CASE STUDY
VIETNAM COMPACT FLUORESCENT PROGRAM

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PROGRAM HIGHLIGHTS

- Electricity of Vietnam (EVN), with assistance from the World Bank and GEF, launched a Compact Fluorescent Lamp (CFL) program to procure and sell 1,000,000 CFLs to rural residential customers over a 3-year period (2004-2007).
- The major drivers for the program were high load growth, need to manage the evening peak load, and the high contribution of rural lighting to the evening peak.
- The program was implemented in two stages, with competitive procurement (using the World Bank's International Competitive Bidding process) of 300,000 lamps in Stage 1 and 700,000 in Stage 2. The lamps were distributed by EVN through its local offices and sold to customers.
- The bulk procurement resulted in a substantially lower price ($1.07 in Stage 1 and $0.98 in Stage 2) compared to prevailing market prices ranging from $2.50 to $3.00 for high quality CFL.
- The lamps were distributed by EVN through its local offices and sold to customers at a price of about $1.56 per lamp.
- EVN adapted the technical specifications from the Efficient Lighting Initiative (ELI) to assure high CFL quality.
- The direct impacts of the program, based on a formal program evaluation, were peak demand reduction of 30.1 MW and energy savings of 45.9 GWH per year.
- The program evaluation pointed out that the EVN CFL program had large positive effects on market transformation with estimated indirect peak demand reduction of almost 280 MW.
- The overall failure rate of the CFLs was less than 0.5%, and the failed lamps were replaced by EVN under the warranty.
- The post-implementation survey indicated a very high level (`~ 92%) of customer satisfaction.

BACKGROUND AND RATIONALE

From 1992-97, Vietnam experienced unprecedented economic growth, averaging 8.2 percent annually. During this same period, the demand for energy grew at a rate 30 percent higher than GDP and demand for electricity 70 percent higher. Recognizing that the ability of Vietnam to continue to meet such an aggressive economic growth rate will require substantial expansion of the electric power sector, the World Bank, in cooperation with Electricity of Vietnam (EVN), commissioned the "Demand-Side Management Assessment for Vietnam". The assessment concluded that DSM had a potentially significant role to play in managing the growth of electricity demand in Vietnam. A two-phased approach for implementing DSM was initiated. Phase 1 of this effort resulted in the establishment of a DSM Cell within EVN, implementation of

several pilot load management DSM programs, development of audit capability within EVN, development of a DSM policy framework, and design of DSM programs to be implemented in Phase 2.

The Phase 2 effort was launched as the Demand-Side Management and Energy Efficiency Project as a part of the System Energy Efficiency Improvement, Equitization and Renewable Project (SEIER). One of the key components of the Phase 2 DSM effort was the Vietnam Compact Fluorescent Lamps (CFL) Program which was designed based on a pilot program conducted in Phase 1. CFLs were attractive to EVN because of the coincidence of lighting loads with the utility's evening peak, and the low tariffs to the rural residential customers. 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 to the implementation of a large scale CFL program in rural areas. Furthermore, after the completion of the program, a high percentage (~80%) of consumers expressed interest in purchasing CFLs in the future. The program focused on rural customers who had a high ownership of incandescent lamps and were likely to derive relatively large benefits from the reduced electricity costs that resulted from replacing their of incandescent lamps with CFLs.

PROGRAM OBJECTIVES

The objectives of the CFL program were consistent with the EVN's overall DSM objectives related to reducing future investments in system expansion to meet rapid demand growth. The social objectives of the program were to provide assistance to rural people in reducing their electricity costs. The main objectives of GEF were to reduce GHG emissions and improve the global environment.

The primary objectives of the CFL Program therefore were documented as follows:

- to ease EVN's investment in system expansion caused by rapid demand growth;
- to help people in rural areas reduce the cost of electricity consumption;
- to increase awareness of CFLs among rural people
- to reduce GHG emissions and improve the global environment
- to promote a market transformation towards the use of CFLs instead of incandescent lamps.

The overall goal 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 (Stage 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 (Stage 2).

PROGRAM DESIGN

Baseline Survey

During Phase 1 of the DSM program, a pilot CFL program was conducted. As a part of this pilot program, a survey of about 500 rural households in two villages was completed. The survey collected information on the numbers and ratings (in watts) of incandescent lamps, existence of CFLs, average hours of use, location of the lamps within the home, decision-maker regarding lamp purchase, knowledge of CFLs, perceptions regarding CFLs, and willingness to pay a higher

price for CFLs. The results of this survey (as well as the post-implementation survey conducted at the conclusion of the pilot program) are presented in Annex 1 - Phase 1 CFL Pilot.

Market Characteristics

The Phase 1 pilot also identified the basic market characteristics. At the time of the Phase 1 Pilot (year 2003), there were 2 local manufacturers in Vietnam. CFLs were imported by a number of importers, and the CFL market was characterized as consisting of three types of products:

- "High Quality": imports from Europe or US with an efficacy of about 60 Lumens per watt (Lm/W), and rated lifetimes of 10,000 hrs
- "Medium Quality": domestic Vietnamese production and imports from neighboring Asian countries with an efficacy of about 50 Lm/W, and a lifetime of 5,000 hrs
- "Low Quality": imports from China with a low efficacy, and a lifetime of only 1,000 hrs

The prices of CFL in the market ranged from about $1.50 for the low quality lamps to about $2.50 to 3.00 for the medium to high quality lamps.

CFLs were available in the retail stores in urban areas but were very hard to find in rural areas.

Barriers to CFL Adoption

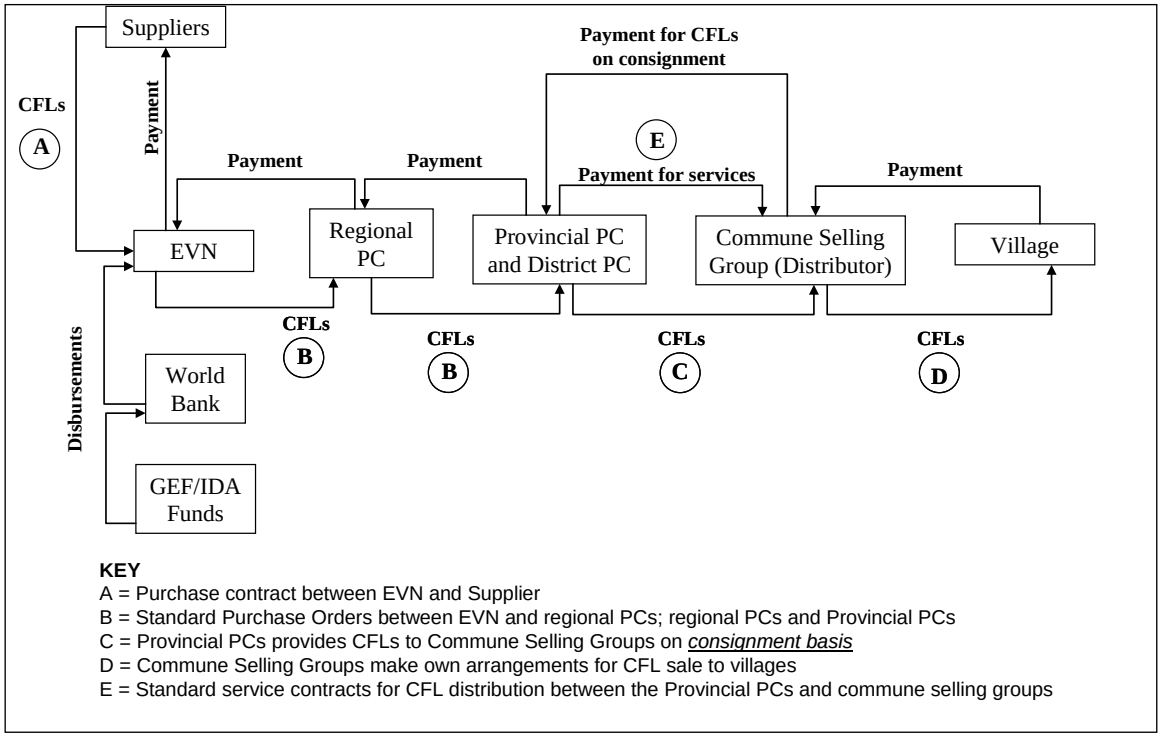
The market assessment pointed out the following barriers to the widespread adoption of CFLs:

- Low ROI to the customer due to low tariffs in the domestic sector
- High first costs
- Lack of knowledge and awareness regarding benefits of CFL
- Lacks of understanding of the quality issues (due to low quality Chinese imports)
- Limited product availability in rural areas
- Perceived risk that CFL may fail soon after installation (due to the low quality lamps in the market)

Original Program Design

The aim of the Year 1 program was the procurement and distribution of 300,000 lamps. EVN conducted the bulk procurement using a competitive bidding process to select one supplier. The distribution of the lamps was to be conducted through the Provincial Power Companies (PCs) to the Communes (villages) via the District PCs as shown in Figure 1. The program was implemented in 3 PCs that served predominantly rural customers (PC1, PC2 and PC3) and the distribution was through the District PCs

Figure 1 - CFL Program Design



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 initial program design included the provision of a subsidy to rural consumers, from 33% in Year 1 to 20% in Year 3. The subsidy was to be combined with marketing efforts to promote the use of the more efficient lamps in and outside the distribution program; this was an important program element since a key long-term goal of the CFL program was 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 of the lamps.

Modifications to Program Design

The implementation of the CFL program included several changes to the original design. The key changes were:

- There was no subsidy provided to consumers as the bulk purchase price of CFLs (and hence, the selling price) turned out to be significantly lower that estimated;
- The option of payment in installments through the utility bills was eliminated.

- 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 Stage 1 in a relatively short period of time.

The success of the Stage 1 sales continued during the Stage 2 with the procurement of 700,000 CFLs using a similar competitive procurement process as Phase 1. Hence the DSM program target of 1,000,000 CFLs was met in Year 2 of the program.

In Stage 1 the distribution of CFLs was restricted to electricity account holders and this approach was adopted to test the other features of the program, primarily the CFL warranty system. With the success of Phase1, the distribution of CFLs in Phase 2 was expanded to both direct sales and commune sales. Considering that the program was primarily focused on the rural sector, the role of community organizations in the distribution of CFLs was considered critical for the sustainability of the program.

PROGRAM IMPLEMENTATION

Implementation Plan

A detailed implementation plan was prepared at the initiation of the program. This plan (see Annex 4) described the program design, training, distribution, marketing, promotion and sales, program management plan, monitoring and evaluation needs, financial management plan and detailed implementation steps.

Program Training

The first step in program implementation was training:

Step 1: EVN trains Regional and Provincial PCs

EVN organized training sessions in Hanoi, Ho Chi Minh, and Da Nang for the respective regional PCs and their Provincial PCs participating in the CFL program. The training covered all aspects of program implementation and management and included "training of trainers" to enable the PC staff to effectively explain the program and train participating staff from the Provincial and District PCs.

Step 2: Provincial PCs train District PCs and Commune Selling Groups

The regional PCs were then responsible for training the Provincial and District PCs in their region to ensure clear knowledge of program steps, timeline, accounting, and detailed activities. This final phase of training occurred prior to program launch, to make sure the Commune Selling Groups were fully informed about the program. During this training, each Provincial PC introduced a Standard Contract with each participating commune.

CFL Bulk Procurement

A competitive tendering process was adopted by EVN using the World Bank's International Competitive Bidding (ICB) approach. In August 2004 EVN issued a Request for Bids to select one supplier for 300,000 CFLs (see Annex 2). In order to assure that only high quality lamps would be supplied, the Request for Bid document included technical specifications that were based on the IFC/GEF Efficient Lighting Initiative (ELI) Voluntary Technical Specifications for Compact Fluorescent Lamps (as revised 10 July 2002). These baseline specifications were

chosen to represent a well-known international standard for CFL quality that has been implemented in many countries worldwide.

The detailed Technical Specifications are in Section 6 of Annex 2. Key features included the following:

- Type of CFL - self-ballasted screw type (with electronic ballast)
- Lamp length $\leq$ 170 millimeters from base to tip of lamp
- Rated life of 6,000 hours
- Branding of CFLs with EVN logo
- Warranty of 15 months
- Delivery in 3 batches at 3 different locations
- Efficacy level, lumen output, performance over time, power factor, etc. in accordance with ELI specifications

The winning bidder in this bulk procurement offered a unit price of US$ 1.07 per lamp. This compared very favorably with the market price of CFLs at that time which ranged from $2.50 to $3.00. While the main contributing factor for the lower unit price was the volume purchase, it should be noted that under the World Bank procurement regulations, the Bank does not allow for payment of any import duties or taxes and therefore the government waived such import tariffs.

In view of this low price per unit, EVN decided to not offer any subsidy to the customers. While EVN wanted to give customers the benefit of the lower cost of the bulk procurement, it did not want to distort the market for existing suppliers and retailers by offering the CFL at a very low price. EVN therefore established a market price of VND 25,000 (about $1.56) per lamp. The difference between the sales price and bulk purchase price was used to cover the distribution and sales expenses.

A second bulk procurement was conducted in September 2005 for 700,000 CFLs using a similar Request for Bids (see Annex 3). The result of this competitive procurement was the selection of the same supplier at a unit price of $0.98 per CFL.

Lamp Distribution

The CFLs were delivered by the supplier to EVN and were transferred to the three PCs. The PCs then distributed lamps to Provincial PCs; Provincial PCs distributed CFLs (via District PCs) to Commune Selling Groups for sale to households. The allocation of CFLs to these units was based on number of communes involved. The distribution covered 151 district towns and communes in 33 provinces. In this program, the incandescent lamps replaced were not collected and destroyed.

Targets for Lamp Sales

The sales target for each commune was, on average, 1,500 CFLs. The distribution of CFLs in each commune was carried out by Commune Selling Groups, established by the local government. These Groups acted as distribution and sales agents for the Provincial PCs. To ensure efficient use of CFLs in the households and even distribution throughout each village, sales were limited to no more than 2 CFLs per household.

Lamp Ordering and Selling

In order to ensure the subsidized lamps went to the right users and to avoid the resale of lamps, the Commune Selling Groups maintained *Sales Lists*, which were developed for each village. The basic steps for lamp ordering were as follows:

1. Provincial PCs made distribution agreements with a Commune Selling Group in each participating commune.
2. The Commune Selling Groups worked with each participating village to estimate the number of CFLs needed for each participating village in its commune.
3. Provincial PCs, through the District PCs, provided the Commune Selling Group in each participating commune with a quantity of CFLs *on consignment*.
4. The Commune Selling Groups acted as distribution agents and sold the CFLs to participating villages in their commune.
5. The CFLs sales from the Commune Selling Group to the villages were overseen by the DSM units at the Provincial and District PCs in cooperation with the Commune Selling Group.
6. The Commune Selling Groups were responsible for ensuring that there were monthly Sales Reports from each village.

Sales of Screw-In Sockets

Only about 5-10% of incandescent lamp fixtures in rural areas had the screw-in socket. EVN procured screw-in CFLs for better durability and quality. The retail price of the screw-in adapters was approximately VND 3,000 (about $0.20). It was thus important to have the screw-in adapters available for all villagers purchasing the CFLs. The Provincial and District PCs negotiated a bulk purchase of screw-in adapters and purchased them on consignment from local suppliers. The PCs kept a stock of the screw-in adapters to make them available for sale with the CFLs by the Commune Selling Groups.

Payment Collections

When they purchased CFLs from the Commune Selling Groups, households could pay the entire subsidized price at once or could pay half up front, and remit the remainder within 3 months. The details of payment collections were worked out separately for each commune.

Lamp Warranty

A set number of lamps used for warranty (5% of the order amount) were given by the regional PCs to the Provincial PCs. Households that had defective lamps within the warranty period had them replaced by returning the defective lamp to the village leaders. It was the village leader's responsibility to ensure that the lamp was returned via the Commune Selling Group to the Provincial PC, and replaced with a new CFL. The Commune Selling Group and the PCs (district, provincial and regional) included the warranty CFLs when accounting for CFL distribution.

Program Management

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

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

MARKETING AND PROMOTION

EVN developed a marketing and promotion plan that included a scheme for the overall marketing of the program through public media at the national and provincial levels. At the local level, the direct marketing, promotion, and sale of lamps was carried out by local communes according to the plans developed by EVN.

The local campaigns started with a one-week intensive marketing and promotion campaign carried out by the Commune Selling Groups and villages, with support from the Provincial PC. The marketing and promotion was carried out using a combination of the following methods: broadcasting to local villages, setting up banners and posters in public places, distributing leaflets to households, and talking at public meetings. The Commune Selling Group was responsible for setting up "Local Dissemination Units" that were in turn responsible for broadcasting, hanging banners, and setting up posters. The distribution of leaflets and promotion at public meetings was the responsibility of village leaders. This was carried out with the assistance of several other organizations such as the Women's Union and Youth Union.

POST-IMPLEMENTATION SURVEY

A post-implementation survey of program participants was conducted as a part of the final program evaluation (see below). The sample size was 300 participants and the survey addressed the following topics:

- Number and wattage of CFLs purchased
- Wattage of incandescent or fluorescent tube lamps replaced
- Where the CFLs were placed
- Hours of use
- Failure of CFLs (if any), and replacement under warranty
- Reasons for participation
- Satisfaction with the program
- Effectiveness of marketing and promotion approaches
- Electricity bill before and after CFL installation

The survey questionnaire is provided in Section 8 of the attached Annex 6.

In addition, a survey of CFL suppliers was conducted as part of the program evaluation to identify the effects of the EVN program on the overall CFL market.

PROGRAM EVALUATION

A formal program evaluation of the CFL program was conducted by EVN. A consulting firm was selected by EVN to conduct the program evaluation using a competitive bidding procedure. The Terms of Reference for the evaluation (see Annex 5) required the program evaluation to include impact evaluation, process evaluation, and market evaluation. The key elements of the evaluation are shown in Table 1 below:

Table 1 - Key Elements of Program Evaluation

Evaluation Objective	*Type of Evaluation*	*Evaluation Method*
Energy and Peak Savings - Determine energy (MWH) and peak demand (kVA) savings associated with the program. Peak demand savings are defined as the average savings during the hours of 6pm to 10pm.	Impact	Engineering Calculations using manufacturer lamp data and engineering estimates for other factors such as operating hours
Environmental benefits – determine reduced pollutant emissions - such as GHG emissions	Impact	Engineering estimates – pending availability of valid data
Program is cost effective - Evaluate cost effectiveness of program	Financial Analysis	Participant and Utility Test – pending availability of data
Reduce investment cost in power plants – evaluate impact of DSM savings on power plant building plans	Process	Survey at EVN – pending availability of valid data
Raise awareness of CFLs – evaluate change in consumer awareness and satisfaction with CFLs	Process	Surveys of customers
Improve customer service - evaluate how consumers have responded to the CFL program and their satisfaction with the program	Process	Surveys of customers
Assist poor communities – evaluate benefits to poor customers	Process	Surveys and participant test analysis
Build market for CFLs - evaluate how CFL manufacturers, distributors and retailers responded to the program and possibly changed their way of selling CFLs	Market	Surveys of manufacturers, distributors and retailers
Prepare recommendations on how could the program be improved	All	Analysis of overall evaluation results

The detailed Final Report of the Program Evaluation is provided in Annex 6.

MAJOR PROGRAM RESULTS

The major program results, based on the program evaluation, are summarized below:

Impact Evaluation

A summary of the direct program impacts of the overall EVN CFL Program are given in Table 2 below.

Table 2 - Direct Program Impacts

Direct System Impacts and Benefits	
Energy Savings (M WH/yr)	*45,900*
Lifetime Energy Savings (M WH)	*243,300*
Peak Demand Savings (MW)	*30.1*
EVN Benefit / Cost Ratio	*99.1*
Consumer Benefit / Cost Ratio	*7.2*

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

- The program was found to be extremely cost effective to both EVN and consumers. The benefit to EVN, calculated using the avoided economic cost of supply, was estimated at around 99 times more than the costs, and the benefit to consumers was estimated at around 7.2 times more than the costs.
- The benefits to EVN were high because the target consumers (rural residential) have subsidized tariffs (less than the avoided cost of supply).
- The demand savings are somewhat lower than estimated, because the program design was based on a 75W incandescent lamp being replaced by a 20W CFL, while, in reality lower wattage incandescent lamps and a significant number of fluorescent tube lights were replaced by the CFLs.
- The average wattage of the replaced lamps was 58W. Around 18% opted to use the CFLs for new fittings. The impact of these CFLs was based on the assumption that consumers would have otherwise used incandescent lamps, and that a holder suitable for either an incandescent lamp or CFL was already installed.
- The direct impact of the EVN Program, estimated using survey results and engineering calculations, was 30.1 MW (90.1%) compared with the 33.4 MW estimated in the EVN Phase 2 DSM Plan.
- The average bill savings for consumers was estimated at approximately 15.2%.
- One of the most important conclusions of the evaluation was that the indirect demand reduction through market transformation of the lighting market was estimated at around 280 MW (more than 9 times the direct program impact.) This metric was based on sales information obtained from leading CFL manufacturers. This metric reflects a significant increase in CFL sales that began in 2005 (the year of the launch of the EVN CFL program) and continued throughout the course of 2006.

Process Evaluation

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

- Around 79% of the participating consumers opted to purchase the maximum number (2) of lamps. A significant percentage (82%) of the participants were new CFLs users and a small number (12%) purchased CFLs outside of the EVN program.
- There was a significant number (39%) of customers who used the CFLs as a replacement for existing 20W or 40W fluorescent tube lights.
- EVN's marketing strategies proved to be effective - with EVN Notices at Branch offices, TV advertisements, and brochures and banners being cited as the most effective marketing strategies. All survey 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 warranty. 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. Unsatisfied consumers cited poor light quality and low level of savings as the primary reasons for dissatisfaction with the program.

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 Stage 1 evaluation the market effects were determined from surveys of key market participants (manufacturers, distributors and retailers). In the Stage 2 evaluation, detailed CFL sales information was 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 3 below:

Table 3 - Imports and Exports of CFL

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 was a rapid decrease in the number of CFLs exported since 2005, indicating a significantly higher domestic demand since the introduction of the EVN program.
- The decrease in import numbers since 2005 could be attributed to the increased production by local manufacturers and customer preference for local products.
- It should be noted that the above figures were obtained from official sources. However, there is a possibility that the numbers may not have been a true reflection of the actual situation considering the practice of some imports of CFLs from China being trans-shipped to neighboring countries like Lao PDR and Cambodia.

A summary of the estimated system benefits based on sales information provided by leading local CFL manufacturers is given in Table 4 below.

Table 4 - Estimated System Benefits

	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*	*3,297,513*	*441,446*	*1,504,030*	*6,125,209*
Peak Savings – System Level	MW	*22.8*	*134.6*	*22.1*	*100.3*	*279.8*
Total Energy Savings	GWh/yr	*22.4*	*132.5*	*21.7*	*98.7*	*275.4*
Total Lifetime Savings	GWh	*184.4*	*1,089.3*	*178.6*	*811.2*	*2,263.40*

The key findings of the market evaluation are summarized below:

- All suppliers experienced a significant increase in sales in 2005 and the trends in 2006 were even higher.
- Rang Dong Lighting, a local CFL manufacturer, experienced a growth of around 150% since the introduction of the EVN Program in 2005 and expected an annual growth of around 50% in 2007.
- Philips experienced a growth of around 80% since the introduction of the EVN Program and expects this trend to continue in 2007.
- The suppliers attributed the overall increase in awareness of CFL as a contributory factor in the increased sales.
- There was strong evidence that the EVN program has had an impact in stimulating the CFL market in Vietnam.
- The significant increase in CFL sales immediately after the launch of the Stage 1 EVN CFL program was an indication of widespread adoption in the use of CFLs.
- Based on the information from the suppliers, the estimated effect of the CFL program was about 280 MW.
- 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.
- 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.

LESSONS LEARNED

The major lessons learned are summarized below:

Program Impacts

The CFL program achieved peak demand savings of 30.1 MW compared to the estimated 33.4 MW in the program design. The somewhat lower savings resulted from the fact that some customers replaced smaller wattage incandescent and fluorescent tube lamps.

The indirect program impacts from market transformation were very significant. The program evaluation estimated that these indirect effects may be as high as 280 MW.

Market Transformation

The results of the EVN CFL Program indicated that market transformation was already well under way and was likely to continue.

Program Marketing

Overall, the marketing activities undertaken by EVN proved to be effective in promoting the use of CFLs. There is strong evidence that the awareness levels of CFLs increased in Vietnam after the launch of the EVN CFL program. 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 should 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 CFL should be properly matched with the wattage of the replaced incandescent lamp.
- The program savings will be les than anticipated if CFLs are used to replace existing 20 or 40 watt fluorescent tube lights.

Product Range

The EVN Stage 1 and Stage 2 procurements were for 20W CFLs which are equivalent to a 75 or 100 watt incandescent lamp. However, the post-implementation survey indicated that the majority of the incandescent bulbs replaced were 60 watt bulbs. Hence, offering consumers CFLs of a range of wattages would maximize savings.

Product Quality

The EVN program used a single supplier and ensured that the product met the required technical specifications. The very low failure rate (less than 0.5%) proved the success of EVN's procurement strategy.

The market assessment in the program evaluation indicated that there were many CFLs in the market which were 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 were high cost and bad experience in using CFLs. These responses indicated that cheap low quality lamps were readily available in the market. Hence product quality is an issue that needs to be addressed for a good CFL program. One way to assure high product quality is to implement minimum technical standards for both imported and locally manufactured CFLs.

Distribution and Sale

The program involved the distribution and sale of CFLs via EVN's regional and local offices. This proved to be an effective mechanism for CFL sales to rural customers as there were no other distribution channels to the market.

LIST OF ANNEXES