Lighting Africa Market Assessment Results

Quantitative Assessment - ZAMBIA
# Report Content

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The World Bank Group (WBG) required information to aid manufacturers to develop, fine tune or simply launch as they are, low cost lighting products to off-grid urban and rural consumers within a variety of African countries.

As such, the main objective of the research was to provide information in terms of the suitability of different types of lighting products in the African market, as well as quantifying the approximate size of the potential market in volume and value terms for appropriate lighting products, and providing other information of use to manufacturers.
Research Objectives

Interviews focused on answering these questions:

**Who is the consumer?**
- Consumer Demographics and Characteristics

**How does the consumer use light?**
- Current Lighting Habits, Attitudes, Preferences, and Needs

**What does the consumer need?**
- Assessment of Need for Modern Lighting

**Which modern lighting products does the consumer prefer?** Lighting Product Preferences (e.g. product performance, specific design)

**How much is the consumer willing to pay?**
- Consumer Economics (e.g. optimum price and capacity to pay for lighting)
Method

Household
- 1000 households, representative sample conducted in Lusaka, Central, Copper Belt, Eastern, Northern and Southern
- Interviewed main (or joint) decision maker regarding household and purchases – i.e. head of household
- Face to face interview using structured questionnaire

Retail Businesses
- 400 retail businesses, representative sample conducted in Lusaka, Central, Copper Belt, Eastern, Northern and Southern
- Covered retail businesses in informal settlements in urban and rural trading centres
- Interviewed the business owner or manager
- Face to face interview using structured questionnaire

Study conducted by: Research International Social & Public Research Division, based in Nairobi, Kenya
Contributors to Household Income

Q. D8 and D9: “How many people in and outside the household contribute to this monthly household income?”

The majority of households are supported single-handedly with the household head as the main income earner. There are very few cases (11%) in which the household income is supplemented by people who are not part of the household.

Mean score or average of a specific measure

Figures in the graph are percentages of the base indicated

Comment on slide content

Sample on which this slide is based

Legend detailing what the different chart colors mean

Sample size on which the chart is based

Slide Title Question which was asked of the respondent
85% of Zambians are subsistence farmers and commercial agriculture is mostly confined to a small number of large farms. The mining and refining of copper constitutes by far the largest industry. Copper accounts for over 80% of foreign exchange.

Zambia's economy has experienced modest growth in recent years with real GDP growth in 2005-07 ranging between 5-6% per year. Copper output has increased steadily since 2004 due to higher copper prices and foreign investment. Although poverty continues to be a significant problem in Zambia, its economy has strengthened, featuring single-digit inflation, a relatively stable currency, decreasing interest rates and increasing levels of trade.
Overall Opportunity in Zambia

Population:
Zambia has a population of 11,669,534 with a population growth rate of 1.67%. The country has unemployment levels of 50%.

Power supply:
More than 50 percent of the population in Zambia live in rural areas, often in isolated homesteads difficult and expensive to supply with centrally generated electricity. While 18 percent of the population in the country has access to electricity, only 2 percent of the rural population has access to electricity compared to 35 percent for urban areas. Furthermore, the growth rate of household connections is lower than that for the population and household growth rate indicating that the absolute proportion of the population without electricity is increasing. In Zambia only 2.5 percent of total households are connected to electricity every year while the household growth rate is around 3.5 percent.

Implication:
With only 2.5% of Zambia connected to the electricity grid yearly, the Lighting Africa products have a wide potential market in the country.

Source – Internet:
*http://www.sei.se/energy/pvesco/pv_intro.htm
**indexmundi.com/zambia/unemployment_rate.html
The urban vs. rural sample was split in line with the national distribution of the Zambian population.
Respondent Demographic Profile

Living Standard Measure

- Male
- Female
- LSM 1 - 2
- LSM 3 - 4
- LSM 5 - 6
- LSM 7 - 8
- LSM 9 - 10

Respondent Demographic Profile

- Lusaka
- Central
- Copper belt
- Eastern
- Northern
- Southern
- Western
- N. Western
- Luapula

- 15
- 12
- 16
- 13
- 13
- 12
- 8
- 5
- 7

- 52
- 48
- 39
- 37
- 13
- 8
- 3

- 9
- 18-24
- 25-34
- 35-44
- 45-55
- 56+

Base = Total sample = 1000

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ZAMBIA
# Observations About Consumer Households

<table>
<thead>
<tr>
<th>Colour of the room in the main dwelling</th>
<th>%</th>
<th>Dwelling environment</th>
<th>%</th>
<th>Wall Material of Dwelling</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>White or Bright colour</td>
<td>21</td>
<td>Planned urban centre</td>
<td>19</td>
<td>Mud/mud bricks</td>
<td>52</td>
</tr>
<tr>
<td>Brown/ natural clay/dark clay</td>
<td>60</td>
<td>Unplanned/informal settlement</td>
<td>28</td>
<td>Wood planks</td>
<td>2</td>
</tr>
<tr>
<td>Other clay</td>
<td>11</td>
<td>Rural -planned</td>
<td>8</td>
<td>Bricks or stone</td>
<td>41</td>
</tr>
<tr>
<td>Not observed</td>
<td>8</td>
<td>Rural - other</td>
<td>47</td>
<td>Corrugated Iron</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size of the main dwelling</th>
<th>%</th>
<th>Roof Material of the dwelling</th>
<th>%</th>
<th>Type of road near dwelling</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Square meters or less</td>
<td>49</td>
<td>Grass or other thatch</td>
<td>42</td>
<td>Tarmac</td>
<td>23</td>
</tr>
<tr>
<td>3.1 – 8 Square meters</td>
<td>45</td>
<td>Corrugated iron</td>
<td>55</td>
<td>Murram or rough road</td>
<td>59</td>
</tr>
<tr>
<td>More than 8 Square meters</td>
<td>6</td>
<td>Tiles</td>
<td>3</td>
<td>Pathway (no vehicle access)</td>
<td>18</td>
</tr>
</tbody>
</table>
LIGHTING AFRICA
Catalyzing Markets for Modern Lighting

TRADERS

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The urban vs. rural sample was split in line with the national distribution of Zambian small business’
Respondent Demographic Profile

- **Male**:
  - Lusaka: 12
  - Central: 10
  - Copper belt: 17
  - Eastern: 13
  - Northern: 12
  - Southern: 14
  - Western: 8
  - N.Western: 6
  - Luapula: 8
  - LSM 1 - 2: 21
  - LSM 3 - 4: 41
  - LSM 5 - 6: 20
  - LSM 7 - 8: 12
  - LSM 9 - 10: 4

- **Female**:
  - Lusaka: 69
  - Central: 31
  - Copper belt: 41
  - Eastern: 41
  - Northern: 20
  - Southern: 12
  - Western: 4
  - N.Western: 16
  - Luapula: 4

- **Age Groups**:
  - 18-24: 41
  - 25-34: 27
  - 35-44: 11
  - 45-55: 5
  - 56+: 4

- **Business Size**:
  - Micro Business: 96
  - Small Business: 4

Base: Total sample = 396
### Observations About Business Premises

#### Colour of the walls in the main business room

<table>
<thead>
<tr>
<th>Colour of the walls</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>White or Bright</td>
<td>40%</td>
</tr>
<tr>
<td>Brown/ natural clay</td>
<td>34%</td>
</tr>
<tr>
<td>Other clay</td>
<td>13%</td>
</tr>
<tr>
<td>Not observed</td>
<td>13%</td>
</tr>
</tbody>
</table>

#### Business environment

<table>
<thead>
<tr>
<th>Environment Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned urban centre</td>
<td>19%</td>
</tr>
<tr>
<td>Unplanned/informal settlement</td>
<td>21%</td>
</tr>
<tr>
<td>Rural - planned</td>
<td>23%</td>
</tr>
<tr>
<td>Rural - other</td>
<td>37%</td>
</tr>
</tbody>
</table>

#### Roof Material of the business structure

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass or other thatch</td>
<td>22%</td>
</tr>
<tr>
<td>Corrugated iron</td>
<td>75%</td>
</tr>
<tr>
<td>Tiles</td>
<td>3%</td>
</tr>
</tbody>
</table>

#### Wall Material of business structure

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mud/mud bricks</td>
<td>25%</td>
</tr>
<tr>
<td>Wood planks</td>
<td>21%</td>
</tr>
<tr>
<td>Bricks or stone</td>
<td>47%</td>
</tr>
<tr>
<td>Corrugated Iron</td>
<td>5%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
</tr>
</tbody>
</table>

#### Size of the main business structure

<table>
<thead>
<tr>
<th>Size of Structure</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Square meters or less</td>
<td>61%</td>
</tr>
<tr>
<td>3.1 – 8 Square meters</td>
<td>32%</td>
</tr>
<tr>
<td>More than 8 Square</td>
<td>7%</td>
</tr>
</tbody>
</table>

#### Type of road near business structure

<table>
<thead>
<tr>
<th>Type of Road</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tarmac</td>
<td>32%</td>
</tr>
<tr>
<td>Murram or rough road</td>
<td>64%</td>
</tr>
<tr>
<td>Pathway (no vehicle access)</td>
<td>4%</td>
</tr>
</tbody>
</table>

Base: Total sample = 396
Most Consumer house/dwelling sizes range from two to four roomed structures with a large number being mud, brick or cement.
Q. 3b “Do you own the home/residence where you live?”

A majority of respondents 79%, own the homes in which they live – only 18% rent.

Base: Total Sample=1000
A majority of the respondents amongst Zambian consumers (28%) are unemployed, giving an indication of the state of the Zambian economy compared to some of the other African countries. 25% are farmers.
The average Zambian household income is US $150.90 – this income level is mainly reflective of those consumers in LSM 1 – 4.
The majority of households are supported singlehandedly with the head of the household being the main income earner. Only in very few cases do households get help from people outside the household.
The average Zambian household consists of between 4 to 5 people of which there are between 2 to 3 children.
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TRADERS
The majority of shop types owned are small ‘Dukas’ (57%) mostly selling fruits, vegetables or other day to day consumption items.
Revenue

Q. D6 “What are the weekly sales of your business and (Q. D7) approximately what kind of profit does your business make per month?”

The average weekly sales of Zambian small businesses is averaged at US $ 125.80 with a weekly profit of US $43.98 (195.90/4) weekly.
Q. 1 “How many people work here either on casual or permanent basis

46% of businesses are sole proprietors, however 54% of business have more than one employees – on average Zambian businesses have 1.92 employees

Base: Total Sample = 396
The average Zambian trader earns US $179.80 which is closely in line with the average monthly profit traders make. This is in line with the fact that on average only 1 trader contributes to the trader household income.

Base: Total Sample = 396
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ELECTRICITY CONSUMPTION HABITS

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CONSUMERS
Q.6 “Is your household currently connected to the main power grid?”

Currently connected 9%

Not connected 91%

Q. 7 “Is the electricity currently working?”

<table>
<thead>
<tr>
<th></th>
<th>Base: All Currently connected to main power grid = 86</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>94</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
</tr>
</tbody>
</table>

Of the 9% of respondents connected to the grid (a quota imposed for the purposes of the research), 94% have electricity which is working.
A very large percentage (89%) of households experience power cuts as frequently as daily to once a week indicating that the electricity network in Zambia really is in quite poor order.
Time Power Cuts Occur

Q. 11 “Do power cuts fall in peak or off-peak hours, and (Q. 12) is that the time when electricity is needed most?”

For most households, 69%, power cuts fall within peak hours and unfortunately, these are the hours when electricity is needed most.

Base: All currently connected to main power grid=86
### Monthly Expenditure On Electricity

**Q. 15 “On average, how much do you pay for electricity per month?”**

<table>
<thead>
<tr>
<th>Total</th>
<th>Lusaka</th>
<th>Central</th>
<th>Copper Belt</th>
<th>Eastern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below US $0.15 (Below 500)</td>
<td>1</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>US $1.5 (ZMK 5000)</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>US $6 – 14.4 (ZMK 20000 - 80000)</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>16</td>
</tr>
<tr>
<td>US $15 – 18 (ZMK 50000 - 60000)</td>
<td>9</td>
<td>8</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>US $21 – 24 (ZMK 70000 - 80000)</td>
<td>15</td>
<td>8</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>US $25.5 – 30 (ZMK 85000 - 100000)</td>
<td>21</td>
<td>8</td>
<td>-</td>
<td>39</td>
</tr>
<tr>
<td>US $35.1 – 39 (ZMK 117000 -130000)</td>
<td>8</td>
<td>16</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>US $45 – 48 (ZMK 150000 - 160000)</td>
<td>17</td>
<td>23</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td>US $53.4 – 60 (ZMK 178000 - 200000)</td>
<td>6</td>
<td>-</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td>US $65.1 - 75 (ZMK 217000 -250000)</td>
<td>7</td>
<td>24</td>
<td>-</td>
<td>8</td>
</tr>
</tbody>
</table>

**Mean**

- **US $52.7** (ZMK175,700)
- **$90.3** (ZMK301,200)
- **$36.7** (ZMK122,300)
- **$41.3** (ZMK137,700)
- **$34** (ZMK113,300)

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**Conversion rate**

1 US $ = 3,335.00 ZMK

**Median on total = ZMK 80,000 ($25)**

**Min on total = ZMK 5000 ($1.5) Max on total= ZMK 1.5M ($449.7)**

**On average US $ 52 is paid for electricity a month making Zambia the most expensive country for mains electricity out of the 5 Lighting Africa research countries.**

**Caution: Small bases**
Households connected to electricity receive bills monthly. Only 26% of households state their electricity is continuous and reliable, while 72% of consumers are not satisfied with the quality of their electricity. This creates a need for alternative lighting devices to be used when electricity is not satisfactory.
Voltage Sufficiency for Household Appliances

Q. 17 “Is the voltage level you are supplied with enough to use for the desired household appliances?”

- Yes, always: 68%
- Sometimes: 24%
- No, never: 7%
- Hardly ever: 1%

Base: All currently connected to main power grid
34% of households share electricity from the same source as compared to 36% of households who have their own source of electricity. The high level of consumers who are not aware of whether they are sole users or combined users of the power-grid indicates poor understanding and awareness of how the Zambian electricity system operates.

Base: All currently connected to main power grid = 86
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TRADERS
Q.6 “Is your business currently connected to the main power grid?”

- Currently connected: 9%
- Not connected: 91%

Q. 7 “Is the electricity currently working?”

<table>
<thead>
<tr>
<th></th>
<th>Base: Total Sample=400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>88</td>
</tr>
<tr>
<td>No</td>
<td>12</td>
</tr>
</tbody>
</table>

Q. 8 “Why is the electricity currently not working?”

All those whose electricity is currently not working cite the power company as the reason for the fault.

**Small Base: All without currently working electricity=4**
Power cuts are common with a majority of businesses experiencing power cuts as frequently as daily or at least once a week (82%). Majority of businesses receive electricity during peak hours when it is needed most.

*Q. 10 Could not be analysed due to small base sizes*
Quality of Electricity

Q. 16 “How would you rate the quality of your electricity?”

- Very inconsistent and not at all reliable: 29
- Fluctuates and not reliable: 12
- Intermittent but when connected it’s reliable: 21
- Continuous and reliable: 38

Base: All currently connected = 34

Q. 17 “When electricity is available is the voltage level supplied enough to use as desired for appliances?”

- Yes, always: 74
- Sometimes: 24
- Hardly ever: 3

Base = 34

41% of those respondents connected to the grid affirm that the quality of electricity they receive is unreliable and inconsistent.
29% of businesses have their own electricity source while 45% are sharing the same electricity source. 15% of traders state they do not know whether they share an electricity source which is more prolific in urban areas where tapping from the same electricity source happens on a regular basis.
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CONSUMERS

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Q 18 “How close is your nearest mains power line?”

Only 12% of the households not connected to a power grid are further away than 5 km from main power line, distance thus not being the major inhibitor to power grid connection. It is more likely to be the very high cost of electricity which is prohibitive of the majority of consumer connecting to the grid.
A majority are not aware of any immediate plans to get their households connected to main power grid and those who are aware don’t know when the connection will take place.

Base: All those close to the main power line= 431
37% of consumers state they would improve the lighting in their household as their main priority. The second highest mention was for improving the structure itself – doors, windows fittings etc. 8% state they would connect to the power grid or improve the main power source.
To be able to use household appliances throughout the day and night 40%

To improve access to lighting 13%

To improve my overall standard of living 35%

To be able to listen to the radio/watch TV when ever I want 12%

The need for improving household power sources mainly stems from wanting to use household appliances throughout as this would make their life easier and comfortable e.g. ironing, watching TV, cooking etc, however an additional 13% state they would improve their lighting.

Base: All who would connect to power grid or purchase a generator=75
Q. 38 “How would you rate the lighting in your home nowadays?”

- Poorly lit: 67%
- Well lit: 33%

Q. 40 “How would you improve the lighting situation in your home?”

- 67% of consumers state their household is poorly lit of which 86% say to improve the situation they would need to add more lights.

- Add more lights: 86
- Operate the light for more hours: 4
- Increase the amount of light from each device: 3
- Use a light that can be placed in a different position: 1
- Use a light which is less glaring (so I do not have to shield my eyes): 0

Base: Households whose light can be improved n = 706
Aspirations if there was Better Lighting

Q. 42 “Is there anything you or other members of your household would do differently at night if you had better light?”

<table>
<thead>
<tr>
<th></th>
<th>Base = 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>56</td>
</tr>
<tr>
<td>No</td>
<td>44</td>
</tr>
</tbody>
</table>

Q. 43 “What would you or other members of your household do differently if there was better light at night?”

- 38% My children will be able to do their homework/studies
- 21% Doing household chores
- 15% Chatting / Socializing
- 13% Watching television
- 13% Start a business near my home where there is security
- 10% Cooking food

If in-home lighting was better, personal development would be the first thing to be improved – i.e. 38% of consumers state their children would be able to do their homework.
In Zambia there is a very high level of candle usage as the main light and power source, followed by a relatively high incidence of Firewood and charcoal. Kerosene, the main power source in most other Lighting Africa research countries is not used much in Zambia which may be due to cost.
Energy Sources

Q. 20 “Do you have any of the following power sources, apart from the mains connection, in this HH providing power generally to the HH?”

Apart from the candles and firewood the majority of Zambian consumers do not have any other power sources available to them. 13% improvise with car batteries and 9% with other power sources.
On average, it gets dark indoors between 18.00 and 18.30 while majority of the respondents begin using lighting products between 18.30 and 19.00 each night – the delay in switching on lighting devices is likely a way of saving fuel for when it is completely dark.
In most households, 81%, the last lights go off between 21.00 and 22.30 which means that consumers use their lighting devices for approximately 2 to 3 hours each night, substantially shorter than in other Lighting Africa research countries. This is also a function of the fact that candles and firewood burn out more rapidly than kerosene in a lantern which is used by many other countries.
**Use of Light in the Rooms**

<table>
<thead>
<tr>
<th></th>
<th>Q. 27 “How many rooms in this dwelling were used after dark yesterday evening?”</th>
<th>Q. 28 “How many rooms in this dwelling were lit at all yesterday evening?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 room</td>
<td>17</td>
<td>30</td>
</tr>
<tr>
<td>2 rooms</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>3 rooms</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>4 rooms</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>&gt;5 rooms</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td><strong>2</strong></td>
<td><strong>2</strong></td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>2.7</strong></td>
<td><strong>2.35</strong></td>
</tr>
</tbody>
</table>

**Q. 30 “Which one room/area did the HH residents use for the longest time after dark last night?”**

Many Zambian households averagely light 2 to 3 rooms after dark and therefore more than one lighting device is usually required. The longest used room is the main living area as this is where most household activities are carried out. Its also the longest lit room/area.

Base: Total sample = 1000
**Rooms Not Lit Last Night**

**Q. 44** “Was your home lit in all the areas that you needed it last night?”

<table>
<thead>
<tr>
<th></th>
<th>Base = 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>45</td>
</tr>
<tr>
<td>No</td>
<td>50</td>
</tr>
</tbody>
</table>

**Q. 45** “Which rooms or areas were not lit last night?”

- **Toilet**: 46
- **Bathing room**: 31
- **Bed room**: 34
- **Patio/yard**: 29
- **Cooking place**: 25
- **Main living area**: 18
- **Dining area**: 8
- **Store**: 1

Rooms which were not lit over the last night are those which are not used continuously or often such as the toilet or the bath room.
Night Time Activities
Q. 31 “What activities were people doing last night?”

70% of consumers spend their evening chatting and socializing whilst 45% state they also spend time cooking/preparing food. Activities which require power such as watching TV and listening to the radio are done relatively little.

Base: Total sample =1000
Activities could not Perform Due To Lack Of Lighting

Q. 33 “Which activities could not be done well or comfortably due to lack of lighting?”

Reading, cooking and using the toilet are the activities which are mainly impaired due to lack of lighting.
42% of consumers state that the main issue they face on a nightly basis is that they were unable to light certain areas in their house.
Outdoor Activities Unable to do Due to Lack of Lighting

**Q. 37a** “Are you currently inhibited to performing certain types of outdoor activity due to lack of lighting?”

- **No** 50%
- **Yes** 50%

Base: Total sample = 1000

**Q. 37b** “Which types of outdoor activities can you currently not perform due to lack of lighting?”

- Getting water: 53
- Using a communal toilet: 38
- Visiting a neighbour’s/friend’s house: 31
- Tending to livestock: 18
- Going to a meeting: 7
- Going to a shebeen/bar: 7
- Cooking: 4

Base: All who could not perform certain types of outdoor activities due to lack of lighting = 498

Outdoor activities which are inhibited are getting water, using the communal toilet and visiting neighbors.
Insecurity as one tries to perform outdoor activities

It's difficult for my children to do their homework/study for a long time

Other household chores are skipped for daytime e.g., cleaning

One cannot extend till late due to fear of paraffin cost

Cannot use some electrical appliances e.g., freezer

Difficult to socialize/chat with family members/neighbours

My business is not doing well due to lack of enough lighting

Smoke produced affects people

Q. 41 “What kind of problems/inconveniences does the current lack of lighting cause?”

Base: All households whose light can be improved = 706
Decision And Control In The House

Q. 54a “Who in the house decides on replacing a lighting device? Q. 54b Who in the house decides on what to buy? Q. 54c Who in the house controls the money?”

In majority of households the head of the household is responsible for decisions and control on expenditure.

Base: Total Sample=1000
64% of businesses are close to the mains power line, and 27% within 5 km. Thus its clear that proximity to the power line might not be the main reason for not being connected. Traders seem to be much more savvy with regards to their electricity connections with only 2% of those connected not knowing whether they share their connection or not.

**Base:** All those not connected = 362
Q. 19 “You mentioned that the nearest mains power line was close to your business. Do you know of any immediate

Base: All with nearest power line on street/road/close by=231

The majority of the traders don’t know of any extension plans or if they have heard of them they have no idea
when these will take effect on their business.
Most traders operate daily throughout the week with 55% opening on Sunday and a majority 57% opening between 7.00am and 8.00am daily.
Many businesses close between 18:00 and 20:00 in the evening. It is likely that traders close before darkness has set in completely and thus lighting devices may not yet be required.

Base: Total Sample = 396
Q. 4 “If there was one thing you could do to improve your business or its facilities…?”

Traders mostly wish to have better lighting for their business (32%). Additionally 8% would like a connection to the power-grid and the reasons driving this are access to improved lighting (12%) and being able to use tools for the business throughout trading hours - thus there is clear wish by traders to improve productivity overall.
Use of Energy Sources to Power Appliances/Provide Light

Q. 21a “Do you ever use any of the following sources of energy to power appliances or to create light?”

Q. 21b “Which of the sources would you say you use as your main energy source?”

- Candles
- Firewood/charcoal
- Kerosene
- Diesel/gasoline
- Coals (briquettes)
- None of these

As in households, traders mainly use candles as their main energy and lighting source. There is a large percentage of Zambian traders (compared to the other research countries) at 21% who do not have ANY power/lighting source available to them on a regular basis.
Q. 20 “Do you have any of the following power sources in this business providing power generally to the business?”

- None of the above
- Car battery
- Solar power
- Car battery with inverter
- Diesel or petrol powered generator

Q. 22 “Is the power source adequate to power all the lighting you need in the business?”

- Yes: 40%
- No: 60%

Besides candles and occasionally firewood Zambian traders have no other energy sources. Only very few (12%) improvise with car batteries as a power source.
Q. 39 “How satisfied are you with the lighting in your business?”

Satisfaction Level and Limitations

<table>
<thead>
<tr>
<th>Limitations of current lighting</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>The brightness is not enough</td>
<td>50%</td>
</tr>
<tr>
<td>Poor customer service due to lack of Lighting</td>
<td>19%</td>
</tr>
<tr>
<td>Limits (discourages) the flow of customers</td>
<td>12%</td>
</tr>
<tr>
<td>Poor lighting causes consumers not to Make the right choice</td>
<td>9%</td>
</tr>
<tr>
<td>It is risky to operate my business after dark</td>
<td>6%</td>
</tr>
<tr>
<td>Lighting is not cost effective</td>
<td>6%</td>
</tr>
<tr>
<td>There are some type of work I can't do with battery light</td>
<td>5%</td>
</tr>
<tr>
<td>I am unable to complete my work at the required time</td>
<td>3%</td>
</tr>
<tr>
<td>When customers are many at the counter, the pressure lamp inside the shop does not bring light outside</td>
<td>3%</td>
</tr>
</tbody>
</table>

Base: n= 248

Mean Score: 3.25
59% of traders show some level of satisfaction with the lighting of their premises – however this high number is likely to be driven by the fact that most do not open their shop when it is dark. Most who do use lights on their premises use the same ones both during the day and after dark, 45%.
Q. 25 “Does this business ever operate after dark?”

Q. 26 “Why do you currently not operate regularly after dark?”

- Lack of light makes it impossible to operate
- Lack of customers after hours
- Increased security risk

Of those traders who do not open after dark, 58% of traders state that lack of light makes it impossible for them to operate after dark. A much lower percentage (23% and 19% respectively) mention reasons as lack of customers and security issues. 87% of Traders believe that being able to open after dark would have a positive effect on the turn over of their business – thus there is a potential for traders to use LED products in their business'
Opening after Dark

Q. 29 “How would customers respond to you staying open at night?”

The main sentiment of traders on how customers would respond to them opening after dark is that ‘they would be able to attract more customers’ or ‘would be able to provide better service’ - indicating there definitely is a market for late night shoppers.
## Rating for Lighting Outside the Business and its Limitations

**Q. 40b** “How would you rate this level of lighting outside the business?”

- **Well lit**: 11%
- **Poorly lit**: 89%

**Base**: All who light their business = 45

89% of traders see the outside of their business as poorly lit – one of the main issues mentioned concerning poor outside business lighting is lack of security.

**Q. 40c** “How does the available lighting outside of your business limit you in terms of running your business, if at all?”

<table>
<thead>
<tr>
<th>Limitation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customers don't see the shop clearly, so they don't shop after dark</td>
<td>27%</td>
</tr>
<tr>
<td>There is no security, hence cannot operate the business after dark</td>
<td>22%</td>
</tr>
<tr>
<td>Sometimes customers tend to think that the business has closed down due to lack of enough light</td>
<td>22%</td>
</tr>
<tr>
<td>I cannot see customers' faces clearly, because they buy from outside</td>
<td>13%</td>
</tr>
<tr>
<td>It is hard to display goods outside the shop after dark</td>
<td>11%</td>
</tr>
<tr>
<td>It is expensive</td>
<td>7%</td>
</tr>
</tbody>
</table>
Barriers to Improving Lighting

Q. 41 “What are the barriers to improving the lighting for your business?”

No better types of lights exist

Do not know where to get better lights

Do not have enough money to buy the fuel / batteries necessary to power the lights

Do not have enough money to purchase more lighting devices

The main barrier limiting traders from improving their lighting is lack of adequate finances

Base: All who light their business=248
Types of Lighting Devices Used

Q. 34 “What, if anything, was used to light the main room last night?”

- Candles: 79%
- Paraffin lamp with simple wick - no cover: 8%
- Paraffin lamp with glass cover: 6%
- Light bulb in socket or lamp: 6%
- Firelight: 5%
- Flashlight or torch: 3%

79% of households use candles for lighting in the main room, other forms of lighting are used at a much lower levels. Paraffin lamp is only used by 8% of consumers compared to 67% in Kenya.

Base: Total sample = 1000
Candles are the main consumer method of lighting the household. The flashlight is the main used backup method.
Q. 58 “What is your preferred type of light excluding mains powered light bulbs?”

Out of the list of lighting products presented to the consumer they prefer the ‘solar powered lantern’, this is likely to be due to the fact it is safe and clean and does not require refueling. A far second is a light bulb in socket or lamp connected to a car battery.
Other Lighting Devices Available

Q. 49a “Apart from all the lighting methods and devices which you used last night, what other lighting devices are available to this HH in working order?”

- None: 71
- Flashlight or torch: 9
- Paraffin lamp with glass cover: 5
- Paraffin lamp with simple wick - no cover: 4
- Firelight: 3

Comparative to other markets Zambian households have very few lighting devices available to them beside the ones which they use on a regular basis in the evenings (71%). Only a very low percentage of consumers have a flashlight, candles as backup devise or some form of paraffin lamp available to them.

Base = Total sample=1000
On average between 1 and 2 lighting devices are used to light an area of the household.
Frequency of Using Lighting Devices

Q. 49c “How often do you use each type of lighting owned?”

- **Flashlight or torch n=89**
  - Every day: 33
  - 2 to 3 times a week: 37
  - Once a week: 13
  - Once a month: 6
  - Less often than once a month: 4
  - 7

- **Paraffin lamp with simple wick - no cover n=42**
  - Every day: 29
  - 2 to 3 times a week: 19
  - Once a week: 17
  - Once a month: 14
  - Less often than once a month: 2
  - 19

- **Candles n=75**
  - Every day: 37
  - 2 to 3 times a week: 35
  - Once a week: 7
  - Once a month: 8
  - Less often than once a month: 7
  - 7

- **Paraffin lamp with glass cover n=51**
  - Every day: 27
  - 2 to 3 times a week: 27
  - Once a week: 12
  - Once a month: 14
  - Less often than once a month: 20

- **Firelight n=27**
  - Every day: 78
  - 2 to 3 times a week: 11
  - Once a week: 7
  - Once a month: 7
  - Less often than once a month: 4

Candles are the most often used lighting devices with the backup devise; flashlight coming in as second most often used.

Base: All with other lighting devices in working order

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### Strengths of Types of Lighting

**Q. 36b “What would you say are the strengths of this type of lighting?”**

<table>
<thead>
<tr>
<th></th>
<th>Base: Total Sample</th>
<th>Firelight</th>
<th>Paraffin lamp with glass cover</th>
<th>Candles</th>
<th>Paraffin lamp with simple wick - no cover</th>
<th>Light bulb in socket or lamp</th>
<th>Lantern (battery or solar)</th>
<th>Flashlight or torch</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base: Total Sample</strong></td>
<td>1000</td>
<td>50</td>
<td>61</td>
<td>794</td>
<td>82</td>
<td>63</td>
<td>14</td>
<td>30</td>
</tr>
<tr>
<td>It has very clear lighting</td>
<td>27</td>
<td>30</td>
<td>31</td>
<td>26</td>
<td>18</td>
<td>52</td>
<td>57</td>
<td>23</td>
</tr>
<tr>
<td>It is easily available</td>
<td>12</td>
<td>6</td>
<td>3</td>
<td>13</td>
<td>9</td>
<td>10</td>
<td>-</td>
<td>13</td>
</tr>
<tr>
<td>It is easy to operate</td>
<td>18</td>
<td>26</td>
<td>8</td>
<td>19</td>
<td>16</td>
<td>10</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>It is portable from one place to another</td>
<td>7</td>
<td>10</td>
<td>5</td>
<td>7</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>13</td>
</tr>
<tr>
<td>It does not produce smoke / does not pollute the air</td>
<td>16</td>
<td>4</td>
<td>13</td>
<td>19</td>
<td>9</td>
<td>-</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>The device is cheap</td>
<td>29</td>
<td>20</td>
<td>21</td>
<td>31</td>
<td>22</td>
<td>21</td>
<td>-</td>
<td>13</td>
</tr>
<tr>
<td>The light is not too bright but enough for the room</td>
<td>8</td>
<td>8</td>
<td>11</td>
<td>7</td>
<td>9</td>
<td>19</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>The device is reliable since it doesn't go off easily</td>
<td>3</td>
<td>8</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>It is long lasting</td>
<td>10</td>
<td>10</td>
<td>16</td>
<td>6</td>
<td>33</td>
<td>30</td>
<td>14</td>
<td>7</td>
</tr>
</tbody>
</table>
| Not a health hazard    | 4                 | -         | 2                              | 4       | 1                                         | 2                           | 14                      | 3                

One of the main strengths of candles are that they are seen as cheap. However in terms of quality light, lanterns, flashlights and light bulbs take the lead.
## Weaknesses of Types of Lighting

Q. 36c “What would you say are the weaknesses of this type of lighting?”

<table>
<thead>
<tr>
<th>Base: Total Sample</th>
<th>Firelight</th>
<th>Paraffin lamp with simple wick - no cover</th>
<th>Candles</th>
<th>Paraffin lamp with glass cover</th>
<th>Light bulb in socket or lamp</th>
<th>Lantern (battery or solar)</th>
<th>Flashlight or torch</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base: Total Sample</strong></td>
<td><strong>1000</strong></td>
<td>50</td>
<td>61</td>
<td>794</td>
<td>82</td>
<td>63</td>
<td>14</td>
</tr>
<tr>
<td>It is expensive</td>
<td>14</td>
<td>4</td>
<td>15</td>
<td>15</td>
<td>10</td>
<td><strong>19</strong></td>
<td>50</td>
</tr>
<tr>
<td>Go off easily when blown by wind</td>
<td>10</td>
<td>8</td>
<td>3</td>
<td>11</td>
<td>5</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Does not provide adequate lighting.</td>
<td>12</td>
<td>16</td>
<td>11</td>
<td>12</td>
<td>11</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>It's delicate hence must be handled with care</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>It's not long lasting</td>
<td>41</td>
<td><strong>58</strong></td>
<td>18</td>
<td><strong>50</strong></td>
<td>22</td>
<td>6</td>
<td>29</td>
</tr>
<tr>
<td>It can easily burn the house</td>
<td>20</td>
<td>6</td>
<td>10</td>
<td>23</td>
<td>11</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>It's limited to one place therefore carrying it to other places is tedious</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Some activities can not be done e.g. reading as little light is produced</td>
<td>1</td>
<td>-</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>It is a health hazard</td>
<td>15</td>
<td>30</td>
<td><strong>49</strong></td>
<td>8</td>
<td><strong>68</strong></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Long hours to recharge the solar panel</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>n</td>
<td>-</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>

The main drawback of candles is that they do not last long. Paraffin lamps are mainly seen to be a health hazard.
Flashlight and Solar Powered Lanterns are considered to be of the highest quality and are thus the most preferred. Interestingly Zambian consumer rate candles to be better quality than paraffin lamps – something which is not prominent in other Lighting Africa markets.
### Rating on Ease of Operation

Q. 57 “For each of these devices how would you rate the ease of operation?”

<table>
<thead>
<tr>
<th>Device</th>
<th>Very easy</th>
<th>Easy</th>
<th>Average</th>
<th>Difficult</th>
<th>Very difficult</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candles</td>
<td>59</td>
<td>29</td>
<td>9</td>
<td>2</td>
<td></td>
<td>4.40</td>
</tr>
<tr>
<td>Flashlight or torch</td>
<td>60</td>
<td>25</td>
<td>9</td>
<td>4</td>
<td>3</td>
<td>4.40</td>
</tr>
<tr>
<td>Paraffin lamp with glass cover</td>
<td>46</td>
<td>32</td>
<td>12</td>
<td>7</td>
<td>2</td>
<td>4.10</td>
</tr>
<tr>
<td>Light bulb in socket or a lamp connected to a car battery</td>
<td>35</td>
<td>36</td>
<td>21</td>
<td>12</td>
<td>11</td>
<td>4.00</td>
</tr>
<tr>
<td>Solar powered lantern</td>
<td>37</td>
<td>21</td>
<td>19</td>
<td>12</td>
<td>11</td>
<td>3.60</td>
</tr>
<tr>
<td>Paraffin lamp with simple wick - no cover</td>
<td>30</td>
<td>27</td>
<td>24</td>
<td>10</td>
<td>9</td>
<td>3.60</td>
</tr>
<tr>
<td>Battery powered stand up lantern</td>
<td>29</td>
<td>27</td>
<td>21</td>
<td>13</td>
<td>9</td>
<td>3.50</td>
</tr>
<tr>
<td>Pressure lamp</td>
<td>23</td>
<td>26</td>
<td>26</td>
<td>19</td>
<td>6</td>
<td>3.40</td>
</tr>
<tr>
<td>Lamp connected to a gas bottle</td>
<td>19</td>
<td>24</td>
<td>29</td>
<td>18</td>
<td>10</td>
<td>3.20</td>
</tr>
</tbody>
</table>

Candles and flashlights are considered the easiest to operate with lamp connected to a gas bottle and pressure lamps considered the most difficult devices to operate.

Base: Total sample = 1000
Q. 36a “Where were the lights in the main room located?”

- **On the table**: 62
- **Moved around as required**: 20
- **On the floor**: 18
- **Suspended from the ceiling**: 7
- **Hung from a hook on the wall**: 6
- **Stands**: 2

Lights are usually placed in a central place in the room like on the table so the greatest benefit is had from them.
Q. 55 “I am now going to read out a list of lighting devices, for each one I would like you to tell me where you would generally purchase these?”

<table>
<thead>
<tr>
<th>Lighting Device</th>
<th>Enclosed market stall</th>
<th>Wholesale shop</th>
<th>Open market stall</th>
<th>Out of Town</th>
<th>Self-Service store (super-market - with 2 tills)</th>
<th>Large Duka</th>
<th>Small local shop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flashlight</td>
<td>5</td>
<td>9</td>
<td>8</td>
<td>13</td>
<td>9</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>Solar powered lantern</td>
<td>4</td>
<td>6</td>
<td>9</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>31</td>
</tr>
<tr>
<td>Battery powered stand up lantern</td>
<td>4</td>
<td>5</td>
<td>10</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>Lamp connected to a gas bottle</td>
<td>2</td>
<td>7</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Pressure lamp</td>
<td>3</td>
<td>10</td>
<td>10</td>
<td>8</td>
<td>4</td>
<td>5</td>
<td>23</td>
</tr>
<tr>
<td>Paraffin lamp with simple wick - no cover</td>
<td>5</td>
<td>8</td>
<td>4</td>
<td>7</td>
<td>29</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Light bulb in socket / a lamp connected to a car battery</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>12</td>
<td>5</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Candles</td>
<td>11</td>
<td>12</td>
<td>5</td>
<td>32</td>
<td>17</td>
<td></td>
<td>34</td>
</tr>
<tr>
<td>Paraffin lamp with glass cover</td>
<td>10</td>
<td>5</td>
<td>7</td>
<td>12</td>
<td>24</td>
<td>13</td>
<td>11</td>
</tr>
</tbody>
</table>

Open market stalls are the place of purchase for the majority of the lighting devices with self service stores also popular purchasing areas.

Base: Total Sample=1000
Besides lighting a percentage of Zambian consumers use paraffin for cooking. In this market cooking is done more often with paraffin than lighting. Paraffin is mainly bought from the pump (77%) and bottles and Gallon containers are also used to carry Kerosene bought in litres from pumps.
Health Effects of Paraffin / Kerosene

Q. 53b “Do you ever worry about the health effects of using paraffin in your home?”

Yes 57%
No 43%

Base: (Consumer) All who use paraffin/Kerosene= 181

Q. 53c “What specifically worries you in terms of health effects?”

- Smoke could cause Coughing
- Pungent smell that causes difficult in breathing
- Lung cancer
- Can cause fire in the house
- Cause asthma
- Children can drink the paraffin
- Makes the eyes itch

Base: All who worry about health effects= 103

57% of those who use paraffin / kerosene are worried about the health effects their main worry being the smoke it emits which causes coughing and makes it difficult to breathe
Environmental Effects of Paraffin / Kerosene

Q. 53d “Do you ever worry about the environmental effects of using paraffin/kerosene?”

Yes 35%

No 65%

Base: All who use paraffin/Kerosene= 181

Q. 53e “What specifically do you worry about in terms of environmental effects?”

- The smoke produced is hazardous to vegetation and animals: 95%
- It can make the house catch fire destroying property: 5%

Base: All who worry about environmental effects= 64

Only 35% of those who use paraffin/kerosene are worried about the environmental effects their main worry being the smoke it emits which is seen as bad for animals and plant matter.
LIGHTING AFRICA
Catalyzing Markets for Modern Lighting

TRADERS
Types of Lighting Devices and where Used

Q. 33 “What if anything is used to light the business?”

- Candles: 77
- Light bulb in socket or a lamp connected to a car battery or inverter System: 14
- Flash-light / torch: 6
- Solar powered lantern: 5
- Paraffin lamp with glass cover: 4
- Simple paraffin lamp with wick and no cover: 4
- Nothing / moonlight / starlight / natural light: 3

Base: All who use lights in their business = 248

Q. 38 “Whether the lights are carried home or only used at the business premises”

- Used at the business and then carried home: 15%
- Not Mentioned: 4%
- Used at the business premises only: 81%

Base: All who use lights in their business = 248

As amongst Zambian consumers, the majority of traders use candles to light their premises – these are generally only used at the business, the trader thus having another set at home to light his/her household.
The preferred type of lighting devise would be the solar powered lantern due to the amount of light it emits and the fact that it is clean and safe. The majority of traders state that lighting is most needed where the money is collected. To a lesser extent products and customer faces need to be lit up.
Q. 34 “How many of each type of light do you use at the business currently?”

Flash-light n=15
- 1: 93
- 2: 7
- 3: 0
- 4: 0
- 5 or over: 0

Solar powered lantern
- 1: 75
- 2: 17
- 3: 8
- 4: 0
- 5 or over: 0

Candles n=190
- 1: 37
- 2: 37
- 3: 11
- 4: 7
- 5 or over: 9

Simple paraffin lamp with wick and no cover n=11
- 1: 100

Paraffin lamp with glass cover n=9
- 1: 78
- 2: 22

The majority of traders only use one lighting device to light their premises, except in the case of candles where two are generally used.

Base: All who use lights in their business

** Caution: low base sizes**
# Lifespan of Lighting Devices

Q. 37 “For how long do the lighting devices last?”

**Base:** All who use light in their business

<table>
<thead>
<tr>
<th>Lifespan (Years)</th>
<th>Flash-light/ Torch</th>
<th>Solar powered lantern</th>
<th>Light bulb in socket</th>
<th>Pressure lamp</th>
<th>Simple paraffin lamp and no cover</th>
<th>Paraffin lamp with glass cover</th>
<th>Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 year</td>
<td>80</td>
<td>42</td>
<td>77</td>
<td>33</td>
<td>82</td>
<td>67</td>
<td>15</td>
</tr>
<tr>
<td>1 to 1.5 years</td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td>18</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>1.6 to 2 years</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>-</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>2.1 to 2.5 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
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<td></td>
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<td>11</td>
<td>1</td>
</tr>
<tr>
<td>3.6 to 4 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>&gt; 6 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>7</td>
</tr>
</tbody>
</table>

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<tr>
<th>Lifespan (Years)</th>
<th>Flash-light/ Torch</th>
<th>Solar powered lantern</th>
<th>Light bulb in socket</th>
<th>Pressure lamp</th>
<th>Simple paraffin lamp and no cover</th>
<th>Paraffin lamp with glass cover</th>
<th>Base</th>
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</tr>
<tr>
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<td></td>
<td></td>
<td>20</td>
<td>18</td>
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<td>-</td>
<td>11</td>
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</tr>
<tr>
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<td></td>
<td></td>
<td>-</td>
<td>11</td>
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<td></td>
<td></td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>&gt; 6 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>7</td>
</tr>
</tbody>
</table>

**Caution:** Small bases
### Consumers: Costs of Lighting Devices

Q. 50a “How much does it cost you to buy__?, Q. 50b What is the cost of buying one of this type of lights now? Q. 50c For how long do __ last?”

<table>
<thead>
<tr>
<th>Type of power/lighting device</th>
<th>Base</th>
<th>Running cost per month</th>
<th>Cost of buying</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Paraffin for) paraffin lamp with glass cover</td>
<td>87</td>
<td>US $3.54 (ZK 11,800)</td>
<td>US $1.98 (ZK 6,600)</td>
</tr>
<tr>
<td>(Paraffin for) paraffin lamp with wick and no Cover</td>
<td>101</td>
<td>US $4.65 (ZK 15,500)</td>
<td>US $2.46 (ZK 8,200)</td>
</tr>
<tr>
<td>Candles</td>
<td>810</td>
<td>US $4.74 (ZK 15,800)</td>
<td>US $0.33 (ZK 1,100)</td>
</tr>
<tr>
<td>(Batteries for) battery powered lantern</td>
<td>13</td>
<td>US $10.21 (ZK 34,000)</td>
<td>US $2.64 (ZK 8,800)</td>
</tr>
<tr>
<td>(Batteries for) battery powered flashlight / torch</td>
<td>59</td>
<td>US $2.34 (ZK 7,800)</td>
<td>US $1.32 (ZK 4,400)</td>
</tr>
</tbody>
</table>

Conversion rate 1US $ = ZK 3,333.33
Traders: Costs of Lighting Devices

Q. 34 “How many of each type of light do you use at the business currently?, Q. 35 How much does it cost you per month to run? Q. 36 What is the cost of buying one of this light now?”

<table>
<thead>
<tr>
<th>Cost of running a month</th>
<th>Cost of buying now</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Owned</td>
<td>Base</td>
</tr>
<tr>
<td>Paraffin lamp with glass cover</td>
<td>9</td>
</tr>
<tr>
<td>Simple paraffin lamp with wick and no cover (often could be home made)</td>
<td>11</td>
</tr>
<tr>
<td>Light bulb in socket or a lamp connected to a car battery or inverter System or to a non-mains power source</td>
<td>35</td>
</tr>
<tr>
<td>Candles</td>
<td>190</td>
</tr>
<tr>
<td>Solar powered lantern (has a solar panel specifically to power it only)</td>
<td>12</td>
</tr>
<tr>
<td>(Batteries for) battery powered flashlight or torch</td>
<td>15</td>
</tr>
</tbody>
</table>

Conversion rate 1US $ = ZK 3,333.33
### Summary: Average Claimed Spend per Month on Current Lighting Devices

<table>
<thead>
<tr>
<th>Type of power/lighting device</th>
<th>App. Running costs per month</th>
<th>Cost of buying actual item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CONSUMER</td>
<td>TRADER</td>
</tr>
<tr>
<td>(Paraffin for) paraffin lamp with glass cover</td>
<td>US $3.54 (ZK 11,800)</td>
<td>US $3.00 (ZK 10,300)</td>
</tr>
<tr>
<td>(Paraffin for) paraffin lamp with wick and no cover</td>
<td>US $4.65 (ZK 15,500)</td>
<td>US $14.00 (ZK 45,000)</td>
</tr>
<tr>
<td>Candles</td>
<td>US $4.74 (ZK 15,800)</td>
<td>US $5.00 (ZK 16,600)</td>
</tr>
<tr>
<td>(Batteries for) battery powered flash-light or torch</td>
<td>US $2.34 (ZK 7,800)</td>
<td>US $3.78 (ZK 12,600)</td>
</tr>
</tbody>
</table>

Conversion rate

1 US $ = ZK 3,333.33
Co-operative loans and Short term loans with interest are the widely recognized source of financial services that can be used to improve businesses, while the most accessible are microfinance programmes.

Base: Total sample = 395
Terms Used

- PSM – Price sensitivity measure
- Cheap/Expensive – price at which consumers consider a device to be cheap/expensive – quality /affordability not an issue
- Too Cheap – price at which consumers consider a device to be so cheap to the extent of questioning the quality
- Too Expensive – price at which consumers consider a device to be too expensive – almost unaffordable
- Recommended price – Anticipated price point at which most consumers feel that the price is neither so cheap that quality is questioned, nor too expensive
- Range – this is between too cheap and too expensive
How the Price Sensitivity Measure works

- The Price Sensitivity Measure has been devised in order to ascertain what is the most acceptable price range for a particular product or service within a given market.
- In order to ascertain the range we ask each respondent 4 questions:
  - At which point would the product/service be considered cheap
  - At which price would the product/service be considered expensive
  - At which price point would the product/service be considered too cheap so that the quality would be in doubt
  - At which price point would the product/service be considered too expensive so that there would no longer be consideration to purchasing it
- The responses to these 4 questions are then plotted on a chart. Where the measures ‘too cheap’ and ‘too expensive’ cross each other is considered to be the low end of the range of acceptable price and where the measures ‘cheap’ and ‘too expensive’ cross each other is considered the high end of the acceptable price range.
- The ideal price point is where the measure ‘cheap’ and ‘expensive’ cross each other.
Anticipated price range is where most consumers feel that the price is neither so cheap that quality is questioned, nor too expensive.

Recommended price

Range
Zk 2,5000 - 50,000

Cheap
Too Cheap

Expensive
Too Expensive
Anticipated price range is where most consumers feel that the price is neither so cheap that quality is questioned, nor too expensive.
Anticipated price range is where most consumers feel that the price is neither so cheap that quality is questioned, nor too expensive.

Recommended price

Too Cheap

Cheap

Expensive

Too Expensive

Range
Zk 11,000 - 21,000
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TRADERS
Anticipated price range is where most consumers feel that the price is neither so cheap that quality is questioned, nor too expensive.

**Recommended price**

**Range**

Zk 29,000 - 50,000
PSM: Rechargeable Task Light

Anticipated price range is where most consumers feel that the price is neither so cheap that quality is questioned, nor too expensive.

Recommended price

Range
Zk 26,000 - 45000

Cheap
Too Cheap
Expensive
Too Expensive
Anticipated price range is where most consumers feel that the price is neither so cheap that quality is questioned, nor too expensive.

Recommended Price

Range
Zk 12,000 - 22,000
Anticipated price range is where most consumers feel that the price is neither so cheap that quality is questioned, nor too expensive.

Recommended price

Range
Zk 38,000 - 61,000
## Summary: Most Acceptable Price Point

How much are Zambians willing to pay for the new products?

<table>
<thead>
<tr>
<th>Product</th>
<th>Household</th>
<th>Trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lantern</td>
<td>US $11.10</td>
<td>US $12.30</td>
</tr>
<tr>
<td></td>
<td>(ZK 37,000)</td>
<td>(ZK 41,000)</td>
</tr>
<tr>
<td>Torch</td>
<td>US $5.10</td>
<td>US $5.10</td>
</tr>
<tr>
<td></td>
<td>(ZK 17,000)</td>
<td>(ZK 17,000)</td>
</tr>
<tr>
<td>Task Light</td>
<td>US $10.20</td>
<td>US $10.50</td>
</tr>
<tr>
<td></td>
<td>(ZK 34,000)</td>
<td>(ZK 35,000)</td>
</tr>
<tr>
<td>Flood Light</td>
<td>N/A</td>
<td>US $15.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ZK 50,000)</td>
</tr>
</tbody>
</table>

Conversion rate

1 US $ = ZK 3,333.33
Home Lighting Concept
Evaluation Of Lighting Concept

Q. 64 “How interested would you be in having the following lighting solution for your household?”

Q. 65 “Which of these phrases best describes how new and different you think this lighting solution is than other lighting solutions currently available in the market?”

Q. 66 “What statement best describes how much you think you would like or dislike this lighting product?”

Q. 67 “Do you think a product of this type would be adequate for your household lighting needs?”

Base: Total sample = 1000
Q. 52 “How interested would you be in having the following lighting solution for your business?”

Mean = 4.62

Q. 53 “Which of these phrases best describes how new and different you think this lighting solution is than other lighting solutions currently available in the market?”

Mean = 3.77

Q. 54 “What statement best describes how much you think you would like or dislike this lighting product?”

Mean = 5.23

Q. 55 “Do you think a product of this type would be adequate for your business lighting needs?”

Mean = 5.37

Base: Total sample = 396
LIGHTING AFRICA
Catalyzing Markets for Modern Lighting

CONSUMERS
Summary: Consumers

Respondent Profile and Behaviours

- A majority of consumer respondents (76%) were of lower LSMs (1-4), and rural based (76%) with most aged between 25 and 44 years
- Wall material used for dwellings among the majority is mainly mud/mud bricks and bricks or stones
- Most households have 4 - 5 people living together on a permanent basis with 2 - 3 children aged under 16 years
- Average household income is US $150.9 and the head is the sole bread winner of the household
- The major occupation is Farming (28%) with 25% being unemployed

Electricity Consumption Habits

- Power cuts are frequent with 51% of those connected to the mains experiencing them daily or nearly daily
- Power cuts occur during both off peak and peak times – mostly peak hours (7:00-19:00)
- Sharing of electricity from same source is common with an average of two households (1.8)
- Almost all households receive electricity bills every month (92%)
- For most households, electricity fluctuates and is not reliable
- Better lighting is cited as the main reason for wanting to connect to the main grid for those who are not connected
### Summary: Consumers

#### Power and Lighting Habits and Usage

- Candles are the main energy source.
- A majority of respondents begin to use lighting devices between 18.00 and 18.30.
- The mean number of rooms used after dark (2.7) is almost the same as those that are lit (2.4) – rooms not in use are rarely lit as it's considered as a waste of fuel/energy.
- The Dining area and Store are the least lit rooms.
- The main problems experienced because of lack of lighting are insecurity, skipping some household chores and school-going children being unable to complete homework.
- With enough lighting, a majority feel that there would be better personal development (e.g., children’s education improving and socialising).
- Lighting is mainly used in two main rooms: the living room and the bedroom.
  - This is further substantiated by the kind of nighttime activities the respondents engage in namely: chatting, resting, listening to radio etc.
Summary: Consumers

Current Lighting Devices

- Light bulb in a socket or lamp connected to a battery is the most used type of lighting device while pressure lamps, candles and flashlights are mostly used as back-up light
- Majority (62%) of the respondents place their lighting devices on the table
- Prices acceptable to consumers for these devices are:
  - Lantern: US$ 11.0
  - Torch: US$ 5.10
  - Task Light: US$ 10.20
- Main grid power and Batteries (AA, AAA etc) are the major power source for lighting devices
- Solar powered lanterns are considered to be of the highest quality and are thus the most preferred.
- Candles and flashlights are considered the easiest to operate.
- Majority of households begin using lighting products between 18.00 and 19.00 each night
- Averagely, the last light goes off between 21.00 and 22.30
- The average time that lighting products are used each night is four and a half hours
Summary: Consumers

- Candles are the most commonly used type of lighting. 79% of the households use candles to light the main living room. The likely reason for this could be because candles are:
  - Easy to operate
  - Cheap
  - Have very clear light
  - Do not produce smoke
  - Easily available

- However, they are not the preferred type of lighting mainly because they are not long lasting

Health and Environmental Considerations

- A majority (57%) worry about the health effects of paraffin/kerosene and mentioned coughing as their main worry followed by difficulty in breathing

- Most respondents (65%) do not think there is any environmental effect in using paraffin/kerosene and those that do cite that the smoke produced is hazardous to the environment – vegetation and animals
LIGHTING AFRICA
Catalyzing Markets for Modern Lighting
TRADERS
Summary: Traders

Respondent Profile and Behaviours

- Most traders (62%) interviewed were of lower LSMs (1-4), with 80% being rural based and aged between 26 and 34 years
- Their weekly sales range between US $7.60 – 15.50, with an average income of US $179.80 and monthly profits of about US $195.9
- Most business owners have small Duka/permanent shop with between 1 – 2 employees working either on casual or permanent basis

Electricity Consumption and Habits

- Only 10% of traders are currently connected to the mains electricity – same percentage as individuals.
  - Most of them (57%) open between 7am and 8am and close at 6pm thus use natural light. Power cuts are frequent with about 45% experiencing them at least once a week
- Traders not connected to the power grid are close to a power line and hence distance is not the reason for lack of connection, but possibly cost
- Power is received mostly during peak times and is stable – continuous and reliable and with enough voltage (74%)
- Majority of traders (91%) connected to the main grid receive their electricity bills every month
Summary: Traders

Power & Lighting Habits and Usage

- Lack of lights and very few customers after dark are the major reasons why traders don’t operate after dark.
- Brightness for current lighting devices is not enough thus a major limitation in terms of lighting for traders.
- Traders strongly believe that opening after dark would affect their businesses positively as they would be able to attract more customers and consequently make more money.
- Finances are the major barrier to installing / improving lighting for traders.

Current Light Devices

- Lighting devices are mainly (81%) used at business premises only - not carried home.
- Solar powered lanterns are the most preferred by traders.
- When using lamps, traders prefer to place them at the till where they collect money.
- For those who could consider acquiring a diesel/petrol powered generator, their major motivation would be to power appliances and tools throughout day and night.
- Prices acceptable to traders for these devices are:
  - Lantern: US$ 12.30
  - Torch: US$ 5.10
  - Task Light: US$ 10.50
  - Flood Light: US$ 15.00
“For the poorest of the poor Lighting Africa represents the opportunity to move from wicks to modern lighting.”