ENERGY EFFICIENCY INITIATIVES IN GHANA

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INTRODUCTION

- ENERGY PROFILE OF GHANA - 2006
  - AKOSOMBO 1020MW
  - KPONG 160MW
  - ABOADZE THERMAL 550MW
  - DEFICIT 300MW
  - ONLY TWO UNITS IN AKOSOMBO AVAILABLE
  - KPONG TAKES WATER SUPPLY FROM AKOSOMBO
LOAD SHEDDING

- ALTERNATE DAYS POWER SUPPLY
- VALCO SHUT DOWN
- SURGE IN GENERATOR PURCHASE
- FIRE OUTBREAK INCREASE
- LAYING OFF OF WORKERS
- INCREASE IN ROBBERY
INTERVENTION

- GOVT OF GHANA IMPORTING 125MW EMERGENCY DIESEL GENERATION
- 80MW DIESEL FIRED PLANT BY CONSORTIUM OF MINES
- IMPLEMENTATION OF APPLIANCE ENERGY EFFICIENCY PROGRAM (STANDARDS & LABELLING)
- LIGHTING RETROFIT PROJECT INVOLVING 6M CFLS
LRP

Based on its terms of reference the task force set itself the following objectives for the LRP:

- To collect and analyze data on end-use lighting load profile for residential customers.
- To determine the quantity, types and total cost of the energy saving lamps required.
- To develop a program for implementation of the Project.
- To monitor and evaluate the outcome of the Project and make recommendations for the subsequent phases of the LRP.
Implementation Objectives

- To reduce the risk of theft, hoarding and smuggling of CFLs to neighboring countries.
- Identify areas within buildings where utilization can be maximized.
- Evolve an effective implementation procedure for lamp installation.
- Design a monitoring and control system to ensure that set targets are achieved by implementing agencies.
## Technical and Economic Analysis

### Total Potential Energy/Demand/Cost Savings of a Nationwide CFL Replacement Program:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated no. of CFLs required to replace all incandescent lamps in the system</td>
<td>10,114,080</td>
</tr>
<tr>
<td>Estimated number of lamps in service during peak hours</td>
<td>6,068,448</td>
</tr>
<tr>
<td>Expected annual energy saving</td>
<td>434GWh/year</td>
</tr>
<tr>
<td>Peak demand shaving</td>
<td>238MW</td>
</tr>
<tr>
<td>Annual net cost savings</td>
<td>US$ 22,306,213</td>
</tr>
<tr>
<td>The total project cost</td>
<td>US$ 20,228,160</td>
</tr>
<tr>
<td>Net present value (NPV) over the life cycle of the lamps</td>
<td>US$ 63,042,292</td>
</tr>
</tbody>
</table>
**IMPLEMENTATION (PHASE 1)**

<table>
<thead>
<tr>
<th>Incandescent Lamp Rating (W)</th>
<th>CFL Replacement Rating (W)</th>
<th><em>Unit Cost Of CFL (US$)</em></th>
<th>Unit Installation Cost (US$)</th>
<th>Total Cost (US$)</th>
<th><strong>Number To Be Bought</strong></th>
<th>Total Cost (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥60</td>
<td>18</td>
<td>1.6</td>
<td>0.32</td>
<td>1.92</td>
<td>750,000</td>
<td>1,440,000</td>
</tr>
<tr>
<td>40</td>
<td>11</td>
<td>1.17</td>
<td>0.234</td>
<td>1.404</td>
<td>250,000</td>
<td>351,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,791,000</td>
</tr>
</tbody>
</table>
Implementation Procedure

- The Procurement Department of VRA would purchase the lamps and other items.
- The VRA logo should be inscribed on the lamps and other items as a measure to prevent theft and smuggling.
- The lamps would be kept at Central Stores, Tema.
- The project would be managed by a VRA Director.
- VRA would engage contractors to carry out the installation.
Implementation Procedure

- The areas identified from the pre-project survey would be divided into zones and allocated to the contractors to reduce the implementation time.
- A team of office/field engineers would be assigned to the project and be responsible for providing second level supervision as well as monitoring and evaluation of the project.
- A team of technician-engineers would be assigned to the project as field engineers to carry out the day to day on-site monitoring of the contractor’s work.
- The Project Manager would request for periodic allocations of the CFLs to the contractors through a requisition system that will be agreed between the Procurement Department and the Project Manager.
Implementation Procedure

- The contractors would install within their allocated zones and also per the schedule of number of lamps to be installed per day.
- The contractor would be required to fill a monitoring and customer data collection form to be signed by the customer.
- After installation the contractor would return the empty boxes as well as the replaced incandescent lamps. These would then be inspected by the field supervisor and a store’s representative and kept at the VRA stores. This measure in addition to the above would then be used to validate the contractor’s claim for payment.
- The monitoring and evaluation of project impact and the implementation process would be carried out by the project engineers with the assistance of the field inspectors.
MONITORING AND EVALUATION

- The project team together with ECG would take energy readings before and after installation in selected zones.
- The project team will carry out checks within each allocated zone to ensure that the lamps are actually installed.
- A monitoring and data collection form will be filled and signed by each customer following installation. These will be submitted to the project engineers for evaluation.
- Following implementation of the first phase the task force will submit a report evaluating the impact of the project and other observations that will inform subsequent phases of the project.
ACTUAL IMPLEMENTATION

- 6M CFLS
- GHANA ENERGY COMMISSION AND GHANA ENERGY FOUNDATION
- DISTRICT ASSEMBLIES
- EXCHANGE OF ONION BULBS WITH CFL
- NATIONWIDE DEPLOYMENT FOR FREE
GAINS

- ESTIMATED GAINS OF 120MW
- NEW CULTURE OF USE OF CFLS
- PEAK LOAD SHAVING AND ENERGY SAVING
- REDUCED GREENHOUSE GASES (CDM)
- SAVED INVESTMENT CAN BE USED AT OTHER SECTORS OF THE ECONOMY
RECOMMENDATIONS

- Governments should make a commitment to support the Utilities to implement LRPs because of the immense benefits to be derived from that.
- Before any LRP, careful planning and analysis should be undertaken in order that they do not fail.
- The best way to undertake an LRP is to provide the lamps free or at a discount. Physical exchange of incandescent lamps with CFIs is the best way and if possible the CFL should be installed by the utility representative and not left with the customer.
- Governments in the sub-region should take steps to ban the incandescent lamps once the CFL penetration is high.
The END – THANK YOU