

COMPACT FLUORESCENT (ENERGY SAVER) LAMPS

PROGRAM CONCEPT

Background

Lighting energy use causes peak load shortages in the Uganda power system which is currently facing increasing supply demand gaps. Although, efficient compact fluorescent (energy saver lamps) have started being used in the market, its share is small. Most residential customers use incandescent lamps because ESLs are expensive and often not of good quality. Higher penetration of efficient lamps into the Uganda power sector can form an important part of the efforts to address the electricity shortages in Uganda.

Current Market Situation

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.

CFL Economics

CFLs have high initial costs but can provide customer a substantial amount of energy and cost savings. Similarly, from the utility perspective, as lighting use generally coincides with the peak loads of the power system, it provides the benefit of a cheaper alternative to avoiding additional generation capacity additions.

At the estimated price of \$2.00, which includes bulk procurement price of \$1.50 and program distribution and marketing cost of \$0.50 per lamp, and assuming T&D losses of 20% and peak coincidence factor of 0.8, the cost of peak load savings comes to about \$10 per kW per year. This is substantially lower than the cheapest of the generation alternatives.

Form the standpoint of the consumer, the energy savings due to a 60W incandescent replaced by a 12 W CFL are in the range of 192 to 240 watt-hours a day. At an electricity tariff of \$0.12 per kWh, this results in cost (electricity bill) savings of \$0.70 per month or a 3-month simple payback period.

Thus, CFLs offer a win-win proposition from both the utility's and the consumer's perspective.

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 will 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.

Estimated Load Impacts

A typical CFL replacement (60W incandescent with 12 W CFL) results in 48W peak load savings. With about 600,000 CFLs in place, an estimated 25-30 MW could be saved assuming T&D losses of 20% and peak coincidence factor of 0.8 for the system. This impact estimate will be further refined based on the exact number and size¹ of the CFLs to be deployed into the system.

¹ The residential electricity consumption survey being conducted by MEMD will help in refining these figures further, before the actual procurement is initiated.