

# Electrification strategies for Slum customers KENYA



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# THE KENYA POWER AND LIGHTING COMPANY



- ❖ Public company , shares quoted in the Nairobi stock exchange- government owns approximately 51% , while the rest are owned by the public
- ❖ Only licensed distributor and retailer of electricity in Kenya
- ❖ Manages and maintains off - grid power stations on behalf of the Government of Kenya
- ❖ Sole purchaser of bulk power from generators
- ❖ All customers enjoy the same tariff

# The Vision 2030



**Electricity infrastructure is a pillar that will facilitate the Government of Kenya achieve its Vision 2030 objective of transforming Kenya into a middle-income economy**



**Increase electricity access rate to 80% by 2020 from the current 29%**



**Achieve a customer base of 3 million by 2016 from the current total of 1.9 million**

**Connect 300,000 customers per year up to 2015**



# Slum Connectivity pilot 1

- Pilot 1- started in Kibera slum in Nairobi in 2007
- Target was 11000 customers
- Load limiters, restricting consumption were to installed but no meters
- Special authority obtained from the regulator to charge a flat rate consumption of 40kw per month, which was approx Kshs 300 (US\$3.75) per house.
- \* Connection charges were subsidised by Kenya power and were Kshs 1000+Vat (KShs 1160; approx US\$15)
- \* Less than 1000 took up the connections-



# Slum Connectivity pilot 1 – cont. - challenges

- The restrictions due to load limiters were resisted
- The network to supply was easy to access
- Cartels supplying stolen power intimidated the customers and disconnected them from legal power
- The value of 40kw units varied month to month since the tariff is not fixed, it has variables. The customers defaulted on payments due to this.
- The Load limiters were vandalised.



# Slum Connectivity pilot 1 – cont. – challenges-2



- Kenya Power could not sustain the program
- Connected Customers continued consuming without payments
- Difficult to disconnect-the cartels would still sell to the customers.
- The illegal network is a danger to life and limb
- Fires and electrocution of humans and animals rampant.
- New thinking was required --- as below

# Kibera -Slum Status



# Slum Electrification Project (GPOBA)

## PROJECT CONCEPT:

- A subcomponent of distribution component of IDA-financed KEEP
- US\$ 5 million GPOBA Funding
- Targets 66,000 Connections
- To improve livelihood of Kenyans in slums by providing safe electricity at subsidized connection rate
- Emphasizes stakeholder communication and involvement of local organizations





# Stimulating Connectivity - Slum Electrification Project (GPOBA )

## PROJECT COSTS:

- Average connection costs in slums approx. US\$400, hence US\$380 per connection
- Reduced connection fee of KSh 1,160 ( approx US\$ 15) or about 5% actual connection cost for the slums has been proposed as a special fee
- The special fee has created a funding gap for KPLC- hence OBA and IDA subsidy to bridge this gap

## Connection cost break-down:

contributor	Amount KShs	Amount US \$	Percent of total
Customer	1,160	15	4
GPOBA (grant)	6,000	75	19
IDA (Credit to KPLC	12,000	150	37
KPLC	13,320	166	40
Total	32,480	406	100

# Stimulating Connectivity - Slum Electrification Project (GPOBA )

## PROJECT COSTS:

- GPOBA & IDA grant funds will reimburse US\$125 to KPLC upon independent verification of each household connection
- They will disburse an additional US\$100 to KPLC upon verification six months later that the connection is still in operation (KPLC to finance ALL other costs)
- Subsidy break-down:

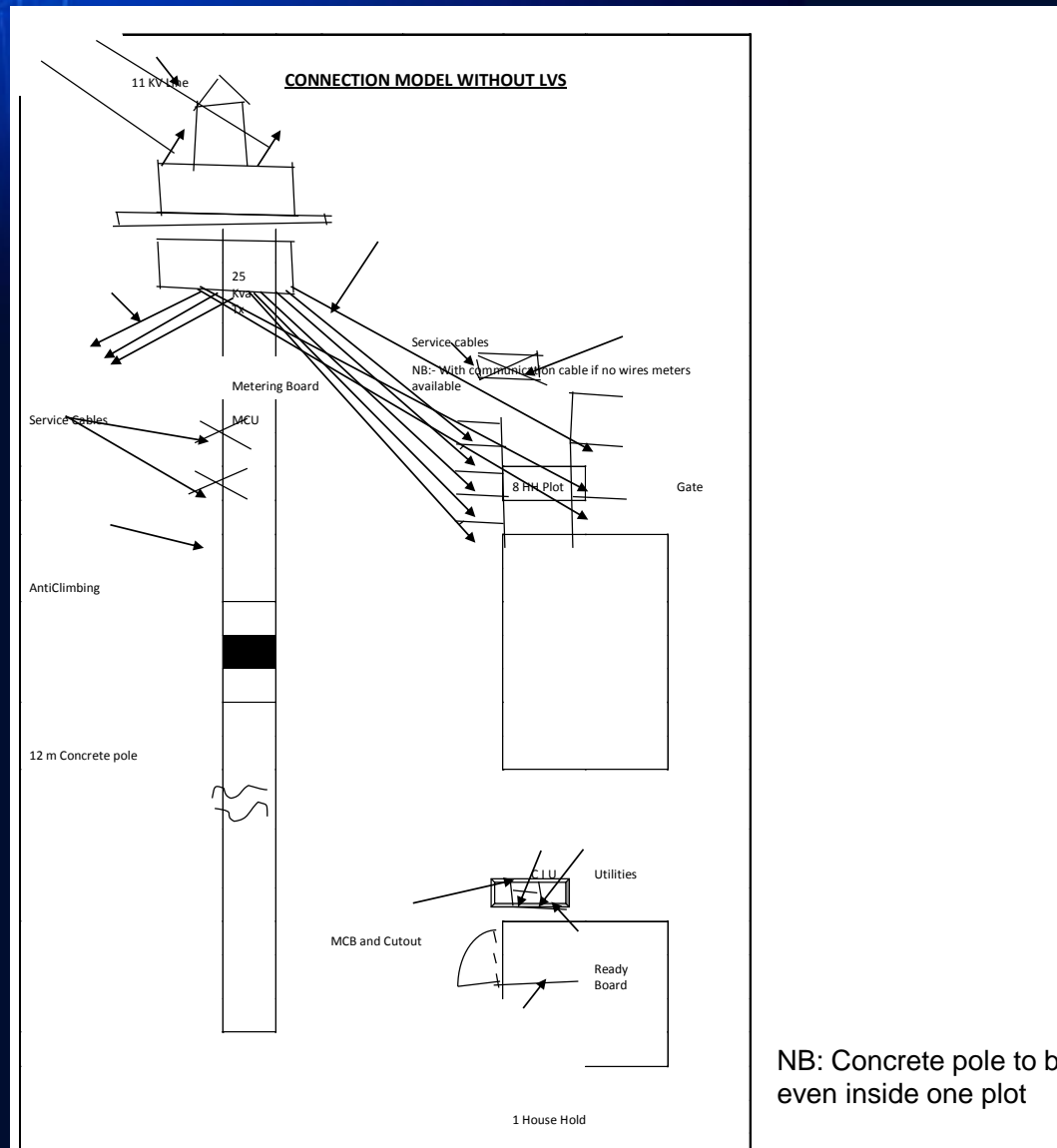
<b>GPOBA 1</b>	<b>50</b>	<b>Reimbursement on connection</b>
IDA 1	75	Reimbursement on connection
GPOBA 2	25	Reimbursement on verification customer still on after six months
IDA 2	75	Reimbursement on verification customer still on after six months

# Stimulating Connectivity - Slum Electrification Project (GPOBA )

## TECHNOLOGY USED:

- Pre-paid meters to meet the needs of the clients with irregular income and to address challenges for Kenya Power such as revenue collection
- Technologies that reduce theft opportunities and allow remote operations
- Use of low-cost technical solutions (e.g. ready boards that do not require internal wiring of houses) hence reduce connection costs
- Use single phase Transformers erected on single concrete poles
- No LV network – to prevent power thieves from accessing for connection
- Any unavoidable LV network will be above the 11 KV (HV) network
- Max. No of connections will be 17 customers connected to the biggest 25 Kva TXs
- Small No of customers per Transformer will create a sense of ownership to customers & security from vandalism
- Due to lack of wayleaves in slums, the 11 KV (HV) network will mainly use insulated ABC lines

# Stimulating Connectivity - Slum Electrification Project (GPOBA)



NB: Concrete pole to be erected between plots or even inside one plot

# Stimulating Connectivity - Slum Electrification Project (GPOBA )



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# Stimulating Connectivity - Slum Electrification Project (GPOBA )

## IMPLEMENTATION SCHEDULE:

<b>Milestone</b>	<b>Expected completion</b>
GPOBA provides subsidy commitment	January 2011
GPOBA Grant Agreement signed	November 2011
Service provision begins	February 2012
GPOBA disbursement begins	June 2012
GPOBA disbursement ends	June 2015

**NB: Over 7,400 Customers connected to date in slums**



# Previous efforts that did not do well

Initiative	Description
StimaLoan	<ul style="list-style-type: none"><li>• Service innovation entails providing credit facilities to low income customers for electricity connection</li><li>• Currently there are three types:<ul style="list-style-type: none"><li>➤ <i>Equity StimaLoan</i>- wholly managed by Equity Bank</li><li>➤ <i>KPLC StimaLoan</i>- wholly managed by Kenya Power.</li><li>➤ <i>National Bank StimaLoan</i> - wholly managed by Equity Bank</li></ul></li></ul>

# Barriers to Connectivity



**Internal wiring costs (Ready board solution)**



**Equitable distribution of costing/pricing/  
unaffordability. (83,000 quoted customers)**



**Rising costs in subsidising standard connection  
fees**



**Capacity to construct the network**



**Scattered clusters of customers far from network**



**Unplanned developments**



**Wayleave acquisition**

# Proposals for Additional Funding To Support Low Income Groups

	Description	Cost -USD/ year (approx.)	Benefits
1.	<p>Energy Efficiency, Conservation &amp; PUE</p> <p>i) Energy Conservation campaigns</p> <ul style="list-style-type: none"> <li>- Media Campaigns &amp; Setting up regional demonstration centres on efficient use of electricity</li> <li>- To set up centres in our main offices to demonstrate efficiency in the use of electricity</li> <li>- To continuously educate our customers on efficient use of energy and energy conservation</li> </ul> <p>ii) CFL distribution to households and SMEs</p> <ul style="list-style-type: none"> <li>- This is meant to benefit approximately 250,000 poor households with a maximum of 4 CFLs per household and SMEs</li> </ul> <p>iii) Capacity building for staff in DSM and productive use of electricity</p> <p>iv) Promoting productive use of electricity</p>	<p>2,000,000</p> <p>3,000,000</p> <p>1,000,000</p> <p>2,000,000</p>	<p>Behavior change and increase adoption of energy efficient technologies and energy conservation practices</p> <p>Distribution of 1million CFLs per year:</p> <ul style="list-style-type: none"> <li>- To reduce peak demand and improve the system load factor</li> <li>- Reduce customer electricity bills</li> <li>- Environmental conservation</li> </ul> <p>Enhanced use of electricity with socio-economic benefits</p>
2.	<p>Solar Water Heaters &amp; Capacity building (Pilot Project)</p> <ul style="list-style-type: none"> <li>- Installation of 4,000 Solar Water Heaters per year in households</li> <li>- The costs include the SWH and installation costs and project management</li> <li>- Includes training for the technical staff on the SWH technology and SWH project management</li> </ul>	10,000,000	<ul style="list-style-type: none"> <li>- To encourage the use of renewable energy sources</li> <li>- Reduce customer water heating bills</li> </ul>

# Proposals for Additional Funding To Support Low Income Groups

	Description	Cost -USD/ year (approx.)	Benefits
3	<p>Prepaid meters &amp; Current transformers for metering – for new connections</p> <ul style="list-style-type: none"> <li>- Installation of 300,000 prepaid meters/ year and 3,000 CTs</li> <li>- Undertake marketing campaigns to educate customers on use of prepaid meters</li> </ul>	<p>29,000,000</p> <p>2,000,000</p>	<ul style="list-style-type: none"> <li>- Loss reduction campaign</li> <li>- Enhance revenue collection</li> <li>- Revenue protection</li> <li>- To support DSM</li> <li>- Affordable power</li> </ul>
4	<p>Smart Meters &amp; Capacity Building</p> <ul style="list-style-type: none"> <li>- Installation of 10,000 smart meters for small commercial customers</li> </ul>	7,000,000	<ul style="list-style-type: none"> <li>- Ring fencing</li> <li>- Load control</li> </ul>
5	Laboratory equipping & capacity building	2,000,000	<ul style="list-style-type: none"> <li>- To support the advanced metering requirements of prepayment meters and smart metering.</li> <li>- Training for the technical staff in the laboratory and customer service department on the laboratory management and on the new metering techniques</li> </ul>

# Proposals for Additional Funding To Support Low Income Groups

	Description	Cost -USD/ year (approx.)	Benefits
6	Connection Policy Review	120,000	To review the existing connection policy to render it cost reflective and market friendly
7	Connection Charges subsidy	130,000,000	To assist customers to afford the connection fees given rising costs in Kenya Power subsidising standard connection charges
8	Ready Boards and Surge protectors for poor households	20,000,000	<ul style="list-style-type: none"> <li>- To reduce internal wiring charges for poor households</li> <li>- To protect the poor households equipment/ appliances against surges</li> </ul>
9	<p>Line maximization funds:</p> <ul style="list-style-type: none"> <li>- Installation of transformers where there are clusters of customers - 5 or more under the MV lines, and construction of LV lines to serve the customers</li> <li>- Extension of 1 or 2 km of MV lines and installation of transformers where there are clusters of customers – 5km or more away from the MV lines and construction of LV lines to serve the customers</li> </ul>	To be determined	<ul style="list-style-type: none"> <li>• Enhance Connectivity</li> <li>• Reduce losses</li> </ul>

# Proposals for Additional Funding To Support Low Income Groups

	<b>Description</b>	<b>Cost -USD/ year (approx.)</b>	<b>Benefits</b>
<b>10</b>	Electricity Safety Promotion Campaign	1,000,000	Educate customers on safe use of electricity
<b>11</b>	Installation of small size transformers - to reduce the LV route lengths from current 600m to 300m. - This will reduce outages, and losses associated with the extensive low voltage network	To be determined	<ul style="list-style-type: none"> <li>• Enhance Connectivity</li> <li>• Reduce losses</li> <li>• Improve quality of supply</li> </ul>
<b>12</b>	Small wind and Solar units - installation of Small wind and Solar units to supplement the off grid stations to reduce the use of diesel	To be determined	<ul style="list-style-type: none"> <li>• Reduce the use of diesel</li> <li>• Enhance use of renewable energy</li> </ul>
<b>13</b>	Marshal plan for Distribution & Transmission network	To be determined	<ul style="list-style-type: none"> <li>• Enhance supply availability and reliability</li> </ul>
<b>14</b>	Sovereign guarantees for IPPs for new plants - Depends on plant capacity	To be determined	<ul style="list-style-type: none"> <li>• Improve supply availability, quality and reliability</li> </ul>



THANK YOU