

LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

Zambia

Qualitative Off-Grid Lighting Market Assessment

October 2008

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1. LIGHTING AFRICA OVERVIEW/ MARKET INTELLIGENCE PROGRAM

What is Lighting Africa?



Lighting Africa is a World Bank – IFC initiative aimed at supporting the global lighting industry to catalyze a robust market for off-grid lighting products tailored to the needs of African consumers.

The Program's mission is to make affordable, environmentally sustainable, durable, and safe lighting available to the masses, who currently depend on kerosene lanterns and candles to satisfy their lighting needs.

How does Lighting Africa support the development the lighting market?



The Lighting Africa program is a **market-based** approach, grounded in the recognition that:

- There is a considerable **commercial market opportunity** and willingness to pay for off-grid lighting, substantiated by annual expenditures on kerosene amounting to \$38 billion and \$17 billion, globally and in Sub-Saharan Africa, respectively
- Recent **technological advancements in lighting**, particularly in the area of Light-Emitting Diodes (LEDs), demonstrate increased promise to deliver affordable technological solutions tailored to the African marketplace and beyond
- The most expedient and sustainable way to bring affordable, reliable lighting to Africa is by **supporting the industry** to design and deliver an array of products tailored to the needs of African consumers

How do we ensure Lighting Africa program activities respond to industry need?



All Lighting Africa program activities are designed *with* and *for* the industry and other stakeholders

Through *ongoing consultation* with a wide array of stakeholders (including private companies, NGOs, financiers, governments and other key players along the supply chain) opportunities are identified where Lighting Africa can play an appropriate role in accelerating the off-grid lighting market in Africa



Lighting Africa: Program Areas

- **Policy:** Addressing policy and regulatory barriers
- **Financing:** Improving access to finance along the distribution chain- for example through partnership with financial institutions
- **Product Quality Assurance:** Addressing issues of quality with lighting products to help consumers make informed purchase decisions and prevent market spoilage
- **Business-to-Business Linkages:** Creating opportunities for different players along international supply chain to meet, exchange information and create business partnerships
- **Market Intelligence:** Collecting & disseminating key market information to support successful market penetration
- **Business Environment:** Facilitating market entry through the provision of relevant information, such as country-specific policy and regulatory information

What will the market research provide?



Key Market Information on consumer needs, preferences and finances. The information will:

- Inform on the desired functionality and design attributes of different types of lighting products within several different product classes (Torch, Floodlight, Task Light, Lantern, Spot Light)
- Enable the industry to overcome potential challenges that are likely to accompany market entry in the African off-grid lighting market
- Create a baseline to quantify the size of potential market segments for appropriate lighting products in volume and value terms

Structure of Market Research Work



- Currently the Lighting Africa market research program covers:
 - 5 countries: Ghana, Kenya, Zambia, Ethiopia and Tanzania
 - 2 key market segments: households & micro-businesses in rural and urban areas
- The research is divided into two phases:
 - **Surveys** on consumer lighting uses, preferences, and expenditures
 - In-depth **product testing** by focus groups

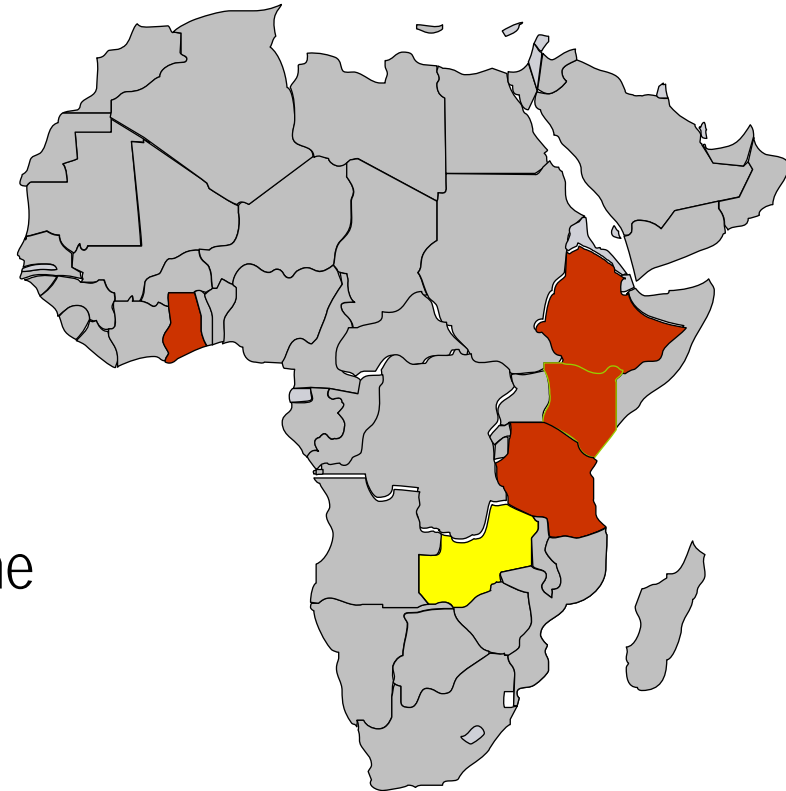


Lighting Africa: Why Market Research?

- While anecdotal evidence shows a substantial opportunity in the off-grid lighting market in Africa, much of the industry lacks the information needed to develop and market products appropriate to meet the needs of African consumers
- This is the result of a premature and undeveloped market, but one with demonstrable potential – **the fuel-based lighting market in Africa is currently worth more than \$17 billion per year** – yet is still largely undefined, untapped, and unrealized
- In response to the industry's call to provide greater comprehension to the scope of this emergent market opportunity, Lighting Africa developed a **Market Research** program

Qualitative Research Phase: Stage 1

- This report summarizes the **qualitative** findings of the first research phase for **Zambia**.
- Analogous studies are available at www.lightingafrica.org for the other 4 countries.
- Lighting Africa will soon issue the following complementary reports
 1. **Quantitative** analyses for each of the 5 countries
 2. A **cross-country summary** report
 3. Results of the in-depth **focus group product tests**





2. MARKET RESEARCH APPROACH

2. Research International: Background and Related Experience



The research was conducted by the Research International Africa, a subsidiary of the global market research firm, Research International, the world's largest custom market research agency, with offices in 50 countries worldwide and 30 years of expertise.



- The market study involves studies of the market in Africa to provide insights that form the basis for innovative product ideas; and is comprised of two primary research methods:
 - An **Exploratory phase** involving a desk study of existing data on the market and a Habits and Attitudes survey of the population
 - **Concept testing, using the proprietary eValue** methodology, to quantify the acceptance and likely uptake of existing, new and revised product ideas for the market in Africa

- The test sample included 2 key market segments: (i) urban and rural households and (ii) urban and rural micro-businesses
- Interview respondents in each segment were selected at random in the following representative locations: Addis Ababa, Butajira, Debre Birhan and Nazareth



- Researchers conducted **55 in-depth, structured interviews** to gather information on current lighting practices, attitudes toward current lighting products, and perceptions of modern lighting products, etc
- **2** different test products were left for **3** nights with each respondent so they could evaluate them in the context of their daily lighting needs
- Researchers returned after 3 nights and invited respondents to complete a callback questionnaire on their experience with the test products

Key Types of Consumer Information Collected



The market research interviews generate the following country-specific consumer information:

- Who are the consumers?
- How do consumers presently utilize light?
- What do consumers want in terms of the amount and type of light needed to satisfy their lighting needs?
- Which products do consumers prefer?
- How much are consumers willing to pay for different kinds of lighting products?





Products Tested

LANTERN
Dynamo or mains power,
rechargeable battery



LIGHT SOURCE
White LED

TORCH
Solar, rechargeable
battery



LIGHT SOURCE
White LED

Products Tested

TASK LIGHT
Lantern & Torch
Solar, rechargeable
battery



LIGHT SOURCE
CFL and LED

TASK LIGHT
Mains power or
replaceable battery



LIGHT SOURCE
White LED

Products Tested

TORCH
Replaceable battery



LIGHT SOURCE
White LED

FLOOD LIGHT
Solar, rechargeable
battery



LIGHT SOURCE
Linear fluorescent

SPOT LIGHT
Solar, rechargeable
battery



LIGHT SOURCE
White LED



3. DEFINING THE ZAMBIAN CONSUMER

3. Lighting Consumers: Households



Urban Dwellings

LSM 1-4

- The house/dwelling sizes, in urban areas are small. Typically families will occupy anything from a *single room* partitioned into a living and sleeping area with a curtain to a 3 room structure
- Generally 2 to 5 people live in the household on a permanent basis

“I am renting two rooms in this whole building. Its one building but each one of use is renting two rooms”

--Male, LSM 3 Household, informal area, Lusaka, urban



“As you can see, one room is a sitting room but we use the same room as a kitchen, for cooking and the other room is a bedroom for me and my wife. This same sitting room is used as a bedroom for my two children at night. Even when we have visitors, they still use the sitting room for sleeping. Sometimes it is difficult especially when I receive my parents or my parents-in-law”

--Male, LSM 3, Household, informal area, Lusaka, urban



Rural Dwellings

- In the rural settings, within LSM 1–4, the houses are similar to those in urban dwellings in size. These houses rarely exceed 3 rooms. When they do, the tenants construct their own room extensions
- For people living in rural areas households range between 2 to 7 people because they tend to have more children

*“My house has three rooms and an extra room that I built separately for the boys”
--Male, LSM 4, Household, Zimba, rural*



LSM 5-12

- Rural higher social classes have dwellings consisting of 4 to 7 rooms. These rooms, in some cases include one toilet and one bathroom or shower within the main house

“My house has 3 rooms and another small room that we use as a toilet and bathe room”

--Male, LSM 9, Household, Zimba, rural

“I live in a 2-bedroom house which has a small kitchen, a sitting room and a shower room and a toilet”

--Male, LSM 7, Household, Zimba, rural





Kitchen and Cooking Areas

Kitchen and Cooking Area

- Within the urban areas the sitting room and the kitchen often share the same room
- In some cases in the upper social classes, within both urban and rural areas, the kitchens are a separate room in the house
- Rural kitchens are sometimes detached from the main house. Within the lower social classes kitchens can double as bedrooms for the children



“This is the sitting room where we normally sit for chatting or just relaxing. Or when visitors come we welcome them in this room. It is used as a kitchen and as a bedroom for my children at night. The other room is our bedroom.” -- Male, LSM 3, Household, informal area, Lusaka, urban

“ My daughters sleep in the kitchen. They also use the light to prepare for sleep.”
--Male, LSM 3, Household, Livingstone

Bath and Toilet Facilities

- In the lower social classes bathroom and toilet facilities are shared with neighbors and are outside of the dwelling. A few respondents in the upper social classes also share the bathroom and toilet facilities
- Generally, toilets are pit latrines with a small structure built around them for privacy. Others use their compounds behind the house when the rest of the neighbors have gone to sleep.

“We are just too many here. The landlord built two bathrooms and two toilets that we all use. [For bathing at night] I just go behind the house when everyone has stopped moving about.”

--Male, LSM 3, Household, informal area, Lusaka, urban

Typical Day

- All the respondents are generally early risers, waking up before 6 a.m. to prepare for work or do household chores, in both urban and rural areas. They work all day and the women go home early to prepare for the evening meal. Sleeping time starts from 9 p.m.; those with electricity go to sleep after 11 p.m.

“.....When I have a contract, I normally wake up around 6 a.m. and go for work and when I come back in the evening I sit a bit with my family and retire to bed at around 9 p.m., from Monday to Saturday”

--Male, LSM 3, Household, informal area, Lusaka, urban

“I wake up at 6 a.m. to clean the house and surroundings. Then I go to draw water at the well to leave enough for the people that I am staying with. Then I cook food if there is anything to cook and after that I go to the market.”

--Female, LSM 2, Household, Zimba, rural

“I go for work from Monday to Saturday. All these days, I normally work from 8 a.m. to 9 p.m.”

--Male, LSM 3, Household, Livingstone

“On a working day, I wake up at 5:30 a.m. to start my preparations to go for work. My wife prepares bath water for both of us. During that time she prepares breakfast for us and the kids. I start off for work at 7:20 a.m. I work from 8 a.m. to 4:30 p.m. And if I am not with my friends spending the evening together... I just go home to stay with my wife and kids.”

--Male, LSM 7, Household, Zimba, rural

Weekends and Days Off

- In both urban and rural areas most people go to church. Those who do not spend their days with family are at home resting
- In the afternoon, some go to visit friends or to the market. Within the upper social classes, respondents watch movies and relax

“On Sundays, I am off duty and I stay at home”
--Male, LSM 3, Household, Livingstone

“We usually work on Saturdays. But when I am free, I do go to church with my family. On Sundays, I normally stay at home, listen to my small radio or just take a nap.”
--Male, LSM 3, Household, informal area, Lusaka, urban

“I go to church on Saturday. On Sunday I go to the market until 1:00 p.m.”
--Female, LSM 2, Household, Zimba, rural

“During weekends, I work on Saturdays and rest the whole day on Sundays.”
--Male, LSM 7, Household, Zimba, rural

“I rest on Saturdays when I am not working but basically I just go to buy things for the house.”
--Male, LSM 4, Household, Zimba, rural

Day-to-Day Challenges



LSM 1-4

- In both urban and rural areas, consumers are trying to make ends meet, trying to provide food on the table on a daily basis, along with education and lighting

“Life is tough. Even as I am working, I can not give my family everything they deserve. The money I get is so little. I only hope I could get a better job so that I can feed my family well but jobs are hard to come by...”

--Male, LSM 7, Household, Zimba, rural

Consumer Aspirations

- Education is perceived as the key to a better future for self or children. Others aspire to start or expand their business to increase their income, or to own their own homes which have electricity

“I recently bought a plot where I want to put up a small house. I am doing this for the children...I am also trying to send them to school so that when I am old or dead, at least they can fend for themselves with the little education that they get when I am still alive.”

--Male, LSM 3, Household, informal area, Lusaka, urban

“One thing I would like is to have all my children educated, maybe up to college level. That is not easy for me but I am trying my best to see that all my children at least finish their secondary education. Another thing is that I would like to live in an electrified house one day.”

--Male, LSM 4, Household, Zimba, rural

“I want the best for my children. I want them to go to school and even reach up to university. I also want to at least build something--like a house--so that if I die my children will not suffer. Those are my plans that are already underway.”

--Male, LSM 7, Household, Zimba, rural

3. Lighting Consumers: Trade



Urban and rural

Traders conduct business using the following shelters or aids:

- Out in the open (usually in front of their house)
- On tables in the market, outside the market or a short distance from their homes, in temporary structures
- In market stalls
- Kiosks
- One-room shops
- Two-room shops (for the larger traders, where one room is a store)
- One room with a verandah (for restaurants)

“As you saw for yourself, I sell vegetables, mealie meal, cooking oil, salt, tomatoes and onions and some eggs outside the market. I sell from outside because I have not been able to acquire a shop or a stand inside the market.”

--Female, Open Market, Retailer, Lusaka, urban

“I just stay at home with my family. This is usually on Sundays that I don’t sell. But people come to my home to buy the things that I sell.”

--Female, Open Market, Retailer, Lusaka, urban



Size of shops

- Trade premises tend to be small, often only one or two rooms depending on business type. Some serve the dual purpose of home and business premise especially on Sundays when the business owners are resting
- In the trade centers, a few of the shops have electricity

Toilets

- The toilets the traders use are shared

“There is a communal toilet just at the entrance of the market. That’s where we go”

--Female, LSM 7, Household, Zimba, rural

“I sell at the market. I sell some vegetables, some tomatoes, onions, kapenta and other small food stuffs.”

--Female, Trade, Zimba, rural

“I don’t have a formal job but I have a shop at the local market.”

--Male, Trade, Zimba, rural



Operating Hours: Urban Trade

- Typically the traders in the market open as early as 6:00 a.m. Those in the shops in urban areas sometimes open at 7 a.m. Closing time is late in the night at 9 p.m. for some, 7 days a week

“I go to the market at around 6 a.m. and close at 8 p.m. My children bring lunch for me so that I don’t have to come home for lunch.”

--Female, Open Market, Retailer, Lusaka, urban

“I go to the market at around 6 a.m. and close at 8 p.m.”

--Female, Open, Market, Retailer, Lusaka, urban

“....My shop remains open every day up to 8 p.m.. I open my shop at 7 a.m.”

--Male, Trade, Small Shop, Retailer, Lusaka, urban



Operating Hours: Rural Trade

- Rural traders tend to open slightly later than urban traders, at about 7 a.m. These traders also close early compared to their urban counterparts.

“people in this area sleep early and so there would be no one to sell to after 9 p.m.”

“I open almost all the days of the week except for Sunday when I go to church. I open in the morning at 7 a.m. and close at 7 p.m.”

--Male, Trade, Small Shop, Retailer, Zimba rural

“I come to the market everyday at 7 a.m. I stay here until 6 p.m. when they close the market, when everyone has to leave.”

--Female, Trade, Close Market, Zimba, rural

Typical Day: Trade



Urban Trade

- Most traders conduct their businesses out in the open (usually in front of their house or in temporary structures outside their houses. Others operate from market stalls and shops

“I wake as early as 5 a.m. to go to Soweto (a wholesale market in town) to make my orders. But I do that twice a week. On the days that I don’t go to Soweto, I go to the market at around 6 a.m. and close at 8 p.m.. My children bring lunch for me so that I don’t have to come home for lunch”

--Female, Open, Market, Retailer, Lusaka, urban

“I open all the days of the week, from Monday to Sunday. I sell from Monday to Friday and my brother sells on the weekend.”

--Male, Trade, Small Shop, Retailer, Lusaka, urban

“....My shop remains open every day until 8 p.m. I open my shop at 7 a.m.”

--Male, Trade, Small Shop, Retailer, Lusaka, urban

“I open my shop at 7 a.m.”

--Male, Trade, Small Shop, Retailer, Lusaka, urban



Typical Day: Trade

- **Most traders conduct their businesses out in the open, usually in front of their house or in temporary structures outside their houses. Others operate from market stalls and shops**

“I wake up at 6 a.m. to clean the house and the surrounding of the house. Then I go to draw water at the well to leave enough for the people that I am staying with. Then I cook food if there is anything to cook and after that I go to the market”

--Female, Trade, Zimba, rural

“I just stay at home with my family. This is usually on Sundays that I don’t sell. But people come to my home to buy the things that I sell.”

--Female, Open Market, Retailer, Lusaka, urban

“... my brother sells over the weekends so that I can go and order more goods or do other things.

--Male, Trade, Small Shop, Retailer, Lusaka, urban



Traders' Aspirations

- **Most traders' aspirations revolve around making more money and expanding their businesses in order to provide for a better future for themselves and their children**

“I want to improve my business so that I can make more money to be able to feed my family well and to send my children to school without fail”

--Male, Trade, Zimba, rural

“I hope that I will be able to save some money to improve my business. I want to have my own shop by then so that I will be able to stock many things apart from what I am selling at the moment.”

--Female, Open Market, Retailer, Lusaka, urban

“I am working hard with my business so that in five years time, I am able to build my own shop and maybe buy a van for the transportation of my goods to the shop”

--Male, Trade, Small Shop, Retailer, Lusaka, urban



Consumer Summary

- **Dwellings in both urban and rural areas range from 2 - 7 rooms in all social classes. In the lower social classes (LSM 1-4), individuals use the various rooms in the house for multiple purposes depending on the time of evening it is. For example, a kitchen can be used for sleeping in later in the night.**
- **Within the household, at least one person starts their day early, preparing for the family to commence their daily activities. The women do household chores then proceed to their daily money-generating activities and go home and do household chores before retiring to bed.**
- **The traders who have shops have the privilege of starting their day slightly later than those who have stalls or temporary structures in the markets, both in urban and rural areas. In rural areas, the traders also tend to close slightly earlier than those in urban areas.**
- **Majority of the respondents are religious. The rest (non-religious) spend their off day, mainly Sunday, relaxing or if a customer comes, selling their wares from the house.**
- **On the other hand, respondents in the upper LSMs, spend their leisure time watching television, watching movies and relaxing.**



4. CURRENT LIGHTING BEHAVIORS

4. Lighting Behaviors: Household

Main activities affected by lighting

- Cooking in the kitchen area
- Eating
- Reading and children studying
- Preparing for school and office
- Relaxing and waiting to go to bed
- Bathroom and toilet
- Watching the baby at night

Some the respondents use fire light both in the kitchen and sleeping areas

“We light the fire in the kitchen, and that gives enough light for us to see what we are cooking... We take the same wood on fire and for a short time light the room where we sleep. We normally prepare our beds during the day and just find our way to the beds in the short time that we light the bedroom with the firelight.”

--Female, LSM 2, Zimba, rural

“I would like to iron late in the night after finishing with the house chores but given that I have no electricity I have to iron at my sister’s during the day. Right now I have to cook early so that the tin lamp can be used for other activities within the house.”

--Female, LSM 2, Zimba, rural



Lighting Behaviors: Household

- On average, lights are used between the hours of 5 a.m. and dawn and in the evenings from about 7 p.m. to 9:30 p.m.
- Often there are only 1 or 2 lighting products in the household. Activities are often interrupted in order for the product to be utilized in an alternate activity. For example, a tin lamp is used to light the cooking activity as well as move about in other rooms or if someone needs to visit the latrine

“I would say that roughly we switch it on at 7 p.m. and put it off when we go to bed at 11:30 p.m.”

--Male, LSM 3, Household, informal area, Lusaka, urban

“It will be useless and expensive to have 2 lights, or another one in the bedroom when there is no one in there. When I am home in the evening, we all sit in the sitting room until my wife finishes preparing food. We eat and then retire to bed.”

--Male, LSM 5, Household, informal area, Lusaka, urban



5. CURRENT LIGHTING PRODUCTS & EXPENDITURES

5. Lighting Products and Expenses





Currency Conversion Rate*

▪ **Zambia** **USD 1 = ZMK 3499**

**Approximate, as of May 2008*

Lighting Expenses

- **Lighting expenses in most cases are the responsibility of the lady of the house. The man of the house tends to give the lady money for the kitchen budget as a lump sum, thereafter, it is up to her to ensure that her immediate family members do not lack light**
- **In the rural areas (LSM 1-4) the lighting budget is usually lower than that of residents of urban areas and higher social classes combined. Rural residents are able to cut cost by collecting firewood for example, and using the fire that they cook with for light**

*“We use that [bundle of wood] for one-and-half weeks and we buy it at K11,000.
So we use K33,000 per month, which is ok with us.”
--Male, LSM 3, Household, informal area, Lusaka, urban*

*“We fetch them from the bushes. We go and cut enough that lasts maybe for one week. We use the firewood for cooking and our light in the night.”
--Female, LSM 2, Zimba, rural*



Lighting Products: Trade

- **Traders in smaller premises find one light is sufficient. Others, however, need more than one light source because of lack of sufficient light**

“I normally put the candles in all the corners of the room so that I can have enough light to at least see a bit. I put the candles in those candle stands and I think they are safe.”

--Male, Open Market, Retailer, Lusaka, urban

“Yes, actually when it gets dark, I light up my shop using a Tiller lamp and a candle, and a small torch for me to see in my money box.

--Male, Trade, Small Shop, Retailer, Lusaka, urban

“I use candles when it gets dark and that does not provide me with enough light to see everything and everyone in the shop. People can be tempted to steal as the light is not enough.”

--Male, Open Market, Retailer, Lusaka, urban



Lighting Expenses: Trade

- Most of the respondents buy their lighting fuel in small quantities. A few of them decant some paraffin from their houses

“I use about a litre per month. I usually buy in bits, very small, small bits for which I pay cash. People cannot give credit on small things like paraffin because they need the money to buy their stuff as well. With that litre of paraffin, I am able to have light using my Koloboyi for the whole month” -- Female, Open Market, Retailer, Lusaka, urban

“I think I spend more or less than K50,000 per month to buy the paraffin and candles if I need them.” -- Male, Trade, Small Shop, Retailer, Lusaka, urban

“Roughly, I use a bottle (375 ml) per week to light my shop in the evening. I don’t light for a long time and I think that’s why it lasts longer. A bottle with paraffin costs about K4,000; it lasts for a week.” -- Male, Trade, Small Shop, Retailer, Zimba, rural

“I use very little, I use about one bottle of paraffin that costs K 4,000. I can use that for the whole month. Sometimes I do not need the paraffin because by the time we knock off, there is still sunlight.” -- Female, Trade, Close Market, Zimba, rural

“I don’t know because I just get the paraffin from home.”
--Female, Fixed Hawker, Livingstone, urban

Paraffin Lamps

Usage

- A paraffin lantern is the most widely used since it has a glass to protect the flame. Paraffin is also readily available and it is also considered inexpensive enough to use on a daily basis

Disadvantages

- Pungent smell
- Too much smoke when using the lamps

“A Tiller lamp is a lamp that has a metal casing like a can at the bottom with a glass on top of it. Inside the can there is a cotton string that comes out into the glass. We normally pour paraffin in the can and then it produces light”

“A paraffin lamp costs K18,000.00 to K20,000.00. it can be compared to most of these Chinese products that have flooded the market. Paraffin use costs K33,000.00 per month.”

... I use the Tiller lamp in all the three rooms in the night. I am not home most of the time until after 10 p.m. My wife uses the light to cook and prepare everything else so that by the time I come; we just use it in the sitting room.”

“I don't like the smell and the smoke. Your nostrils become dark because of the smoke that the lamp produces.”

“The Tiller lamp releases some smoke that smells bad.”

--Male, Trade, Small Shop Retailer, Lusaka, urban



Usage

- The tin lamps are cheap to use since many of them are home made.
- Paraffin is also readily available and cheap to buy since the tin lamp only requires a little.

Disadvantages

- Its smells badly.
- The light is easily blown off by wind.
- It has disturbing smoke.

“I use a Koloboyi. It is a simple lamp that is made from an ordinary tin. You put a hole on top of the tin, pour some paraffin in the tin and put a cotton string through the hole on top of the tin with a slight protrusion”

--Female, Open Market, Retailer, Lusaka, urban

“... the problem I face is the wind that sometimes blows off my light. Also the smoke that comes from the light disturbs me a lot.”

--Female, Open Market, Retailer, Lusaka, urban

Mains Power (Electricity)



Usage

- Electricity is used by individuals in the upper social classes. These are consumers who are able to afford rent in slightly more up-market areas

Disadvantages

- Frequent power cuts
- Unpredictable in terms of respondents are never sure when power will come back, once it goes
- Electricity is expensive for those in the lower social classes

“ We don’t have any problems.”

--Male, LSM 7, Household, Zimba, rural

“Yes, we are very satisfied. If it were not for the power cuts, electricity is the best source of lighting”

--Male, LSM 7, Household, Zimba, rural

“We leave the power on only where there are people in those rooms. We switch it on when it gets dark maybe at 7 p.m. and switch off the inside lights when we all go to bed at 10 or 11 p.m.. There are security lights outside that we leave on until morning.”

--Male, LSM 7, Household, Zimba, rural



Usage

- In many cases, candles are the main source of light.
- For respondents with electricity, candles are used in case of power black out.

Disadvantages

- Candles do not give sufficient light.
- The candles also do not last long, so they are expensive in the long run.
- Wax spoils things.

“Candles: we have not much choice when power goes but to use something else.”
--Male, LSM 7, Household, Zimba, rural

“...they don't give enough light for you to do everything that you would like to do.”
--Male, LSM 7, Household, Zimba, rural

“Candles don't last for a long time and are very expensive to use.”
--Male, Trade, Small Shop, Retailer, Lusaka, urban

“I am not really pleased with the wax that falls from the candles. It falls on the goods and messes things up.”
--Male, Trade, Small Shop, Retailer, Lusaka, urban



Usage

- Very few torches are used by consumers in urban and rural settings. Those who use torches focus on particular things such as cash boxes or the path to the toilets

Disadvantages

- Some respondents consider the batteries expensive

“[I use] a small torch to see in my money box and to changing customers’ money.”

--Male, Trade, Small Shop, Retailer, Lusaka, urban



Usage

- A minority of the respondents in rural areas (LSM 1-4) use firewood in their kitchens as a source of light. Those who use it claim they opt for it because it is the cheapest source of light; they collect the firewood from thickets

Disadvantages

- The firelight has too much smoke
- An unpleasant smell is permanently on clothes of those who use firelight

“We light the fire in the kitchen, and that gives enough light for us to see what we are cooking and almost everything else in our small kitchen. The fire is lit in the middle of the kitchen. We take the same woods that have fire and light for a short time in the room where we sleep. We make sure that the firelight does not go off. We put a big log that keeps the fire until in the morning. We always have light.”

--Female, LSM 2, Household, Zimba, rural

“The smoke is very bad. It chokes our eyes and makes our clothes smell badly.”

--Female, LSM 2, Household, Zimba, rural

Summary of Lighting Products Presently in Use

	ADVANTAGES	DISADVANTAGES
Paraffin/ Kerosene Lantern	<ul style="list-style-type: none"> ▪ Paraffin not very expensive since it can be bought in small quantities 	<ul style="list-style-type: none"> ▪Pungent smell ▪Too much smoke when using the lamps
Tin lamp	<ul style="list-style-type: none"> ▪ It can be made at home ▪ Uses little paraffin 	<ul style="list-style-type: none"> ▪Its smells bad ▪The light is easily blown off by wind ▪It has disturbing smoke
Electricity	<ul style="list-style-type: none"> ▪ Easy to use 	<ul style="list-style-type: none"> ▪Long power black outs ▪Expensive for most
Candles	<ul style="list-style-type: none"> ▪ Give some light 	<ul style="list-style-type: none"> ▪Lasts a short time only ▪Expensive since have to keep buying candles ▪Messy - Wax drips on things
Torch	<ul style="list-style-type: none"> ▪ Can focus on items 	<ul style="list-style-type: none"> ▪Buying batteries makes using a torch expensive
Firelight	<ul style="list-style-type: none"> ▪ Inexpensive 	<ul style="list-style-type: none"> ▪The firelight has too much smoke ▪An unpleasant smell is permanently on clothes of those who use firelight

Environmental and Health Effects

- Most of the respondents, when asked to describe environmental considerations, instead mention health considerations
- Almost all the respondents (except for those who use electricity) are concerned about residues such as smoke that is produced by the light they use

“.....when you pour paraffin in the water, the water becomes polluted and you can not drink that water anymore. You see the problem it has though it is very useful at the same time.”

--Male, LSM 9, Household, Zimba, rural

“I am not very sure but I think that the smoke will eventually make us start coughing. I don't know very well.” -- Male, LSM 3, Household, informal area, Lusaka, urban

“I would agree because paraffin emits some very bad smoke as it burns and that smoke can be harmful to health” -- Male, LSM 9, Household, Zimba, rural

“The only worry that I have with this light is the smoke that it produces and I think that smoke puts some bad air in the air and that same bad air can make people sick if they breath it in. You find that even your body is smelling paraffin.” -- Male, Trade, Small Shop, Retailer, Zimba, rural

“My children are not able to study at night because the lighting is not enough and if they do use it for their studies at night, they might spoil their eyes and that is what I don't want. I don't want to have blind children. So we, especially my children, are not able to do everything that we want with the light that we are using.” -- Male, LSM 4, Household, Zimba, rural

Summary of Present Lighting Use



- **All the respondents require light in the morning since they are early risers and from sundown up to the time they sleep, which varies according to whether it is urban or rural.**
- **Those who have electricity sleep later than those who use all other sources of lighting since it is considered much easier to use.**
- **Businesses which are in rural areas close earlier than those in urban areas since their customers go home earlier than those of urban areas.**
- **Paraffin lamps (middle and upper social classes) and tin lamps (lower social classes) are more widely used than any other form of lighting for both household and trade respondents.**



6. Consumer response to Modern, Off-Grid Lighting Products



5. Lantern: Solar, LED (bi-level)

Advantages

- Familiar lantern design
- Dimmer switch is seen as a useful extra and similar to current paraffin lamp
- Easy to handle
- Economical due to solar charging and rechargeable batteries
- Adequate light intensity
- Aspirational image

Disadvantages

- Seen as an expensive product due to design
- The fact that the plastic is not see-through means that respondents perceive the lamp to give less light than it could.



“This other one is also good but it is not bright and also the light fades away quickly. Maybe the battery is not strong to hold enough power for a long time. I like one thing about the handle which is made from a strong wire and can be used to hang the light on a nail.”

Lantern: Solar, CFL

Advantages

- Gives off adequate light intensity enough for a large area
- Familiar design - similar to a paraffin lantern
- Safe
- Perceived as durable due to its durable plastic casing
- Convenient and Easy to handle: can be used to walk around with due to the handle
- Attractive

Disadvantages

- Lead between the light and the solar panel should be longer so that the product can be left inside the house when charging.
- Would be good to have a dimmer switch.



“ I like the size and the fact that I don’t need paraffin to operate it. It’s the size of the paraffin lantern that I use which is good enough for my room. It has a fluorescent tube which has a brighter light than a normal lamp. It’s easy to use because you just need to put it in the sun during the day charge and put it on in the evening.”

“ Yes I would buy it and I think I would pay something like K40,000.”

--Female, street vendor, Livingstone, urban

Lantern: Dynamo, LED

Advantages

- It is light in weight making it easy to handle
- Dual purpose: *“Can charge my phone also”*
- Economical: no batteries and mechanical charging
- Easy to handle
- Adequate light intensity
- Good size-does not require a lot of space
- Durable glass panel is protected when not in use

Disadvantages

- Looks like it can easily break
- Unfamiliar design (some thought it was a food flask)
- Fragile winding element
- Tiring to operate: Must allocate resources to charge it (time, energy)



“The only problem I foresee is that it can easily break.”

--Male, LSM 3, Household, informal area, Lusaka, urban

“Yes I would buy it because I will no longer have to spend money on paraffin and it does not produce any smoke. The light seems to be bright to use at night. It also looks easy to use, not complicated at all.” -- Male, LSM 3, Household, informal area, Lusaka, urban

Task Light, Lantern & Torch Combo

Advantages

- It is portable and easy to handle.
- Gives enough light.
- Economical due to rechargeable battery and solar recharging
- Attractive, despite unfamiliar design for a lighting device.
- Multipurpose: can be used as a torch when going to the toilet or as a lantern to light the whole room

Disadvantages

- It can easily break.
- Perceived to need a lot of care: solar flap can break easily.
- Produces too much heat at night.
- Charging process a concern because theft is very likely



“It also very good. My neighbours were admiring them very much. They were jealous of me when I used them”

--Female, Fixed Hawker, Livingstone, urban

“It can break easily, it is not very strong. Even as you adjust the lamp part and the solar panel, they can break. They should make them a bit stronger so that even if for drop it down, it can not easily break”

--Female, Trade, Close Market, Zimba, rural

Task Light: Replaceable battery, LED

Advantages

- Easy to handle and use
- Looks nice
- Structural design is good
- Good size that does not occupy much space

Disadvantages

- Can only be used to light one area of the room
- Inconvenient as has to be placed on a flat surface
- Only uses batteries, so may be expensive to maintain
- Inadequate light intensity
- Unfamiliar, intimidating design
- Fragile



“I was happy with both of them but they are not giving the light that I needed in my shop. They are not bright enough. Otherwise they are just ok. Its just the brightness that I was not happy about” --Male, Open Market, Retailer, Lusaka, urban

“It is the weakest material I have ever seen for a desk lamp. You know such lamps are put on the desks or tables and they can drop at any time and that’s why the material that must be used should be very strong ”

“Yes it has enough light and much better than candle light. The batteries are also get easily available and they are not that expensive”

“.....it doesn’t look strong” --Male, LSM 7, Household, Zimba, rural

Torch: Solar, LED

Advantages

- Easy to use
- Has a beautiful look
- Seems durable and long lasting
- Portable
- Economical
- Environmentally friendly due to solar as the source of energy

Disadvantages

- Little product security during charging
- Not practical for trade premises-light is not adequate



“It looks to be very strong that even if you drop it, it looks like it can withstand the impact it cannot break.”

“...it will be stolen if I leave it outside..”
--Male, Trade, Small Shop, Retailer, Zimba, rural

“I only used the torch to look closely in my cash box”
--Female, Open Market, Retailer, Lusaka, urban

Lantern: Dynamo, rechargeable battery, LED

Advantages

- Perceived to be strong
- Easy to use
- Strong handle which can be used to move the product from place to place

Disadvantages

- It does not give enough light
- Winding can become tiring and cumbersome
- Need some power/strength in order to wind the lamp which may be tiring for some people



“I put this one (the wind-up rechargeable lantern on a nail of my stand. The light was just okay and I was happy about it.”

--Female, Open Market, Retailer, Lusaka, urban

“It’s fine but the winding is hard. It should have been made a bit soft. I tried to wind it just to see and I found it to be hard.”

--Female, LSM 2, Household, Zimba, rural

“This one looks very attractive.”

--Female, LSM 2, Household, Zimba, rural

“The winder seems a bit hard.”

--Male, LSM 3, Household, Livingstone

“Yes, it looks to be strong. It has a good wire handle; it’s good.”

--Male, LSM 3, Household, Livingstone

Torch: Replaceable battery, LED



Advantages

- Durable design and material
- Strong light intensity

Disadvantages

- Perceived as expensive to buy
- Batteries are not rechargeable
- Not multipurpose: cannot be used as a task light whilst cooking or for children's studies



“It seems to give very bright light. It looks very strong. I think you can even hit a thief with it... The switch is simple and just the design itself is very attractive.”

--Male, Trade, Small Shop, Retailer, Lusaka, urban

“I tell you this torch is very nice. It is very bright and if you were selling it I would have bought it immediately. The light was very bright and it helped me a lot to see in my cash box and also to see around the shop”

--Male, Trade, Small Shop, Retailer, Lusaka, urban

Flood Light: Solar, Linear Fluorescent

Advantages

- Adequate light intensity
- Cost effective: no bill or battery cost
- Can act as an emergency light
- Can reduce electricity consumption
- Safe: no risk of electrocution

Disadvantages

- Perceived expensive
- Bulky
- Can easily be stolen if not fixed to the wall
- Not portable
- Perceived as hard to maintain: spare parts
- Possible problem when charging it during the cold weather



This light was tested in businesses premises only

“The only problem I see about this is charging in the cold season when there is no sunshine during most part of the day. Otherwise I like it.”

“I think that this is a very interesting device. It looks as if it can give enough light in the room and it’s good that it uses solar for recharging.”

Spot Light: Solar, LED

Disadvantages

- Unfamiliar
- Can easily be stolen
- Inappropriate for a household or small business premises
- Not suited to the respondents' image and needs
- Hard to handle, cannot stand it or hang it
- Lacks a switch
- Inadequate light intensity



“This one is not fit to be called a flood light because its light is useless, it’s not bright enough and it can easily be stolen.”

--Male, LSM 3, Household, Livingstone

“I would use this light as a torch but it is not easy to manage and I do not like the way it is shaped.”

“It’s okay but it is not very bright. It’s like a torch. I didn’t like it very much”

--Female, LSM 2, Household, Zimba, rural

Lighting System Concept

Advantages

- It looks beautiful
- Can be used in different rooms

Disadvantages

- Looks like it would be expensive
- Not sure where a device like this would be sold



“If given a choice, I would prefer this one with several lights to those other two that are not even bright enough.”

“This is very beautiful. It’s bright enough to light the house. You don’t have to move around with it and that reduces the risks of dropping and breaking. If it was available and affordable, I would really like to buy it and use it. Even people that have electricity can use this to reduce their bills.”

Lighting System Concept: Traders' Suggested Prices

- The amounts traders feel they can pay for the concept are:
 - K200,000
 - K300,000
 - K500,000



“Suggested price 200,000 and 300,000 Kwacha”
--Male, LSM 3, Household, Livingstone

“ I think it would cost about K 200,000”
--Female, Open Market, Retailer, Lusaka, urban

“This one would maybe cost K500,000 or even more especially if its original.”
--Male, Open Market, Retailer, Lusaka, urban

“This one can be expensive. Maybe about K300, 000”
--Female, Trade Close, Market, Zimba, rural

- Most of the respondents have not seen any lighting advertisements. Some have seen actual products displayed in shops

“No, I have not seen any messages that are talking about lighting devices, besides I don’t even read the papers so I wouldn’t know if there is anything that mentions lighting products”

--Female, Open Market, Retailer, Lusaka, urban

“I have seen some of these in the shops in Lusaka but those were not similar to these”

(Only one respondent has seen adverts in form of leaflets in the game store)

“Yes, I have only seen advertising in the leaflets from game stores at Manda Hill but that was some time back.”

--Male, Open Market, Retailer, Lusaka, urban

- Some respondents claim that the best medium of advertising is radio. Others suggested posters displayed in the market place, announcements on a megaphone or giving samples to a few people

“I think they should be talking about them on the radio...., they can also put posters in the compound, like at the market.”

--Female, Open Market, Retailer, Lusaka, urban

“I would make pictures of them and distribute the pictures where there are messages about the lamps. I would also pass around the compound with a mega phone announcing to the people that there are new lamps that they should try.”

--Male, Open Market, Retailer, Lusaka, urban

“I would put them in the newspapers. I would also distribute some for free, especially in the villages so that people who don't read papers could experience and see what I am selling.”

--Female, Fixed Hawker, Livingstone, urban

“I would put them in the shops near people that need them the most. I would give one or two to people to use so that others can see how they work.”

--Female, LSM 2, Household, Zimba, rural



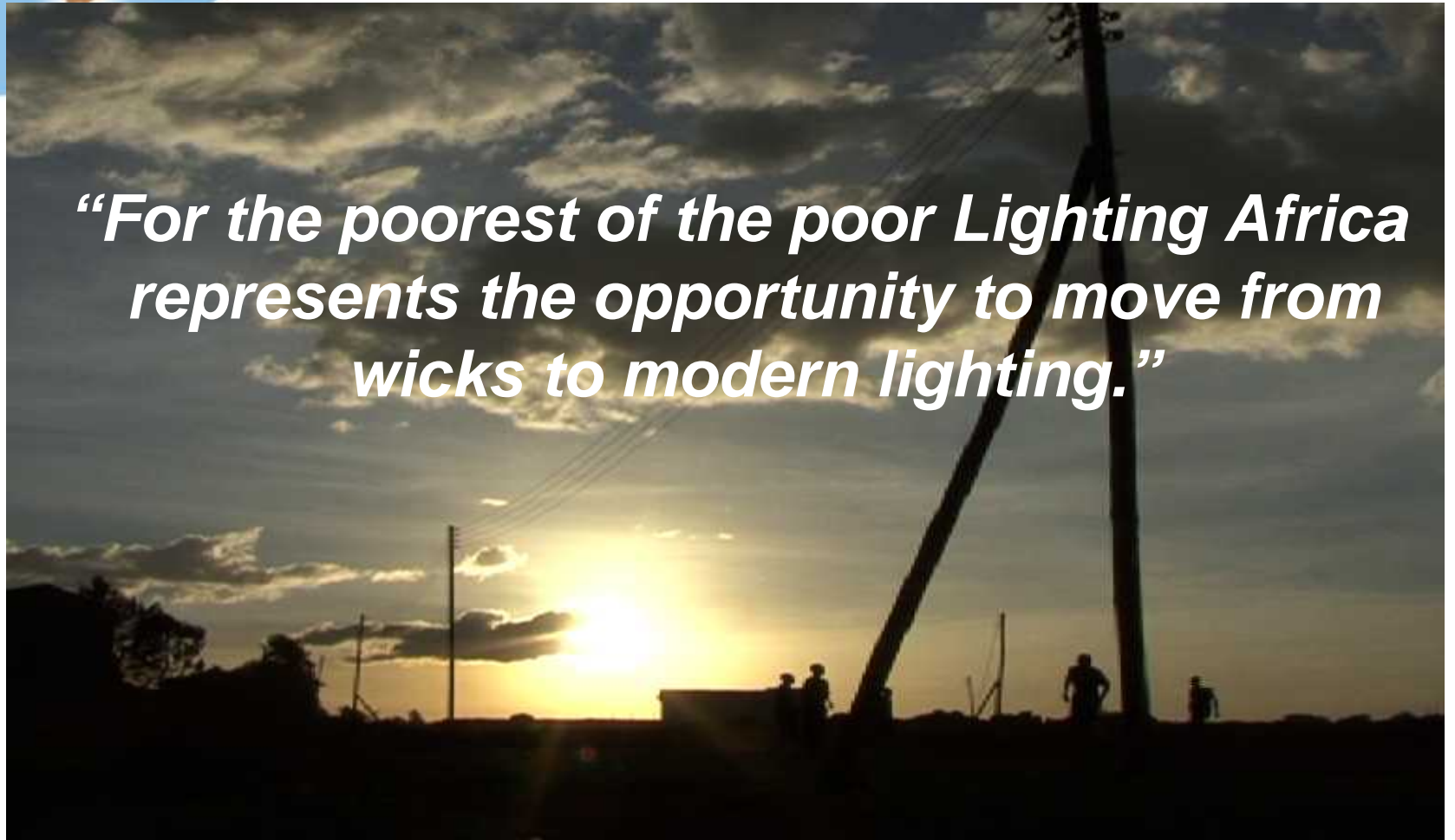
7. SUMMARY & CONCLUSIONS

7. Summary and Conclusions

- **Compared to the other countries, Zambia's consumers earn less and therefore have less money to spend**
- **They live frugally and most lead a 'hand to mouth' existence with their daily earnings immediately being spent on food, kerosene, or other necessary expenditures**
- **The majority of households and traders only have one or two lighting products and they are unable to afford more**
- **There is a higher incidence in Zambia (than in the other study countries) of consumers using firewood inside the house to light their rooms**
- **The modern solar charged lighting devices were received positively although there was a higher level of confusion about how solar technology actually works. Consumers have not had as much exposure to solar products as in other African countries such as Kenya and Ghana**
- **There is a good level of enthusiasm: products that can light up a bigger area are most popular in both household and trade premises**
- **The 'home lighting system' lighting concept is well-received although there is strong impression that this type solution will be very expensive**
- **Zambia seems to be a market where more consumer education about solar products and other modern lighting technology is needed**



“For the poorest of the poor Lighting Africa represents the opportunity to move from wicks to modern lighting.”



- For more information about LIGHTING AFRICA, please visit the Lighting Africa website at www.lightingafrica.org
- Contact: info@lightingafrica.org

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