CASE STUDY
UGANDA COMPACT FLUORESCENT PROGRAM

BACKGROUND AND RATIONALE

With the current demand for electricity around 350 MW, Uganda faces a power supply crisis. Out of the installed capacity of 300 MW (Nalubale and Kiira hydropower plants), only 135 MW is currently available. If the weather situation worsens resulting in more severe droughts, the power availability may go down further, to 80-90 MW in the next several months. About 50 MW is produced by a diesel-based thermal plant (installed in May 2005). The Government is considering adding 100 MW of thermal capacity, but this is likely to be subject to high diesel prices resulting from price escalation in the international oil markets. Efforts are underway to reduce transmission and distribution losses in the power system network from 41% to 20% by 2011. Even with all these measures, there is not enough capacity to cover the demand-supply gap, resulting in acute power shortage.

OBJECTIVES

The objectives of the CFL program were consistent with UMEME'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 urban 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 Uganda's investment in system expansion caused by rapid demand growth;
- to help people in UMEME districts 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.

PROGRAM DESIGN

Baseline Survey

In preparation for this program, a study on Residential Customer Lighting was conducted to establish the following:

1. The types and nature of residential lighting used in the Kampala area,
2. The area's normal lighting practices,
3. The extent of consumer awareness of energy savers available in the market.
4. Consumer perception of CFL technology

The survey was conducted within a time frame of two weeks due to the urgency attached to the overall program. At least 500 households and small commercial businesses were sampled, 100 households and small commercial businesses from each of the five divisions of Kampala (the two new divisions were not considered as separate, rather incorporated in the five mentioned ones). A structured interview approach with the questionnaire was used. The survey team comprised of five graduates from both engineering and social sciences. Each surveyor was assigned 100 households in one division. The results of this survey (as well as the post-implementation survey conducted at the conclusion of the program) are presented in Annex 1 - Phase 1 CFL Pilot.

Market Characteristics

There are about 220,000 consumers in the UMEME power system, excluding large and medium industries. About 140,000 consumers are in Kampala itself. Of these 220,000 consumers, about 75,000 are low-income consumers on lifeline tariffs who use, on an average, 1-2 lamps per household, usually of 100 W rating, for more than 4 hours a day. The remaining consumers are the middle- and high-income households, and small commercial and public building sectors. It is estimated that an average middle-income home uses 2 to 4 lamps on a regular (for more than 4 hours per day) basis. The high-income and small commercial customers use 6-12 lamps per consumer for more than 4 hours a day. This results in the estimated total number of lamps used for over 4 hours a day to about 850,000.

It is estimated that 100,000 CFLs and 1.5 million incandescent lamps are being sold annually in Uganda. The latter figure translates into an additional market for 500,000 to 600,000 CFLs.

A wide range of CFLs – with rating from 5 W to 23 W - are sold in the Ugandan market. In addition to the well-known brands such as Philips and Osram, many other low quality cheaper brands are available. All CFLs and incandescent lamps are imported and are subject to duties and taxes that total almost 50%, of which import duty is 25% and VAT is 18%. The landed cost works out to be about Shs 5,200 and Shs 450 for the CFLs and incandescent lamps respectively. The standard quality CFLs, with 6,000 hour life, retails around Shs 7,000 ($3.90) to Shs 9,000 ($4.50) compared to incandescent lamps of Shs 800-1,000 each. The normal delivery schedule of CFLs is about 5 to 6 months from the time the order is placed by the distributors.

As seen from the experience elsewhere (Vietnam, India, South Africa, etc.), the price of CFLs could be between $1.00 and $2.00 if they are procured through bulk procurement programs. The quality, in terms of light efficacy lumens/watt of CFLs, lifetime of CFLs and the voltage fluctuations they can withstand, can also be assured when the specifications, certified manufacturers and procurement protocol of the Efficient Lighting Initiative (ELI) are used.

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 objective of this program is to have UMEME do the bulk procurement of 800,000 CFLs from one or two suppliers using the specifications and list of certified manufacturers and products available through the international standards under the Efficient Lighting Initiative. The procurement specifications will include minimum of one year warranty and quality parameters such as efficacy of lamps (about 1100/watt), life of lamps (minimum of 6,000 hours), and voltage tolerance (fluctuations of 170-260 V). The lamps procured through this program will be branded by UMEME.

Of the 800,000 lamps, 600,000 were to be distributed by UMEME channels (UMEME contractors for bill delivery and others) free of cost to the residential and small commercial consumers. The number of lamps to be distributed per household will be determined by the last six months of bill records, with a maximum of up to 4 lamps per consumer. The replaced incandescent lamps collected from the consumers will be destroyed and disposed off by UMEME.

About 50,000 lamps will be retained by UMEME for replacement during the warranty period free of cost. The remaining 150,000 lamps will be available for post-warranty sales at the bulk procurement price. This would enable a smooth transition into a market-based pricing at a later stage which is expected to be closer to the bulk procurement price.

The advantages injecting large number of lamps in the market will help market development, which along with customer experience plus post-warranty replacement sales should lead to positive future purchase decisions in favor of CFLs. It is also expected that the program design will build up customer confidence and CFL image, which will lead to increased market acceptance. Finally, it will bring down the market price for CFLs in the Ugandan market. In the long-term, after the proposed 800,000 CFL program is completed, UMEME may be able to devise a system of providing loans to customers for purchasing CFLs, which would be recovered in installments through the electric bills.

The program design includes three other key elements: (1) Comprehensive awareness and promotion campaign- this would be carried out by UMEME in conjunction with MEMD (ii) monitoring and evaluation component to be led by MEMD and/or an advisory committee and (iii) product quality and standards compliance to be conducted by the Uganda National Bureau of Standards.

PROGRAM IMPLEMENTATION

CFL Bulk Procurement

A competitive tendering process was adopted by UMEME using the World Bank's International Competitive Bidding (ICB) approach. In July 2006 UMEME issued a Request for Bids to select one supplier for 800.000 CFLs (see Annex 2 – Uganda CFL Tender). 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 Uganda coat of arms
- Warranty of 12 months
- Delivery in 2 lots, first lot of 700,000 lamps to be shipped by sea freight to Mombasa, second lot of 100,000 to be shipped by air freight to Entebbe airport
- 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 $3.90 to $4.50. 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.

Program Management

UMEME was responsible for overall program management. Lamp distribution was conducted by the UMEME Yellow Pages, who carried out distribution largely by hand. The yellow pages were also responsible for conducting a lamp exchange and collecting incandescent bulbs at the time of CFL distribution. The program aimed to distribute a maximum of three CFLs per household.

MARKETING AND PROMOTION

UMEME was responsible for carrying out the marketing and promotion activities needed to raise awareness of the CFL distribution program.

LESSONS LEARNED

Program Marketing

Overall the marketing and promotion techniques adopted by UMEME proved to be fairly effective at raising overall awareness of the CFL program. However, the post implementation survey highlighted several shortcoming's of UMEME's marketing program, the study pointed out that:

- Awareness was rather low in the areas outside of Kampala, in places like Mpigi and Jinja, few people knew about the government initiative to promote energy savings in households.
- Efforts were made to sensitize the public through radio announcements, posters and fliers. However, radio announcements tended to only reach and benefit those with radio sets
- Although sensitization went on for about two weeks many people in the sample didn't receive enough marketing information on the program. The radio stations that were used were CBS, Simba, and Capital, all of which are urban stations. Areas that are located far from Kampala did not have the radio coverage necessary to achieve desired market awareness.

- Posters were printed primarily English thereby discriminating against those who did not know how to read the English language. This created a gap in awareness between different socio-economic groups in the UMEME districts.
- Yellow pages donned yellow uniforms and were often mistaken for NRM party members, creating resistance in some areas as individuals feared the yellow pages were attached to a political campaign.