customers, the PCs are responsible for purchasing and installing the TOU meters.

Given this situation (that EVN has already implemented a wide scale TOU program according to government policy), when the World Bank visited Vietnam in May 2004 to review the progress of Phase 2 DSM program, EVN and the World Bank agreed to develop a DSM program to replace the originally planned Phase 2 TOU Program.

The TOU Replacement Program is not an extension of the TOU program. Rather, it is a new, full-scale DSM program.

The proposed main steps to implement the program in action plan are as follows:

Step 1: Evaluate TOU impact

Step 2: Select replacement for the TOU program

Step 3: Procure equipment and services

Step 4: Prepare Implementation Plan and design marketing and promotion campaign

Step 5: Implement TOU Replacement Program

6.2 Review of TOU Implementation Plan

TOU implementation plan provided details of steps outlined in action plan to achieve objective of the program.

6.3 Mid-Term Review

This section provides extracts from the Mid-Term Review, in relation to the TOU Program, conducted by the World Bank in December 2006

PROGRAM ACTIVITIES

As indicated above, EVN has implemented the TOU metering using its own funds and there have been no program activities under the Phase 2 DSM Program.

EVN has procured and installed over 60,000 TOU meters. For customers required to use TOU meters, technical advice and support is provided by EVN, PCs, and the Energy Conservation Centers on the possible means to reduce peak period electricity costs through load shifting and/or load reduction.

ESTIMATED PROGRAM BENEFITS

Since it began the TOU program in 2002, EVN has not conducted any formal evaluations of the impacts of the TOU program.

An assessment of the effect of EVN's TOU tariff was conducted by the Phase 2 TA Consultant. The Consultant documented a number of difficulties in conducting such an assessment (including lack of good data, large changes in the composition of the loads, large increase in total number of customers and electricity consumption, and absence of any pre-metering prior to installation of the TOU meters). The assessment results were rather inconclusive, and the TA Consultant concluded that the savings from TOU tariffs were as low as 0 MW and as high as 90 MW, with an estimate of 45 MW as a reasonable figure.

FUTURE ACTIVITIES

While EVN, PCs, and the Energy Conservation Centers have offered technical advise to customers, it is unclear how effective such technical advice and support services have been and how many customers have taken advantage of such services. It will be very useful for the M&E Consultant to conduct an evaluation of the effectiveness of such assistance and to document case studies of successful load shifting in response to TOU tariffs.

RECOMMENDATIONS

The major recommendations are:

EVN should ask the M&E Consultant to review the TA Consultant's report on the assessment of the TOU Program impacts and conduct additional analysis, if appropriate

The M&E Consultant should conduct a survey of TOU customers to conduct an evaluation of the effectiveness of assistance provided by EVN and others, and to document case studies of successful load shifting in response to TOU tariffs.

ACTION ITEMS

The Action Items are summarized in the Table 6.1 below:

Table 6.1: ACTION ITEMS – TOU

Major Program Activities	*Summary of Progress*	*Comments*	*Action Items & Recommendations*
Meter procurement	Good progress by EVN (without using IDA funds)	EVN has installed 60,000 meters using its own funds; Does not plan to use IDA funds	EVN has requested change in procurement plan. WB to approve change in procurement plan
Assessment of TOU impacts	Completed by TA Consultant	Results were inconclusive; appropriate data not available	Need review and assessment of TA Consultant report as part of M&E project
Assistance to customers to reduce peak period consumption	Some progress	EVN, PCs and Energy Conservation Centers provide some customer assistance	Conduct evaluation of assistance provided to customers save peak loads and costs
Assessment of load shifting opportunities	No progress	The M&T (monitoring and targeting) approach may be useful	EVN should conduct a pilot M&T project for a selected group of TOU customers

6.4 Results of Program Evaluation

The scope of the program evaluation by IIEC included survey of selected customers who originally transferred from the old tariff to the new TOU tariff. This evaluation was qualitative in nature and the evaluation was based on the responses received from 37 customers. The program evaluation objective was to evaluate how consumers have responded to the TOU tariff and their satisfaction.

ANALYSIS OF SURVEY RESULTS

The survey was primarily aimed at determining the impacts of TOU Program on the customer side namely those customers whose demand has decreased, has remained the same, and has increased. Analysis of survey responses given by 37 TOU customers reveals that a total of 75% had shifted load at varying extents, the breakdown of which is shown in

Table 6.16.2.

Table 6.1: Customer Action Due to the Introduction of TOU Tariff

Customer Action Due to the Introduction of TOU Tariff	*Percentage*
A – Shifted load, to a significant extent	51%
B – Shifted load, but to a lesser extent	24%
C – Did not shift load	14%
D – Cannot be determined	11%
Total	100%

Most of the load shifters come from Tariff I category or the production or manufacturing firms. This can be attributed to the flexibility of most firms to alter their existing operations to respond to economic incentives in the TOU Program. A few of them comes from Tariff IX category or the services sector. Not too many load shifters come from this particular tariff category because of the inherent limitation of the service sector to modify and control their operations as they are mostly customer driven.

The customers who did not shift load were the ones who are constrained by current operations where load shifting was not an option. Some were service driven (e.g. water pumping stations, hotels, etc.) and hence, dependent on customer demands.

Around 62% of the customers indicated that they had benefited from the TOU Program. The majority of the customers who had not benefited were the ones who do not have the flexibility to shift operations to suit EVN's off-peak and low-peak periods.

Only a few customers have implemented any significant EE measures while the majority have implemented "good-housekeeping" measures. However, 65% of the customers indicated their intention to undertake EE investments in the future.

The surveys conducted were also aimed to verify the program logic and the market response to the TOU Program. The latter is gauged on customer satisfaction and customer reaction.

Program Logic

The surveys highlighted how TOU participants perceive the logic of the program. All respondents said they were given TOU information prior to implementation and all of them indicated that the information was easy to understand.

The strength of the program logic is also demonstrated on the cause-effect relationship of each respondent's evaluation of existing operations and the consequential lowering of their electric bills. Most respondents who evaluated their existing operations and adopted load shifting report lower energy usage in their electric bills. This confirms that the 3-tiered TOU Program consisting of peak, off-peak, and low

periods is viewed by most TOU customers as applicable to their operations.

Customer Satisfaction

Two-thirds of the customers reported satisfaction to the program while the rest are dissatisfied. Most of them view the immediate benefits in the form of reduced electric bills. Summary statistics on customer satisfaction are shown in Table 6.3.

Table 6.2: Customer Satisfaction

Satisfied	Number	%	Arbitrary Grouping			
			A	B	C	D
YES	23	62%	18	1		4
NO	13	35%	1	7	5	
Undetermined	1	3%		1		
TOTAL	37	100%				

A large number of these satisfied customers come from Group A. It is reasonable for Group A customers to be satisfied because their efforts, i.e. shifting load, paid off in lower electric bills. Furthermore, Group D customers are also satisfied because of their lower electric bills. However, as has been argued above, it cannot really be accurately said that this group of customers did actually shift load because their lower electric bills could just be a result of lower electricity consumption.

It is quite rational for Group C customers to be dissatisfied with the program. These customers reported higher electric bills because they were not able to shift load having no room in a fully stretched production operations. What makes this group even worse off is that they had actually evaluated their existing operations but it did not result to lower electric bills. They seem to bear the burden of paying high tariffs during peak periods, and their dissatisfaction could stem from the fact that they could not do anything to rationalize their current operations to suit to TOU.

Dissatisfaction from Group B customers could come from unmet expectations. While these customers reported to have shifted load (but to a lesser extent), they could be expecting that their efforts could result to lower electric bills that did not happen. These customers did not fully maximize the benefits of TOU because many of them did not evaluate their existing operations to suit to TOU.

While it is obvious that the immediate benefit of shifting load due to TOU is reduced electric bill, EVN customers have yet to realize that the TOU Program had indeed triggered process improvement in their production operations. As a result of the TOU, customers falling into *Tariff Category I – Production* rationalized their workforce and production schedule. The perception of these benefits needs to be understood as this would induce large customers seriously adopt long run EE measures.

Customer Reaction

The program urged many customers to evaluate their existing operations to suit to the TOU Program. The TOU Program is a success given that 73% of the survey respondents evaluated their existing operations for the TOU. This can be considered a success because the customers would not have evaluated their existing operations if there was no TOU program. On the first place, the TOU program made them aware

of potential load usage improvements. And not only that, these customers have also found TOU program beneficial.

In terms of instigating load shifting among customers, 19 (Group A and B) out of the 27 customers who evaluated their existing operations had actually shifted load. The different pricing tariffs under the TOU program provided the strong economic incentives to achieve this. However, the changes that customers did as a result of initial evaluation of their existing operation were more of "good housekeeping" type of measures.

It is also worth exploring why majority of Group B customers did not evaluate their existing operations to maximize the benefits of TOU. Further analysis on their survey responses reveal that these customers had fully stretched operations in which there is no flexibility to suit to TOU. Knowing these limitations, this customer group had actually tried different energy management strategies in response to the TOU program, but did not conduct formal evaluation of their existing operations.

Table 6.4 summarizes the customer reaction and the changes they made to their existing operations to suit to the TOU Program.

Table 6.3: Customers who Evaluated Existing Operation for the TOU Program

Has the Customer evaluated existing operations?	Group						Changes made
	A	B	C	D	Total	%	
YES	16	3	5	3	27	73%	• Work in off peak periods • Rationalize production operations • Proper scheduling of labor • Avoid high energy use during peak hours
NO	2	7		1	10	27%	
TOTAL					37	100%	

6.5 Section Summary

Since the survey focused on customer responses rather on EVN responses, a more meaningful indicator whether the TOU Program would result to the objectives of reduced investments in system expansion, reduced system losses at peak hours and improved system stability can be found in customers' responses as to whether they have intensions to make long-term changes in their existing operations. Long term changes in existing operations renders load shifting more permanent and this minimizes the need for future EVN investments due to system expansion, reduce peak time usage, reduce peak hour losses and system stability improvements.

Survey results (See

Table 6.4) show that 65% of customers intend to make long term changes. The remaining 35% of customers do not intend to make long term changes. The latter will have a significant impact on the overall objectives of the TOU program. The reason cited is that they cannot do much EE measures because production is driven by customer demand and beyond their control.

Table 6.4: Intentions to Make Changes in the Future

Has the Customer intended to make changes in the future?	Group					
	A	B	C	D	Total	%
YES	15	3	2	4	24	65%
NO	4	6	3		13	35%
TOTAL					37	100%

There is much impact that is anticipated from those customers who intend to make long-term changes. It is quite interesting that progress is made by customers in terms of intended long term EE measures. While most of the initial responses at the start of the TOU Program were simple low cost operational improvements, i.e. work scheduling or load shifting, long term EE measures involve installation or use of new EE technologies entailing huge capital investments. These measures will seriously address EVN's objective of reduced investments in system expansion, reduced system losses at peak hours and improved system stability.

Table 6.5 provides a summary of the long term EE measure that customers intend to make depending on their major end use applications.

Table 6.5: Long Term EE Measures

End-Use Applications	Long Term EE Measures	Industry
Motors & Drives, Process Equipments	• Acquire new motors and drives • Install capacitor to improve power factor, i.e. use frequency converter • Control operating conditions; i.e. not operate in no load conditions • Running high loads in off peak • Change in motor start up times • Rational scheduling of production and labor	Cement, chemicals, construction materials, steel, garments
Lighting	• Use of Compact Fluorescent Lamps • Use of other energy efficient lighting devices	Services, tourism, and business sector

7 DIRECT LOAD CONTROL

EVN in collaboration with PC HCMC and PC Hanoi, implemented a pilot direct load control (DLC) program using ripple control systems to curtail demand of about several thousand customer end-use loads (e.g., air conditioning and water heating systems) on a voluntary basis. The Hanoi pilot site has been installed: it has a transmitter at a 110 kV substation, and it will control 1,523 loads (receivers) located at 43 different customer sites with maximum peak reduction of 2.6 MW.

7.1 Review of Action Plan

The objective of Direct Lad Control Program is to provide targeted load control for urban buildings I areas with high demand and peak congestion, using DLC technology and "ripple control" of electric loads at customer facilities.

The projected impact of the DLC program at the end of 2006 is a 3.1 MW reduction in peak demand.

Initial results from the program indicate that the PCs in Hanoi and HCMC have not been able to sign up as many customers as targeted in their plan. EVN worked with the PCs to overcome this initial barrier and improve customer acceptance and uptake.

The expanded DLC program was planned to be implemented as part of the Phase 2 DSM effort. Under the plan, it was expected that the Ho Chi Minh Power Company will procure and install one DLC system in the 110 kV Cho Lon substation in Ho Chi Minh City. Based on the results of the results of the two DLC pilot programs (in Hanoi and Ho Chi Minh City), EVN and PCs would decide to expand the DLC program. This could involve expanding the number of receivers, or possibly purchasing a new central station and transmitter. In case EVN and the PCs decide to expand the number of receivers at one or both pilot programs, the implementation plan will be modified to reflect this.

EVN would provide incentives to customers who agree to the installation of load control equipment on certain end-use loads in their facilities. The customer agreement will specify limits on the timing and extent of the control. The DLC equipment will allow EVN to shut-off the equipment for up to a pre-specified maximum number of hours each year during system shortages and seasonal peaks. The equipment (central stations, receivers, communication systems) will be purchased with the associated IDA credit, and EVN will use its counterpart funds to pay for program administration and incentives for participating customers.

The main Steps to implement the program were as follows:

Step 1: Evaluate results 2 DLC pilot program

Step 2: Procure DLC equipment and marketing and promotion services

Step 3: Prepare Implementation Plan and design marketing campaign

Step 4: Implement, monitor, and evaluate DLC program

7.2 Mid-Term Review

This section provides extracts from the Mid-Term Review, in relation to the DLC Program, conducted by the World Bank in December 2006.

PROGRAM ACTIVITIES

Prior to the initiation of the Phase 2 DSM Program, EVN received a grant from the Swiss Government to purchase the equipment for two DLC systems. These two systems were installed in as pilot programs in Ho Chi Minh City and Hanoi. The Phase 2 DLC program was to build upon the results of these two pilots.

Unfortunately, there has been no progress with the two DLC pilot programs in PC Hanoi and PC HCMC, and EVN believes that there is a complete lack of customer interest in a DLC program because:

Customers initially targeted for the DLC program are now on the TOU tariff

Customer incentives were approved by MoF only for air conditioning equipment

The incentives were relatively low to be attractive enough for customers to allow their loads to be controlled

The two PCs have limited capacity to communicate and market the program to the customers.

EVN has therefore proposed to cancel the DLC program and has sent a formal notification to the World Bank to this effect.

ESTIMATED PROGRAM BENEFITS

Since the DLC program is being cancelled, there are no anticipated program benefits

FUTURE ACTIVITIES

None planned.

RECOMMENDATIONS

The major recommendation is that the Bank should agree with EVN to cancel the DLC program and make appropriate changes in the Project Agreement.

ACTION ITEMS

EVN is recommended to reallocate the fund to other activities.

7.3 Program Monitoring and Evaluation

No Monitoring and Evaluation of Program conducted due to cancellation of DLC program.

8 DSM SCREENING AND PILOT PROGRAM

This program screened and selected DSM options for implementation of two DSM pilot projects.

The objective of the program was to:

- Train EVN and the PCs in the use of Save-X DSM planning tool
- Screen and select 2-3 pilot programs
- Design and begin implementation of pilot programs
- Develop a framework for program screening for EVN's Long-Term DSM Plan

8.1 Review of Action Plan

Action Plan proposed to use Save-X planning model as a flexible tool for screening and assessing the cost effectiveness of DSM options to select DSM pilot projects.

The main steps to implement the program are as follows:

Step 1: Training in Save-X DSM planning model

Step 2: Selecting DSM pilot programs

Step 3: Design DSM pilot programs

Step 4: Procure equipment and implement DSM pilot programs

Step 5: Develop framework for screening programs for Long-Term DSM Plan

8.2 Review of DSM Screening Plan

As outlined in the Action Plan, Save –X was used to screen DSM pilot project. Based on the screening, the plan recommended EVN to pursue a two-pronged focus:

1. An initial emphasis on residential sector, focusing on measures that reduce evening peak demand.
2. A simultaneous building up of capacity to implement DSM in the industrial sector, which will have a greater influence on the coming noon-time peak demand.

Based on the result of the DSM screening, and the fact that EVN is already committed to implementing a large-scale CFL program, the following DSM measures were recommended for implementation during 2006 and early 2007 as EVN's new pilot programs:

- **Solar Water heaters:** Solar water heaters (as a back-up for electric water heaters) have highest single savings potential in the residential sector. While the transactions costs for the installation of each solar water heater are higher than for the purchased of household appliances such as refrigerators, electric fans, or air conditioners, there is a good opportunity for EVN and PCs to develop standard turn-key installations.
- **Energy audits:** Energy auditing is a critical DSM measure, since the industrial sector accounts for half of Vietnam's electricity consumption and in the future the industrial sector will be the main contributors to the noon-time system peak. In addition, the DSM potential in the industrial sector is quite large and significant savings can be achieved relatively easily.

8.3 Review of Implementation Plan for Pilot Program on Solar Water Heaters

This document presented an implementation plan for a pilot program on solar water heaters (SWH) to be implemented by the EVN under Vietnam's Phase 2 DSM Program. The SWH program is one of two pilot DSM programs that EVN will implement in the Phase 2 DSM Program, in addition to the two core DSM programs – compact fluorescent lamps (CFLs) and thin fluorescent tube lamps (FTLs).

In the DSM Screening Report from March 2006, which presented the findings of an assessment and prioritization of DSM measures for Vietnam, solar water heaters was identified as one of the single most appropriate measures and potential technologies to be promoted in the efforts of reducing overall peak demand in Vietnam – and especially in reducing the evening peak, where the electricity consumption for water heating is highest.

Furthermore, in April 2006 the Prime Minister of Vietnam issued a National Plan, which includes the approval of an Electricity Saving Program for the period of 2006 – 2010. In this program, Solar Water Heaters are also identified as one of the top priority measures to be pursued in connection with energy conservation efforts at the national level.

The National Plan specifically identifies one sub-component directly related to the promotion of solar water heating, namely "Popularization of solar heaters and use of alternative energy sources". To achieve this, the National Plan identifies the following activities:

An initial design session for the SWH program was carried out during the 2nd Baseline DSM Training Course at EVN in March 2006. Subsequently, Danish Energy Management (DEM) carried out an assessment mission in June 2006 and met with EVN, PC Hanoi, PC HCMC, and several suppliers of SWH systems in Hanoi and also Ho Chi Minh City. A draft Implementation Plan was presented to EVN during August 2006. This document incorporates comments received by EVN and The World Bank, and is the final draft of the Implementation Plan for the SWH pilot project.

PILOT PROGRAM OBJECTIVES

The objectives of pilot program are:

- to increase the general public's awareness of the benefits of SHW systems;
- to remove negative perceptions and myths about the difficulties of using SWH; and
- to document and demonstrate that an increased utilization of SWH systems can contribute to energy savings and to a general cut in the peak demand.

PROGRAM DESIGN

The proposed Pilot SWH Program involves promotional activities as well as close monitoring and evaluation of the installations and performance of approximately 100 systems in households in Hanoi (50), Danang (20) and Ho Chi Minh City (30). These main activities will be supported by a number of smaller tasks which outcome are supporting the main activities as well as serving as preparations for potential larger national initiatives and for generally maturing the SWH market in Vietnam. The pilot program consists of the following five main components:

Task No.	Activity / outcome
Task 1	Detailed Customer and Supplier Survey. The surveys will be designed to better understand barriers to widespread uptake of SWH systems.
Task 2	Selection of SWH Suppliers. Review of SHW system quality and selection of suppliers that can participate in the pilot installation activities
Task 3	Pilot Installations. (50 in North, 20 Central, 30 in South) The pilot installations should include financial incentives to reduce the initial capital costs of the SWH systems.
Task 4	Pre- and Post-Monitoring and Data Collection.
Task 5	Promotional Activities After Pilot Program. These activities will raise customer awareness of the availability and benefits of SWH systems and serve as the basis for a platform for expanded full-scale orogram in the future..

8.4 Mid-Term Review

This section provides extracts from the Mid-Term Review, in relation to the DSM Screening activity, conducted by the World Bank in December 2006.

ACTIVITIES TO DATE

The DSM screening activity has been completed. This activity used detailed survey data from a nationwide survey of 1,200 residential households. The survey assessed ownership, demand, usage, and time-of-use of different household appliances and lighting equipment. For the commercial and industrial sectors the study used information from energy audits, as these reveal the general technology level in the facilities. A number of industrial and commercial energy audits had been carried out during the Phase 1 DSM Program. These provided the basic information for the analyses.

The screening analysis was conducted using the Save-X planning model as a flexible tool for screening and assessing the cost effectiveness of DSM options. Save-X enables impact assessment of proposed activities and evaluates their economic viability prior to implementation. The tool will also be used for post evaluation of the programs implemented in order to verify the results achieved in terms of energy savings and benefit/cost ratios (BCR).

During 2005, the TAS Consultant provided training to EVN and the PCs in the use of the model, which is a DSM program impact assessment tool that has been used in Denmark since 1995 for DSM in the electricity sector. After training EVN and the PCs in the basic use and understanding of Save-X EVN, the Consultant selected a number of DSM measures for screening.

RESULTS OF MID-TERM REVIEW

The Save-X tool is an excellent tool for screening and analysis of DSM programs and should prove very useful to EVN as it moves forward with its DSM activities. The residential customer survey has led to the development of a good data base on residential appliance and end use characteristics. Unfortunately the information available for the commercial and industrial customers is not at the same level of detail. Nevertheless, the Consultant has been able to conduct a screening assessment of a wide range of DSM programs.

The Consultant screened about 13 DSM options and presented the results in terms of near-term residential measures and medium to long term commercial and industrial programs. The screening

process led to the identification of 3 DSM programs for consideration as pilot programs under the Phase 2 activities:

- Air conditioner testing, labeling and standards
- Use of energy advisors to identify energy efficiency measures in industrial and commercial establishments
- Use of solar water heaters to replace electric water heaters.

Detailed implementation plan for the pilot program to promote solar water heaters was prepared by the Consultant. However, EVN decided to cancel the pilot. The rationale was that a similar program is planed for MoI under the ESP.

RECOMMENDATIONS AND ACTION ITEMS

The MTR supported EVN decision to cancel the solar water heater program and proposed to reallocate the remaining fund of the DSM Phase 2 to MoI to execute this pilot and other programs consistent with ESP.

8.5 Program Evaluation

No Monitoring and Evaluation Conducted due to cancellation of the both Solar Heater and Energy Audit Program. During June-August, 2006, consultant designed audit program (renamed TOU Enhancement to focus on TOU customers and avoid overlap with MOI CEEP), which EVN decided to cancel in August 2006.

9 DSM TRAINING AND CAPACITY BUILDING ACTIVITIES

Training and capacity building is realized as an important part of DSM / EE project. Special emphasis has been put on by TA on development of the skills and capacity within EVN to effectively advocate for DSM as an important new business area within EVN.

The specific objectives of this program were as follows:

- Define the organizational structure, position descriptions, responsibilities, and skill requirement for DSM staff in EVN and the PCs.
- Develop the skills and capacity within EVN and the PCs to effectively analyze and screen DSM program options; to design, implement and monitor DSM programs; and to advocate for DSM as an important new business area within their organization.
- Develop work practices, procedures and training vehicles to equip DSM staff within EVN and the PCs to meet the specific implementation objectives of the Phase 2 programs as well as new programs for subsequent phases.
- Provide the DSM Cell and PCs with the necessary assistance and support to implement the Phase 2 program, such as marketing and promotion, public information campaigns, contract negotiations with customers and vendors, and equipment procurement.

9.1 Review of Action Plan

DSM action plan has recognized DSM institutional structure and needs analysis as a foundation for designing of trainings to meet objectives of DSM training and capacity building capacities.

The proposed steps to implement the program were as follows

Step 1: Institutional Strengthening and Organizational Development Plan

Step 2: Dedicated DSM training sessions and other assistance as needed

Step 3: Twinning study tour

9.2 Review of DSM Staffing and Training Plan

Withstanding DSM action plans recognition of structure and needs analysis as a foundation for designing of trainings and capacity building program, DSM Staffing and Training Plan laid the groundwork for enhancing EVN's capacity to achieve the targets of the Phase 2 DSM project. The plan focused on steps to build capacity in the areas of management strategy and human resource development. The plan covers three areas:

1. Need Assessment
2. Organization Structure Assessment
3. Recommendations for Enhancing DSM staff capacity

Following are the findings of background research conducted during planning phase:

1. Symptomatic Problem: Investigation indicated four factors contributing to delay in the program

a. Project organizational structure, management and communication
b. Staff: quantity, quality and attitude
c. Technology involved in each program: level of complexity
d. Supporting factors: such as campaign and marketing strategies, participation of local authorities, other government agencies, industrial and community sectors.

2. Structural Analysis: Investigations indicated following areas for improvement:
   a. Inter Organization Communication
   b. Internal monitoring
   c. Project management skills and other functional skills
   d. Procurement procedures

Based on these findings DSM Staffing and Training Plan made following recommendations

- EVN should add 2-3 DSM staff
- DSM Cell Leader be a full-time position
- Full time DSM position in each PC
- Establish Task Manager positions
- Additional training need

9.3 Review of Baseline DSM Training

EVN organized a four-day Baseline DSM Training Course from 28 November through 1 December 2005. The course was attended by 40 participants from EVN's DSM Cell, other EVN departments, and EVN's subsidiary power companies (PCs). The course was followed by a one-day Management Seminar on 2 December 2005, which was attended by members of EVN's DSM Cell as well as the DSM unit managers from each of the 10 PCs. The course was organized and led by EVN's Phase 2 DSM Consultant, Danish Energy Management A/S (DEM), supported by a local consulting team from Entec Hanoi. The objective of the course was for participants to obtain:

- a broad understanding of DSM concepts and how DSM programs affect and benefit the mission of EVN and the PCs;
- knowledge and sufficient understanding to explain to clients about the DSM programs in Vietnam, including the technologies, equipment, and tools (i.e. incentives) used in the programs;
- analytical skills in the areas of benefit-cost analysis for DSM and energy-efficiency measures; DSM program screening; and program monitoring evaluation;
- awareness of the nature and the significance of DSM market, and capability to design strategies for marketing DSM programs; and
- through the exercises and interaction during the training course, a clear idea of the relative roles of activities of EVN and the PCs in all aspects of DSM program design, implementation, monitoring, and evaluation.

Based on the detailed course evaluation, the training course was considered successful. Of the 25 completed evaluation forms, 18 participants responded that the course met their expectations, and 7 said it exceeded their expectations. On average, the participants rated all aspects of the training as a 4+ (median 4) out of 5.

9.4 Review of Refresher Course

This 4-day refresher course organized from 14 to 17 March 2006 was conducted as a follow-up activity to the Baseline Training organized during 28 November-2 December 2005. This workshop was a combined effort of DEM and International Institute of Energy Conservation (IIEC). There were total of more than 25 participants from EVN and the PCs. About two thirds of the participants had attended the previous Baseline DSM Training. The objective of the course was for the participants to:

- Review their knowledge and understanding of DSM from the Baseline DSM Training and shared their post-workshop work experience
- Obtain a broad understating of M&E, and particularly for DSM programs being implemented by EVN and PCs;
- Participate in the process of DSM program design for Vietnam; and
- Be informed by EVN of the roles of EVN and the PCs in the upcoming activities, e.g., in the M&E and promoting CFL programs.

The course covered eight key subjects, namely:

- Review and discussion of Baseline DSM concepts
- Overview of Practical M&E
- M&E Framework for CFL program
- M&E Framework for TOU Program and Load Research Activities
- Program Design Exercise (parallel sessions) for two pilot programs selected by EVN: solar water heater and energy efficiency advisor programs
- Presentation and brainstorming session on the two pilot program designs

On the session on "DSM Baseline Training Review", most of the participant responded that they applied lessons learnt form the workshop at the work. However, changes in the PCs, the lack of interest of top management in DSM could result in insufficient support too promotion of DSM works.

Overall, the participants rated the training very positively (good and very good) in its usefulness, practicality, interesting, the quality of training team presentation, the quality of group exercise, hand-outs and supporting factors, such as the meeting facility and interpreters. Participant evaluated that the workshop met their expectations.

9.5 Review of DSM Study Tour to Thailand

The purpose of the 8-day study tour was to expose the EVN and PC delegation to both the theory and practices of DSM, by targeted meetings with DSM officials and related stakeholders in Thailand, which has been implementing DSM programs since 1994

The expected outcomes of study tour was for DSM officials and EVN and the PCs to develop a deeper familiarity with various pieces of an effective DSM effort, including policy, testing, data collection, implementation, monitoring, and evaluation. This knowledge was expected to be gained through extensive direct meetings and interviews with staff from the DSM office and related agencies and institutions who are doing the DSM work on day-to-day basis. The knowledge and confidence gained from this study tour was expected to be used as a springboard in the implementation of EVN's DSM programs, and supporting activities such as load research, DSM screening, data collection and analysis, short- and long-term DSM planning, and monitoring and evaluation.

10 DSM REGULATORY FRAMEWORK & BUSINESS OPPORTUNITIES CONSULTANCY

The objectives of the DSM Regulations and Incentives Study are to:

- To analyze and develop a broad framework for the future of DSM that encompasses both regulatory aspects and financial incentives for the utilities to pursue DSM as well as potential business opportunities for EVN in providing DSM and energy-related services to customers.
- To work systematically and make recommendations on an appropriate regulatory environment and framework to support a sustainable DSM program.
- To develop an effective mechanism for coordinating EVN's DSM efforts with activities and regulations under other government agencies.
- To build up an organization and institutional mechanisms that can effectively carry out DSM activities.
- Identify and assess potential areas for EVN and the PCs to offer new business services to their customers on a profitable basis.
- Define a business plan for developing these service capabilities should attractive opportunities emerge from the market assessment.

10.1 Review of Action Plan

EVN will procure the services of an outside consultant to make specific and detailed recommendation on DSM regulatory structure and incentives as part of an overall review of the DSM regulatory framework and business opportunities.

The selected consultant will assess EVN's capabilities and potential for EVN divisions to launch new business services related to DSM activities. Based on this assessment, the consultant will then develop a feasible business plan for EVN.

The consultant will identify services that EVN could offer to its customers. The services could include a range of idea, such as i) implementing DSM and energy efficiency opportunities for customers of EVN or at EVN's facilities; ii) providing technical assistance and engineering services to identify customer load management and energy efficiency options that will save money; iii) identifying, designing, implementing and operating load management options for EVN customers; iv) providing services to customers in feasibility studies, design, financing/leasing, implementation, operation and maintenance of on-site generation and cogeneration systems; v) design, construction, financing, maintenance and operation of industrial substations and "in-plant" electricity distribution systems; vi) identification of the need for and design, installation, financing, operation and maintenance of power factor correction, electro-technologies and other power quality equipment; and vii) build/own/operate (BOO) or financing/leasing of equipment such as power factor correction equipment, in-plant distribution systems, efficient motors, etc.

It is expected that the potential new business will build on EVN's unique capabilities or create new capabilities in order to meet following objectives:

The main steps outlined in action plan to accomplish the above objectives were as follows:

Step 1: Review of DSM regulatory structure and incentives

Step 2: Establish ongoing DSM coordination framework

Step 3: Consultancy to improve DSM regulatory and financial framework within EVN and the PCs as well as identify business opportunities for EVN and the PCs

Step 4: Decide on regulatory revisions and business opportunities.

10.2 Mid-Term Review

This section provides extracts from the Mid-Term Review, in relation to this activity, conducted by the World Bank in December 2006.

ACTIVITIES TO DATE

The Consultant completed the Inception Mission in August 2005 and submitted the Inception Report in September 2005. Since then the Consultant has submitted the Mid-Term Report and a draft of the DSM Circular. The Mid-term Report includes a detailed financial analysis of the impacts of DSM programs on the cash flows of EVN and the PCs as a function of various incentive schemes. The report also includes a situational analysis of the existing relationships between EVN and the PCs, particularly financial transactions which are relevant to the implementation of DSM programs. The analysis identifies specific benefits that will accrue to EVN and the PCs from implementing DSM programs as well as the specific disincentives to EVN and the PCs implementing DSM programs.

The Mid-Term Report also includes a discussion of the regulatory principles influencing the implementation of DSM in Vietnam both in the current electricity industry structure and in the potentially restructured electricity industry in the future.

The draft DSM Circular was designed to assist the electricity supply industry to meet the statutory requirement imposed by the Electricity Law to implement DSM programs. The Circular prescribes protocols to govern the internal relationship between EVN and the PCs in the design, implementation and review of DSM programs, and to support:

- Formulation of DSM programs, including the setting of targets and the definition of financial incentives
- Implementation of programs
- Monitoring and evaluation of programs
- Financial reconciliation and division of benefits

The Circular also prescribes the responsibilities of the parties and defines a schedule for the timing of activities within a repeated annual cycle.

The TOR for Business Opportunity study has been prepared. However, EVN proposed to cancel the assignment because of inadequate implementation time.

RESULTS OF MID-TERM REVIEW

The Consultant has prepared a very detailed Mid-Term report identifying the financial impacts of DSM on EVN and the PCs (as well as on the customer and the national economy. Different possible financial incentives have been identified to make it attractive for the PCs to engage in DSM and the financial impacts of each have been calculated. This is useful information for EVN.

The discussion of the regulatory principles is also useful but is somewhat limited by the fact that ERAV has not yet formulated the policies for addressing DSM in the regulatory framework.

Some of the assumptions used by the Consultant need to be reviewed and modified by EVN to refine the conclusions of the analysis, but this can be easily done as the calculations are described in detail.

With respect to the Circular, the Consultant has attempted to describe the protocols for the effective and productive relationship between EVN and the PCs for the implementation of DSM programs. EVN has criticized the document as being more of a Guidebook than a Circular. Nevertheless, the document does provide a good description of the internal activities as well as a detailed flow chart of the DSM Program Cycle.

Since the organization of EVN's is undergoing a major change with the establishment of the Vietnam Electricity Group, it is likely that many of the findings and conclusions of the Consultant report will have to be adapted and/or modified to be consistent with the new company structure and functions. Even if the document does not meet EVN's requirements for an internal circular, it provides a substantial amount of information for developing such a Circular.

RECOMMENDATIONS

The information prepared by the Consultant is likely to be very useful as the inputs to the regulatory framework for DSM that will be established in the future by ERAV.

There appears to be a dispute between the Consultant and EVN regarding the usefulness of the deliverables provided to EVN so far. It is recommended that EVN review these deliverables and provide comments to the Consultant as soon as possible so that the Consultant can respond and take care of the comments.

This study on Business Opportunity should be carried out later when the regulations on DSM provided ERAV will develop the regulation framework for DSM activities that provide adequate incentives for EVN and Power Companies to undertake DSM activities.

ACTION ITEMS

Major Program Activities	*Summary of Progress*	*Comments*	*Action Items & Recommendations*
Working paper on DSM Regulations and Incentives	Draft prepared by Consultant	Consultant has submitted report; work should be useful to the DSM Center	Hold further work on this study until after DSM Center established; Complete by October 2006

10.3 Program Evaluation

The TOR for Business Opportunity study was prepared. However, EVN proposed to cancel the assignment because of inadequate implementation time.

11 LONG TERM DSM PLANNING

Long term DSM planning is important in order to effectively identify and exploit available DSM resources.

The objective of the program is as follows:

- Develop a long-term plan for DSM programs, load research, and related activities to support and effective and sustainable DSM program for Phase 3 and beyond.
- While developing the plan, to build technical and managerial capacity at EVN in all aspects of DSM planning and strategy.

11.1 Review of Action Plan

The action plan proposed that EVN and the PCs develop a Long-Term DSM plan to guide DSM programs and activities in the future (Phase 3 and beyond) with assistance from DEM. The long term DSM plan is supposed to provide a road map for the Phase 3 DSM effort, Based on the estimated DSM potentials of different technologies/activates, DEM required to work with EVN and PCs to prepare plan for continuing DSM programs and supporting activities in future phased of Vietnam DSM prom. The plan should include an assessment of existing DSM resources; the five-year target for the DSM Phase 3 Program; a process for EVN and PCs to identify and assess new DSM options on ongoing basis; a strategy and plan for continuing load research activities; and an approach for using integrated resource planning (IRP) to include DSM as integral part of the resource planning process. It was also to include recommendations on regulatory framework and possible incentives to support a sustainable DSM effort by EVN and the PCs in an ongoing, future DSM

The main steps to implement the program are as follows

Step1: Develop long-term DSM strategy

Step 2: Review and approve DSM strategy

Step 3: Allocate resources for future DSM program

Step 4: Develop detailed implementation plans for DSM programs

11.2 Mid-Term Review

This section provides extracts from the Mid-Term Review, in relation to this activity, conducted by the World Bank in December 2006.

ACTIVITIES TO DATE

Work is under progress by the consultant. Much of the basic analysis work has already been done in the attached DSM Chapter on EVN Master Plan, which was included in the 2006 Power Development Plan.

The objective of the DSM Chapter of the EVN Master Plan is to review international DSM experience and to present a plausible scenario for DSM programs that could make a substantial contribution to the Vietnam power sector in the coming years. Accordingly, the Chapter presents a scenario of DSM programs through 2012 and analyzes their impact and cost-effectiveness.

The Chapter was prepared at the request of the President of Electricity of Vietnam by EVN's Phase 2 TA Consultant with substantial assistance and background data provided by the Institute of Energy on energy demand forecast, supply options, and costs.

ACTIVITIES TO DATE

A draft of the Chapter was completed by January 2006. This draft included:

- Review of the principles of DSM and overview of some successful international experience with DSM.
- Review of the current situation with regard to energy efficiency and DSM in Vietnam.
- Overview of DSM planning tools and principles.
- Estimated budgets and impacts from a medium-term scenario for DSM programs through the year 2012.
- Two priority DSM pilot programs to be initiated by EVN in 2006
- Overview of medium-term DSM programs and staffing, through 2012

RESULTS OF MID-TERM REVIEW

This report is very useful in placing the DSM activities initiated by EVN in the context of EVN's long-term resource planning. It provides a good summary of international DSM experience and the benefits of DSM to utilities. Further it identifies why DSM is important for Vietnam and how it can help EVN in planning its future resource mix to meet the substantial increase in demand.

The Chapter also presents a good overview of DSM tools and techniques. It then identifies the potential contributions that DSM can make to EVN in terms of peak load and energy reductions. A detailed budget estimate is provided broken out by major cost component.

One of the items that needs to be clarified in this draft is the distinction between DSM activities carried out by EVN and the PCs, and energy efficiency (EE) activities carried out by other agencies and organizations.

RECOMMENDATIONS AND ACTION ITEMS

It is important to complete this Chapter to provide the needed inputs on DDSM to EVN's long-term planning process. It is therefore recommended that the comments by various parties on the draft be incorporated into the Chapter and the final version completed by June1, 2006.

11.3 Program Evaluation

Evaluation of the program was not conducted since the DSM Planning work has not been completed.

12 CONCLUSIONS

Significant progress has been made with the CFL Program

EVN has made significant progress with the Compact Fluorescent Lamps (CFL) Program and is expected to achieve the objectives of installing one million CFLs. This Program has been working well, and is expected to fully meet its targets. About 75% of the CFL from the 300,000 CFLs in the first year procurement have been distributed and sold and the remaining CFL are expected to be sold by June 2006. The CFL marketing and promotion campaign has been launched and is helping the distribution and sale of CFLs. An additional 700,000 CFLs have been procured (representing the 2nd and 3rd year procurement), and the distribution and sale of these CFLs will be initiated in July 2006. The CFLs are operating well and there have been very few CFL failures. The launching of the EVN CFL program has also stimulated the market for CFL and it appears that the range of CFLs being offered in the market has expanded and other manufacturers have also experienced increased sales.

The savings from the program was 30.1MW of peak demand (forecast savings 33.4MW) and 45.9 GWh/year energy savings (forecast saving 40 GWh/yr).

FTL Program successfully implemented

The two key procurement packages under the FTL program were successfully implemented although it was behind schedule. The Schools Demonstration program offers tremendous potential for replication throughout the country. The highly visible marketing campaign is expected the speed up the market transformation from the 40W FTLs to 36W FTLs.

EVN has implemented the TOU Program without using IDA funds

The Time-of-Use (TOU) Program has been implemented by EVN without utilizing the budgeted IDA funds. EVN initiated the installation of TOU meters using its own funds based on an assessment by the World Bank during the Phase 1 DSM activities that implementation of TOU tariffs can provide peak load reduction. EVN has installed over 60,000 TOU meters by May 2006. While EVN has not conducted a formal evaluation of the peak reduction benefits, it has been estimated by the Phase 2 DSM Consultant that the savings are about 45 MW.

Limited Progress on the other project components

The progress with respect to the other Program elements has been very slow. EVN has proposed to cancel the DLC program citing the lack of customer interest in participating in such a program. Technical issues related to data communication, as well as procurement issues related to modem and software procurement, have resulted in very substantial delays in the Load Research Program.