LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

Lighting Africa Market Assessment Results

Quantitative Assessment - ZAMBIA

IFC International Finance Corporation
World Bank Group

THE WORLD BANK

Report Content

1	Research Approach
2	Who is the Consumer?
3	Current Lighting Habits
4	Expenditure on Current Lighting Devices
5	Modern Lighting Devices – A brief Evaluation
6	Summary & Conclusions

Background

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

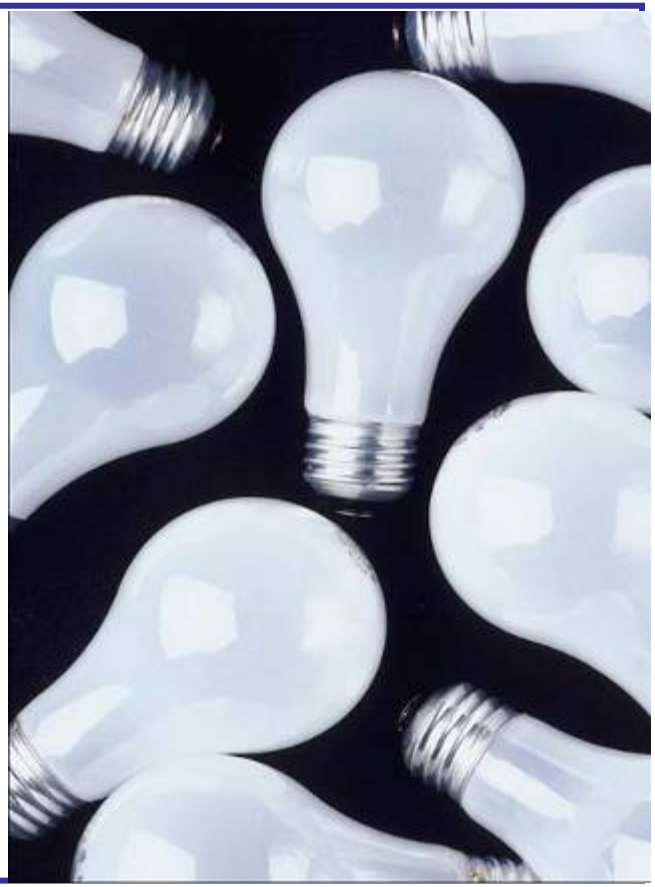
What does the consumer need?

- 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

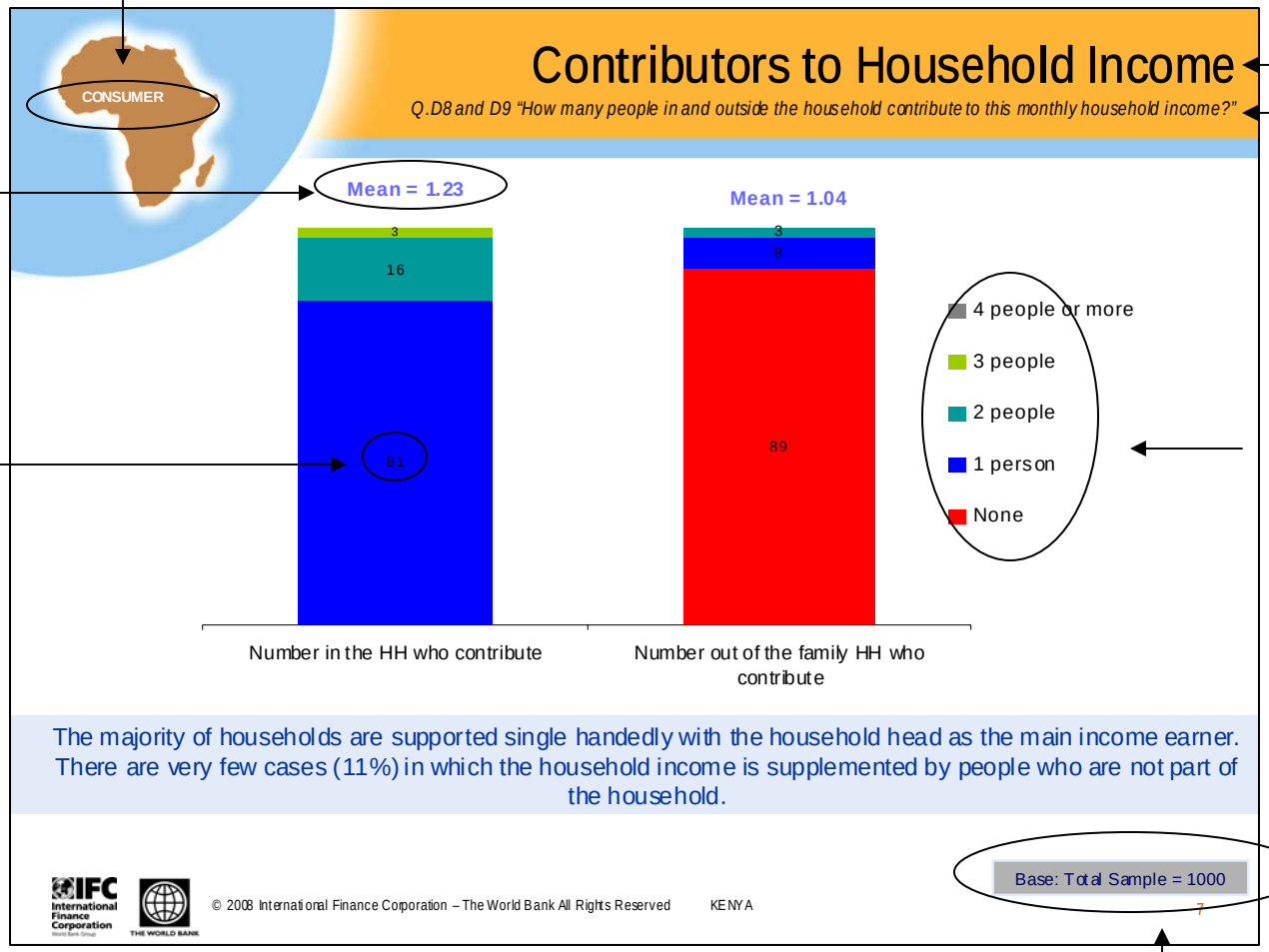
How to Read the Slides

Sample on which this slide is based

Mean score or average of a specific measure

Figures in the graph are percentages of the base indicated

Comment on slide content



Slide Title

Question which was asked of the respondent

Legend detailing what the different chart colors mean

Sample size on which the chart is based

ZAMBIA

Zambia: Socio-Economic Environment

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 2005-07ranging 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*

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RESPONDENT PROFILE

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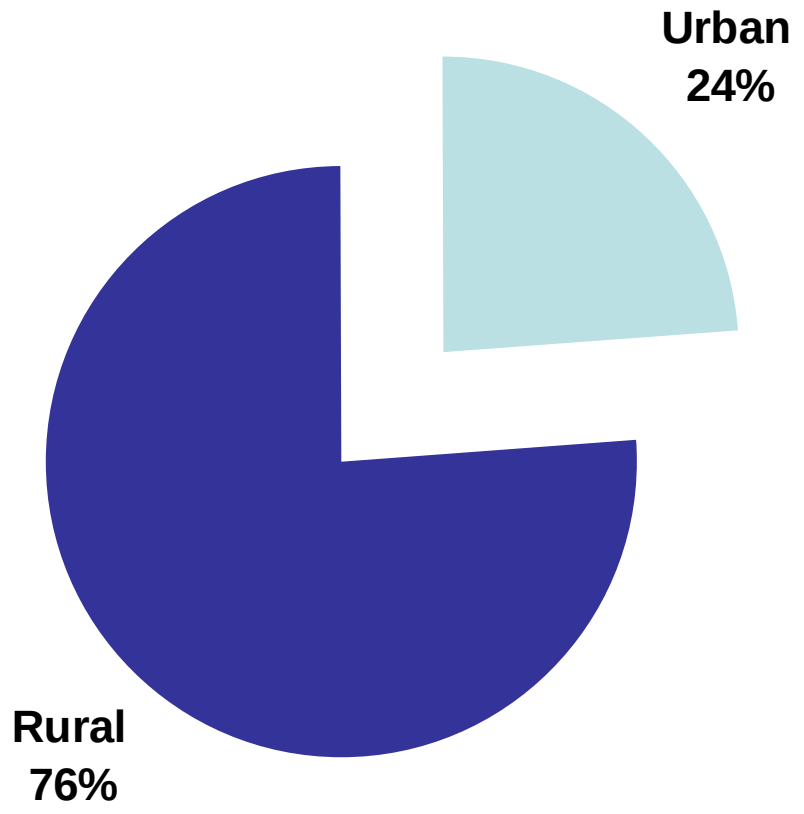
Rural Vs. Urban Sample Distribution

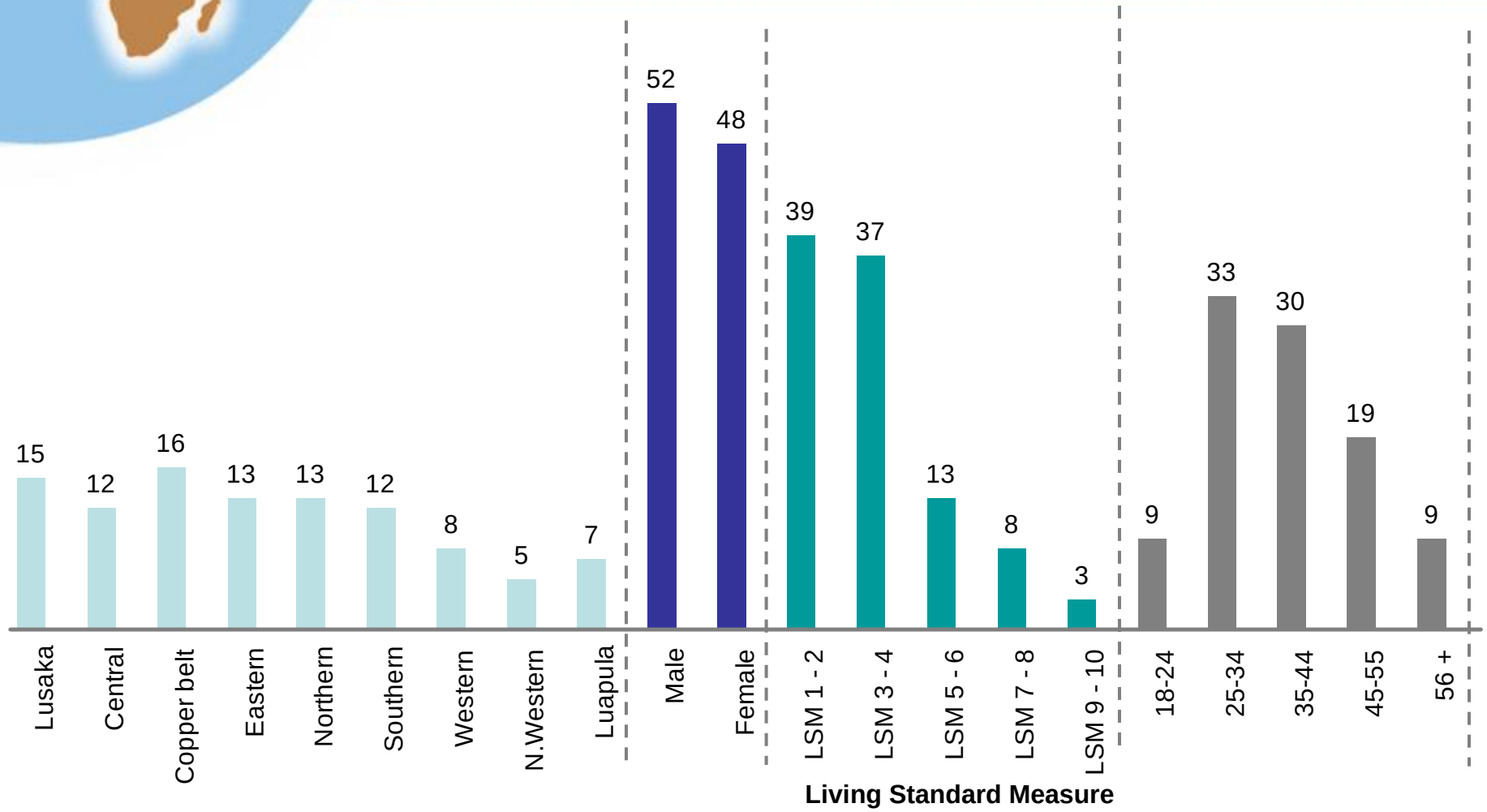
The urban vs. rural sample was split in line with the national distribution of the Zambian population



Base :Total sample = 1000

CONSUMER

Respondent Demographic Profile



Base = Total sample = 1000

Observations About Consumer Households

Colour of the room in the main dwelling	%
White or Bright colour	21
Brown/ natural clay/dark clay	60
Other clay	11
Not observed	8

Dwelling environment	%
Planned urban centre	19
Unplanned/informal settlement	28
Rural -planned	8
Rural - other	47

Wall Material of Dwelling	%
Mud/mud bricks	52
Wood planks	2
Bricks or stone	41
Corrugated Iron	3
Other	2

Size of the main dwelling	%
3 Square meters or less	49
3.1 – 8 Square meters	45
More than 8 Square meters	6

Roof Material of the dwelling	%
Grass or other thatch	42
Corrugated iron	55
Tiles	3

Type of road near dwelling	%
Tarmac	23
Murram or rough road	59
Pathway (no vehicle access)	18

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Base = Total sample = 1000

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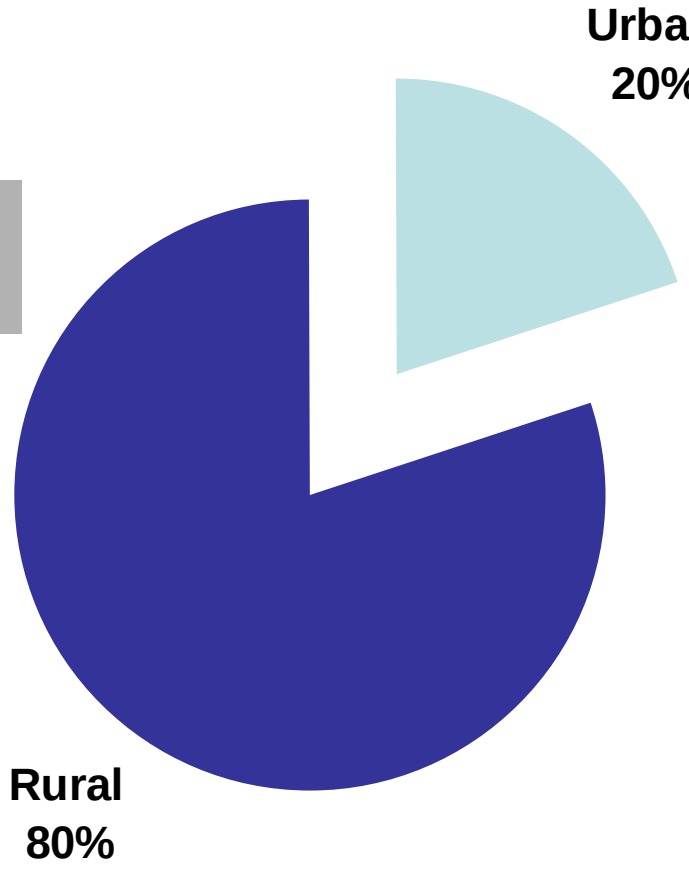
Rural Vs. Urban Sample Distribution

The urban vs. rural sample was split in line with the national distribution of Zambian small business'



Base :Total sample = 396

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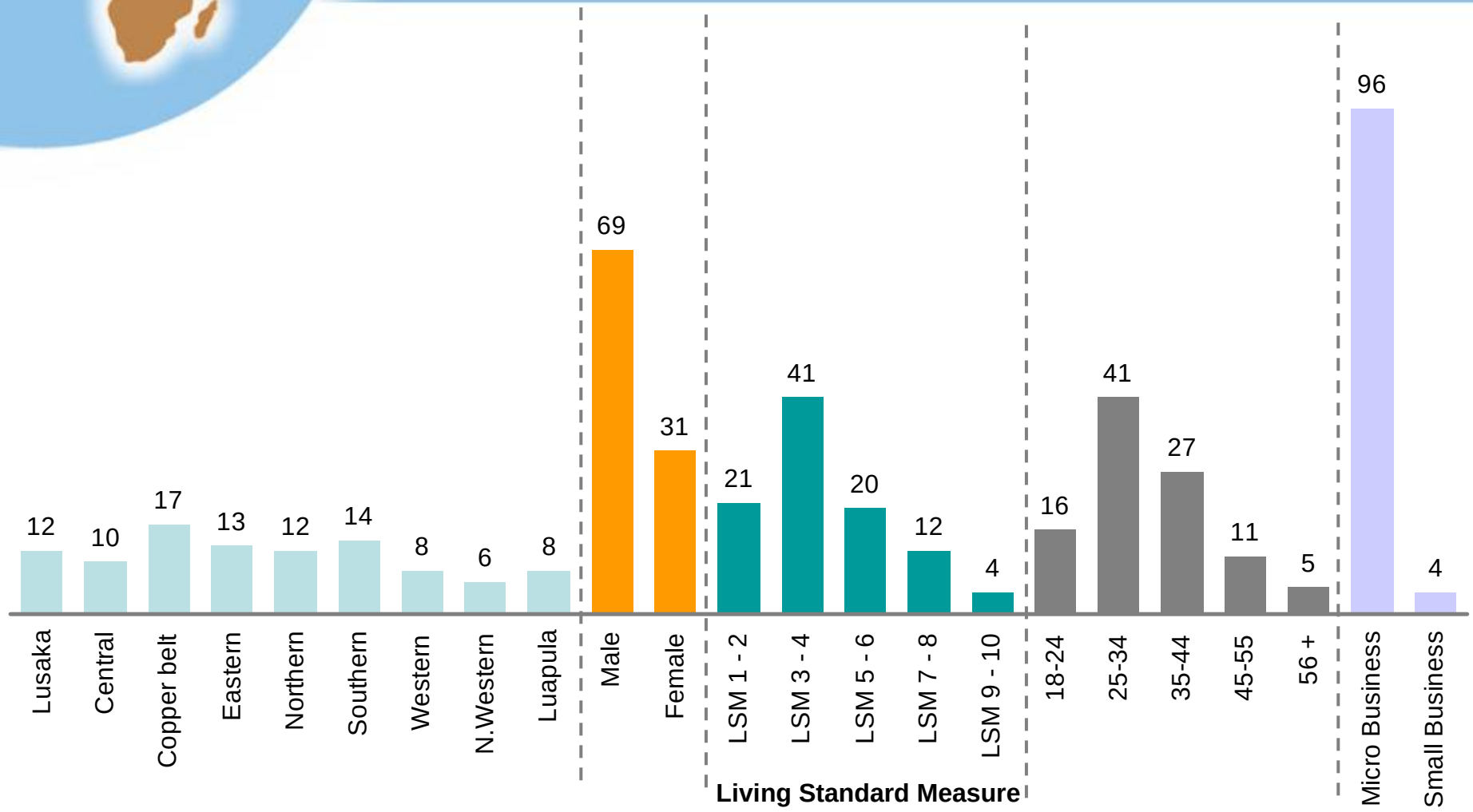
Respondent Demographic Profile



Base :Total sample = 396

Observations About Business Premises

Colour of the walls in the main business room	%
White or Bright colour	40
Brown/ natural clay/dark clay	34
Other clay	13
Not observed	13

Business environment	%
Planned urban centre	19
Unplanned/informal settlement	21
Rural -planned	23
Rural - other	37

Wall Material of business structure	%
Mud/mud bricks	25
Wood planks	21
Bricks or stone	47
Corrugated Iron	5
Other	2

Size of the main business structure	%
3 Square meters or less	61
3.1 – 8 Square meters	32
More than 8 Square meters	7

Roof Material of the business structure	%
Grass or other thatch	22
Corrugated iron	75
Tiles	3

Type of road near business structure	%
Tarmac	32
Murram or rough road	64
Pathway (no vehicle access)	4

Base :Total sample = 396

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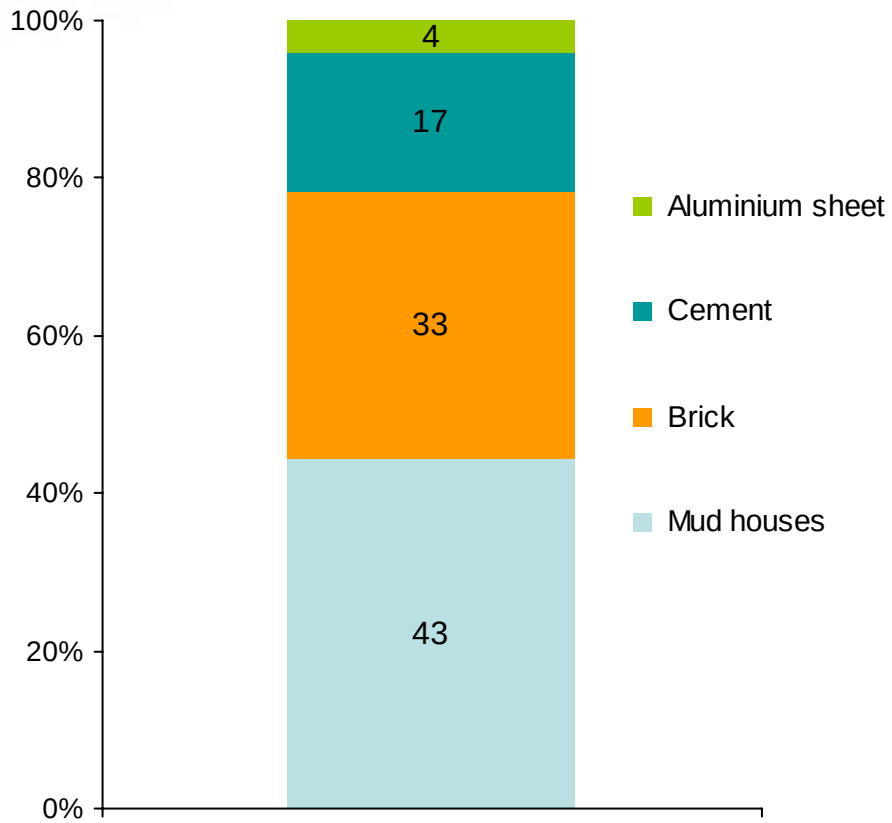
Dwellings



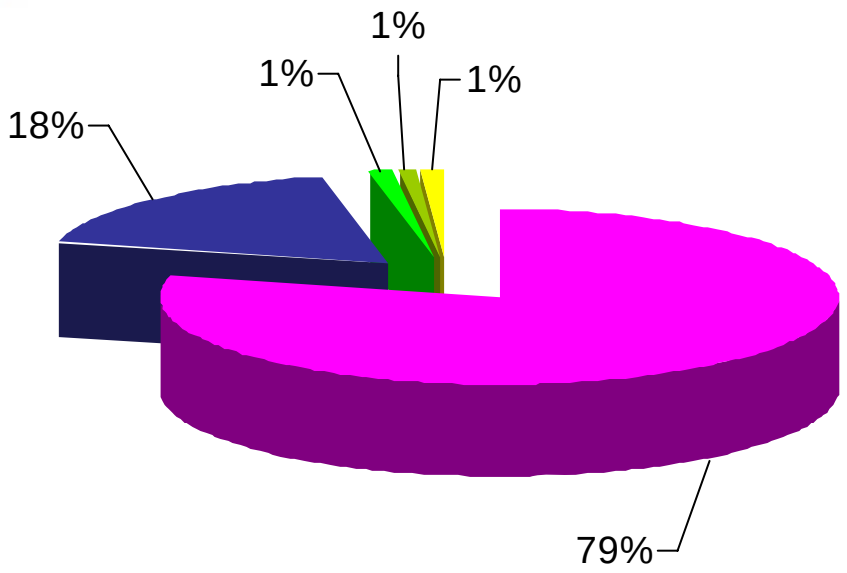
Most Consumer house/dwelling sizes range from two to four roomed structures with a large number being mud, brick or cement.

Base = Total sample =1000

CONSUMER

Home Ownership

Q. 3b "Do you own the home/residence where you live?"



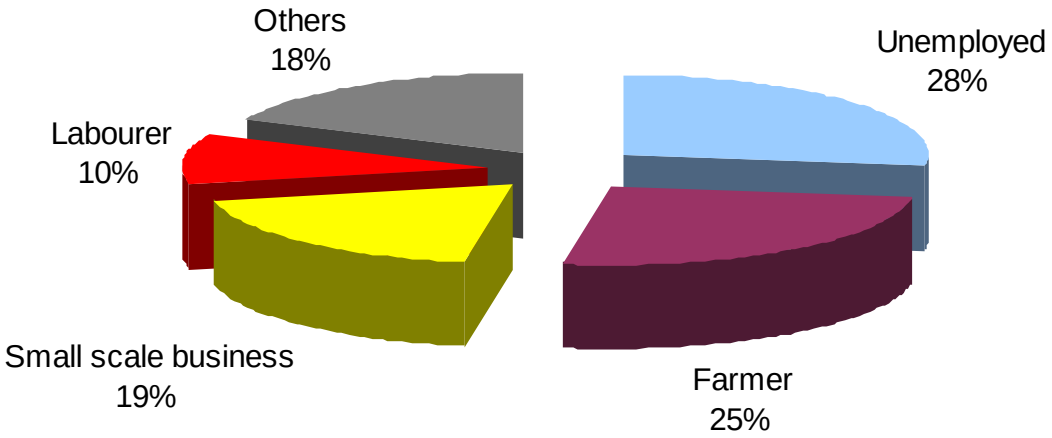
A majority of respondents 79%, own the homes in which they live – only 18% rent.

Base: Total Sample=1000

CONSUMER

Occupations

Q. D4 "Please can you tell me your occupation?"



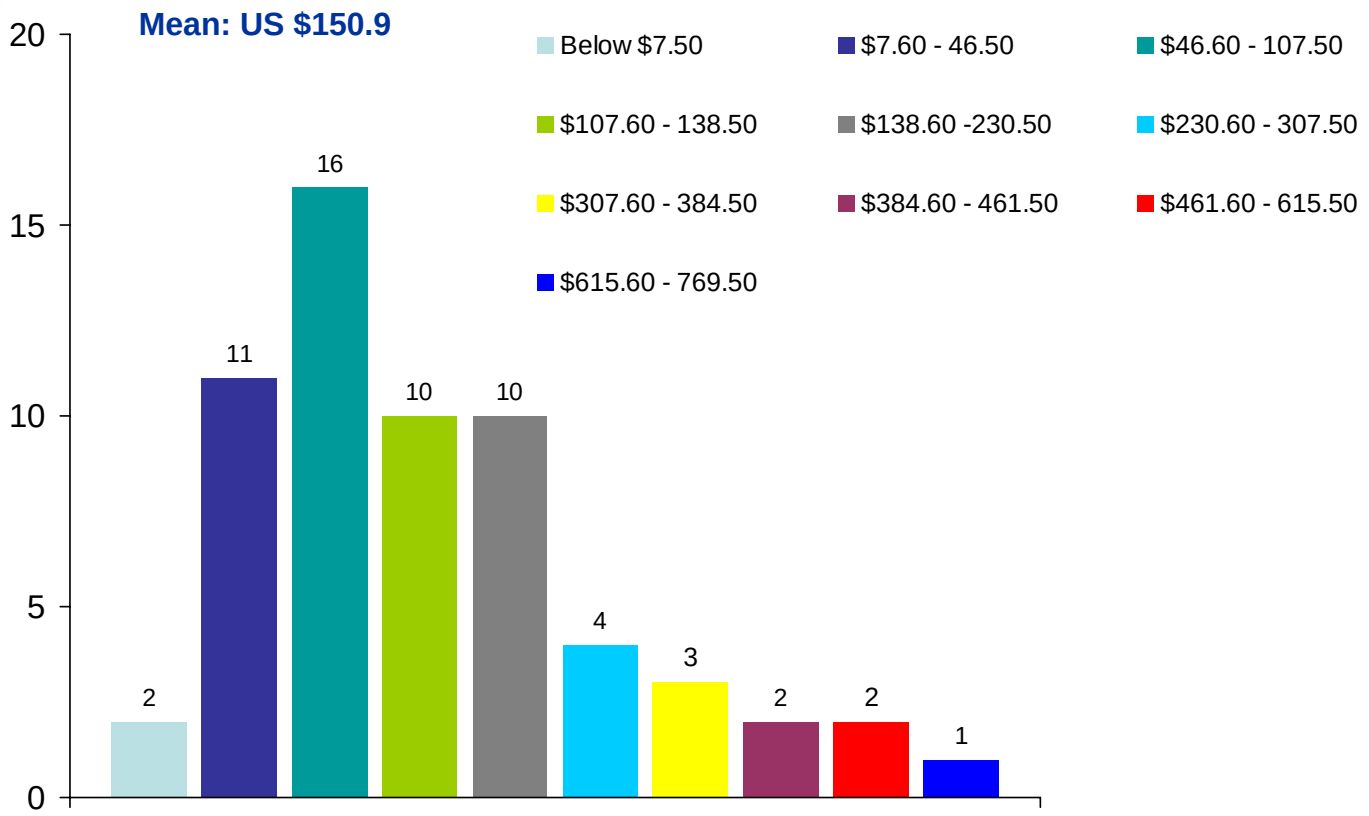
A majority of the respondents amongst Zambian consumers (28%) are unemployed, giving an indicating of the state of the Zambian economy compared to some of the other African countries. 25% are farmers.

Base = Total sample =1000

CONSUMER

Average Zambian Household Income

Q. D7 "What is the average monthly income of your family"?



The average Zambian household income is US $150,90 – this income level is mainly reflective of those consumers in LSM 1 – 4.

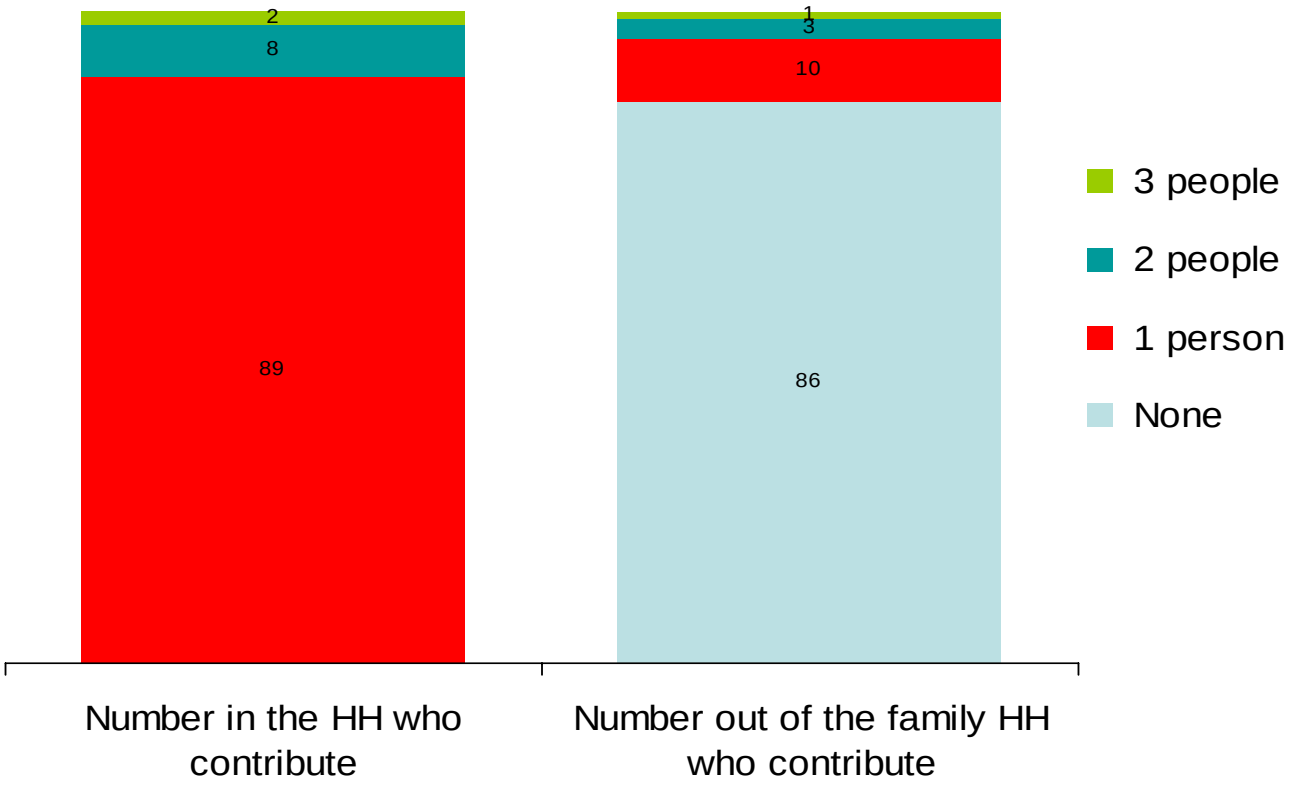
Base: Total Sample = 1000

CONSUMER

Contributors t Household Income

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

Mean=1.27



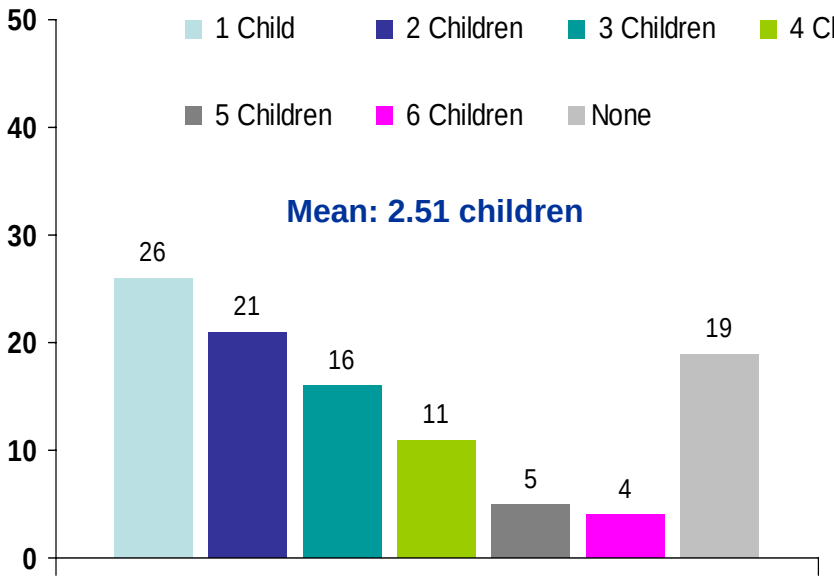
The majority of households are supported singlehandedly with the head of the household being the main income earner. Only in very few cases do households get help from people outside the household.

Base: Total Sample = 1000

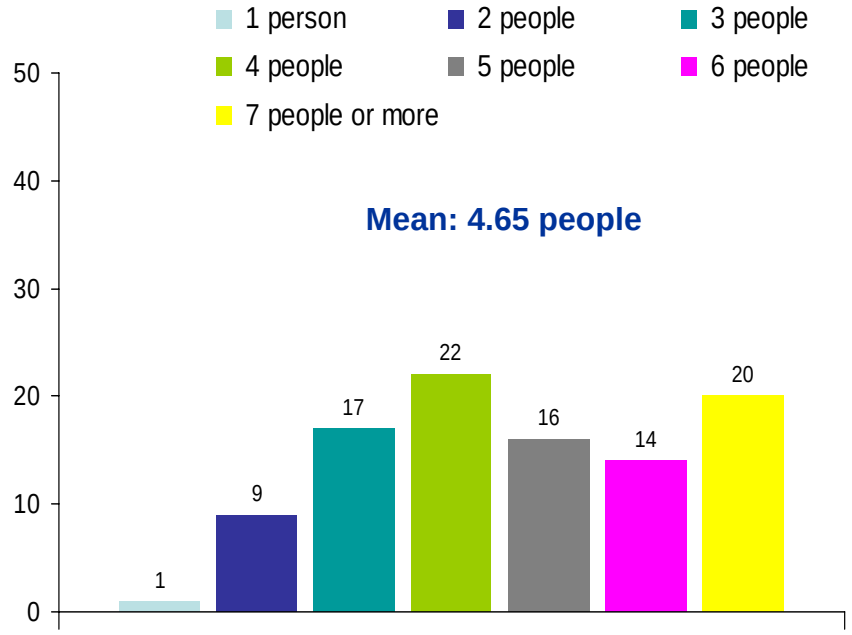
CONSUMER

Number Of People In The Household

Q.1b "How many children (under 16 years) live in your HH in total on a permanent basis?"



Q.1a "How many people live in your HH in total on a permanent basis?"



The average Zambian household consists of between 4 to 5 people of which there are between 2 to 3 children.

Base: Total Sample = 1000

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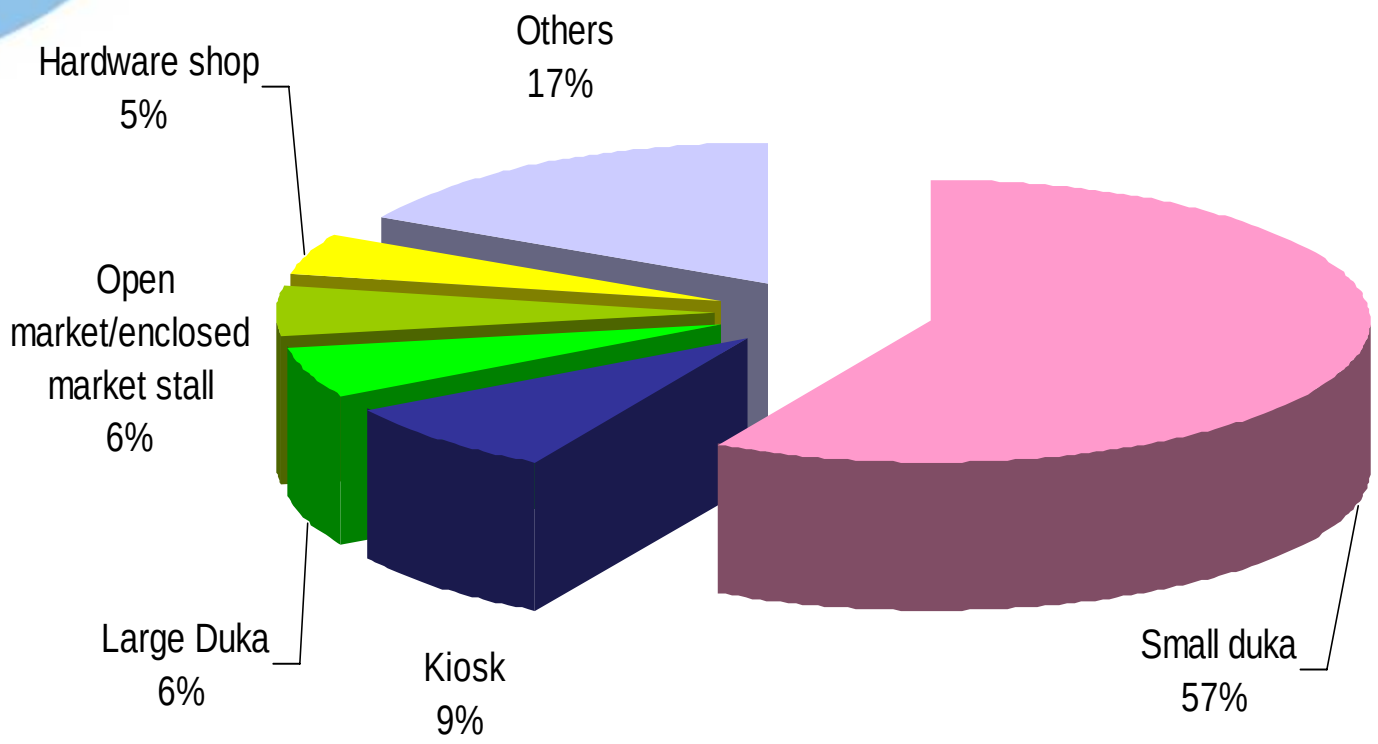
Types of Shop



The majority of shop types owned are small 'Dukas' (57%) mostly selling fruits, vegetables or other day to day consumption items

Base: Total sample = 396

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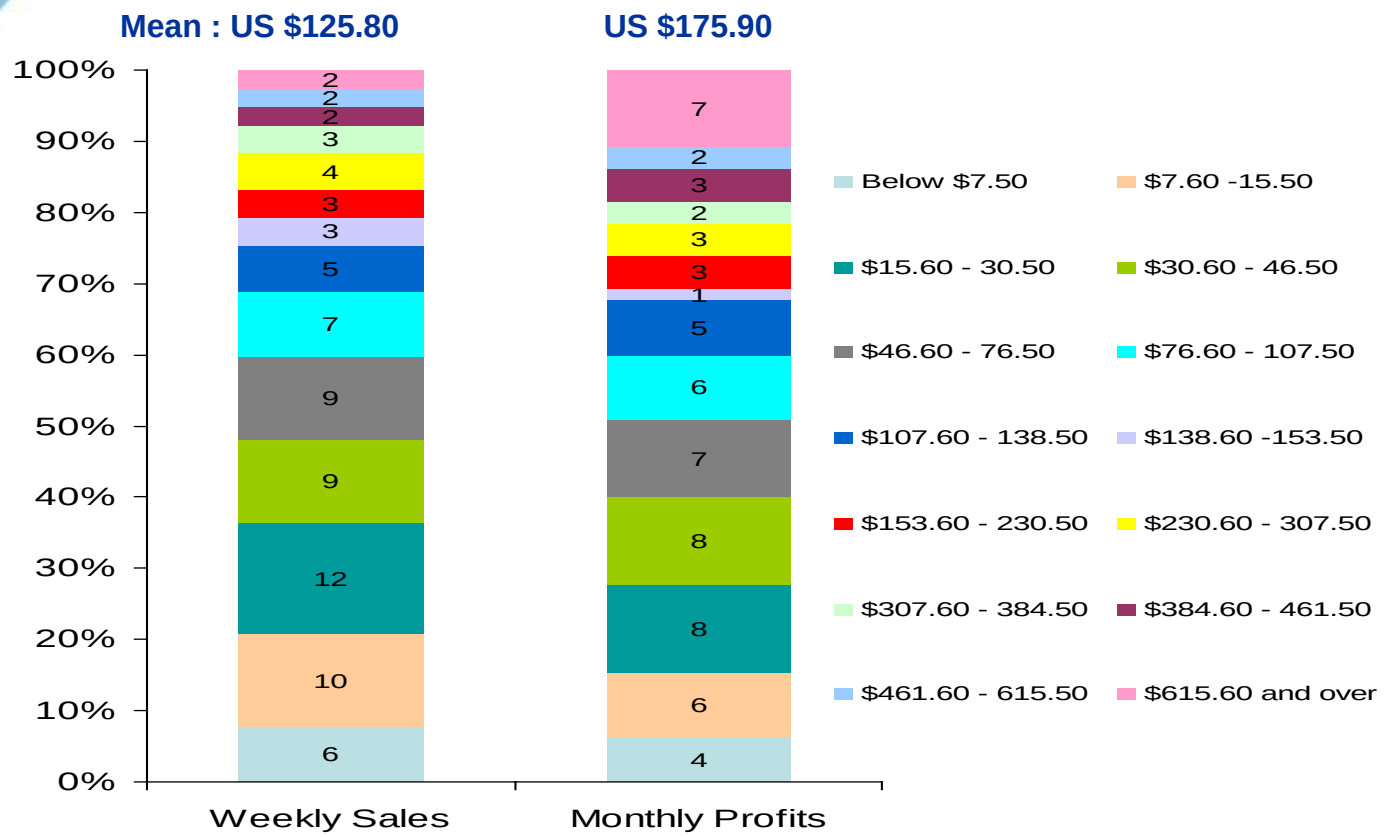
Revenue

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



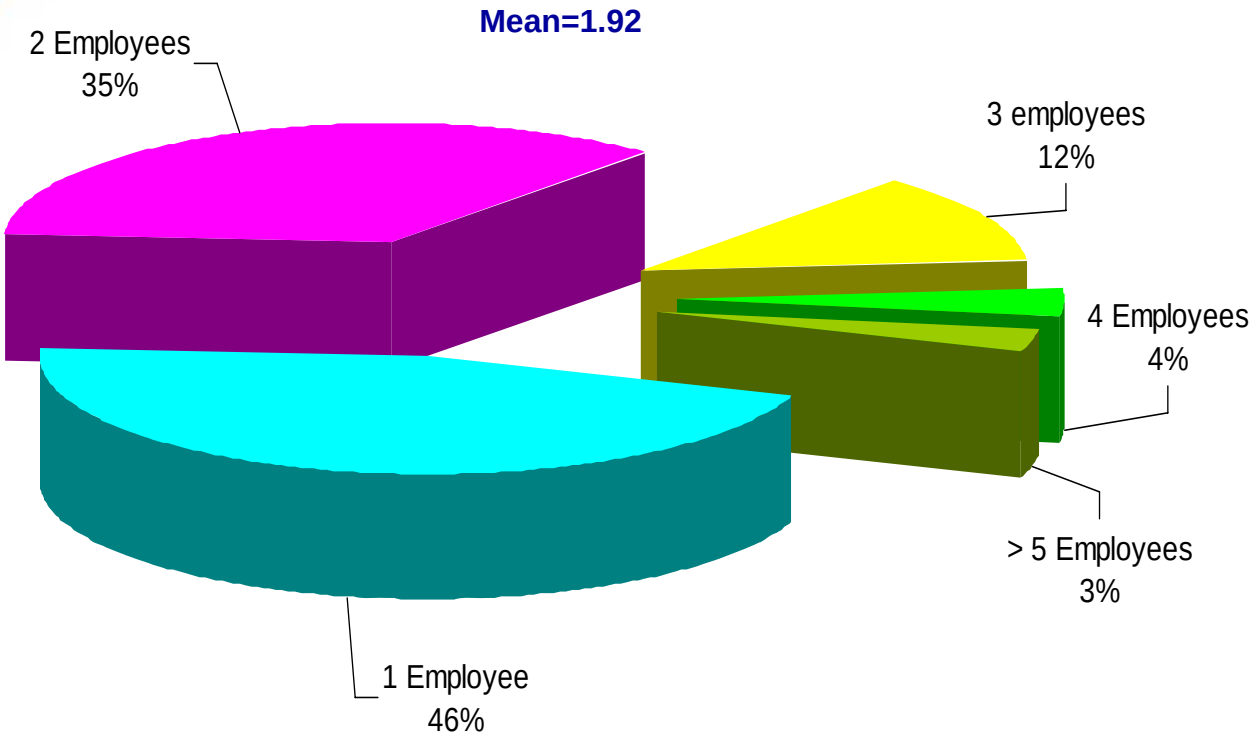
The average weekly sales of Zambian small businesses is averaged at US $ 125,80 with a weekly profit of US $43,98 (195.90/4) weekly.

Base: Total Sample = 396

TRADER

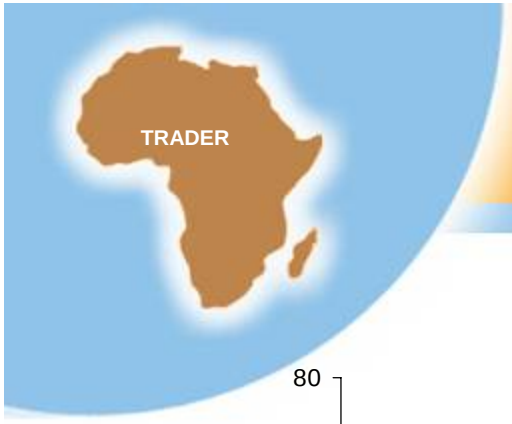
Number of Employees who Work in the Business

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

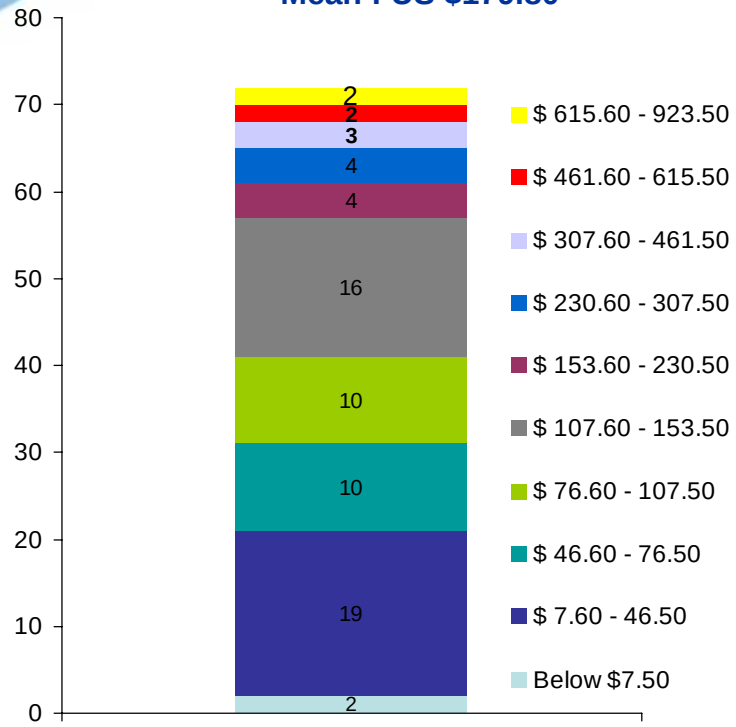


Monthly Income

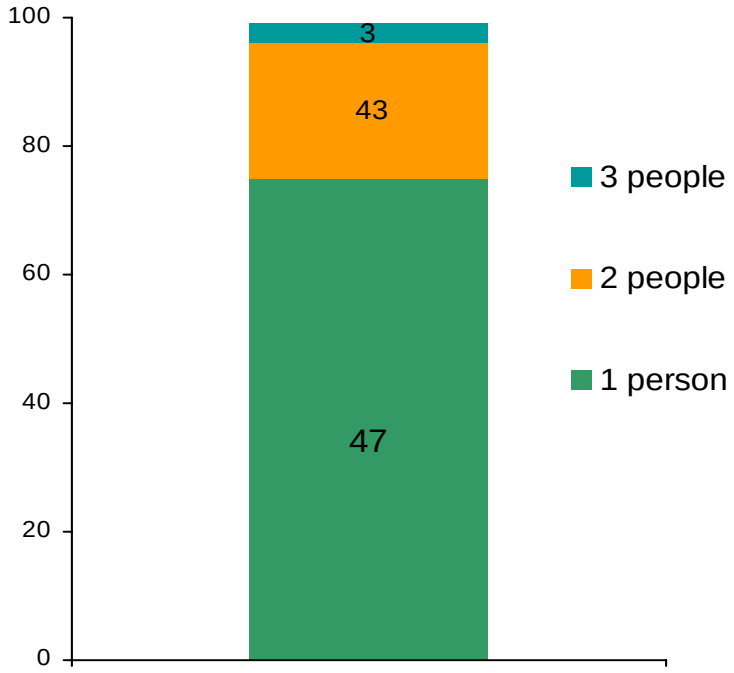
Q.D4 "What is the average monthly income of your family?"

Q.D5 "How many people in the HH contribute to this monthly HH income?"

Mean : US $179.80



Mean : 1.31 people



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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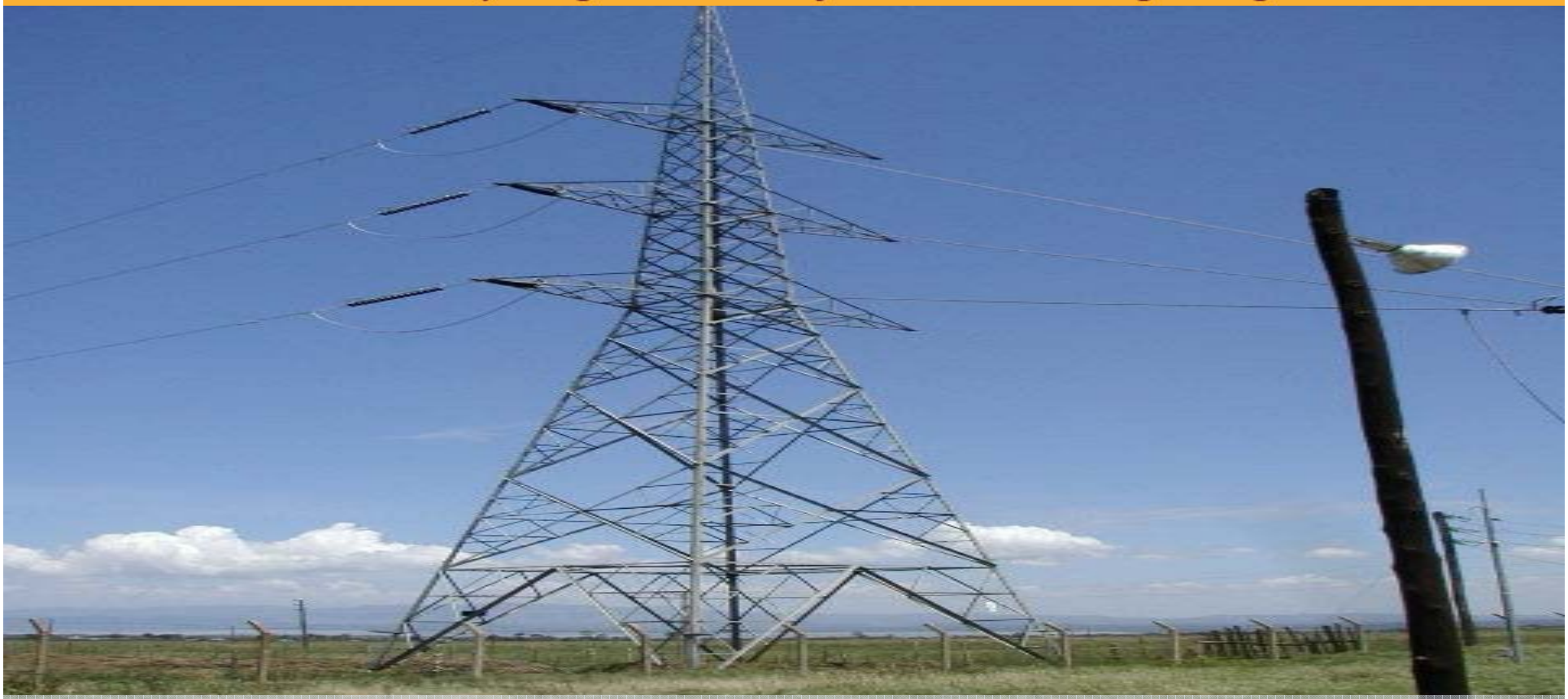

ELECTRICITY CONSUMPTION HABITS

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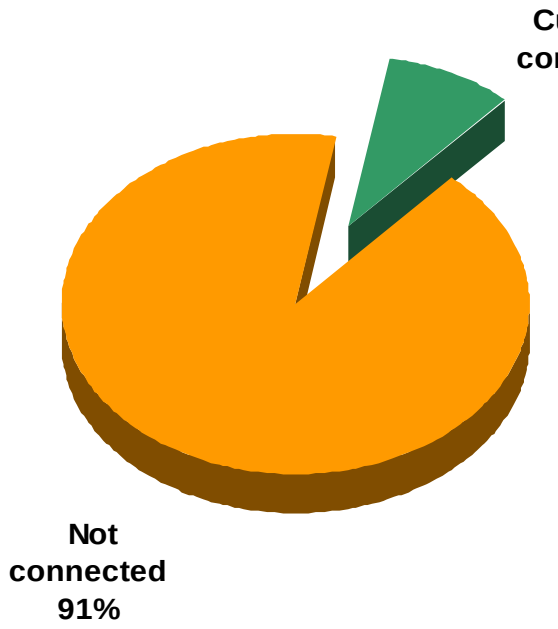
Connection to Main Power Grid

Q.6 "Is your household currently connected to the main power grid?"



Q. 7 "Is the electricity currently working?"	**Base: All Currently connected to main power grid = 86**
Yes	94
No	6

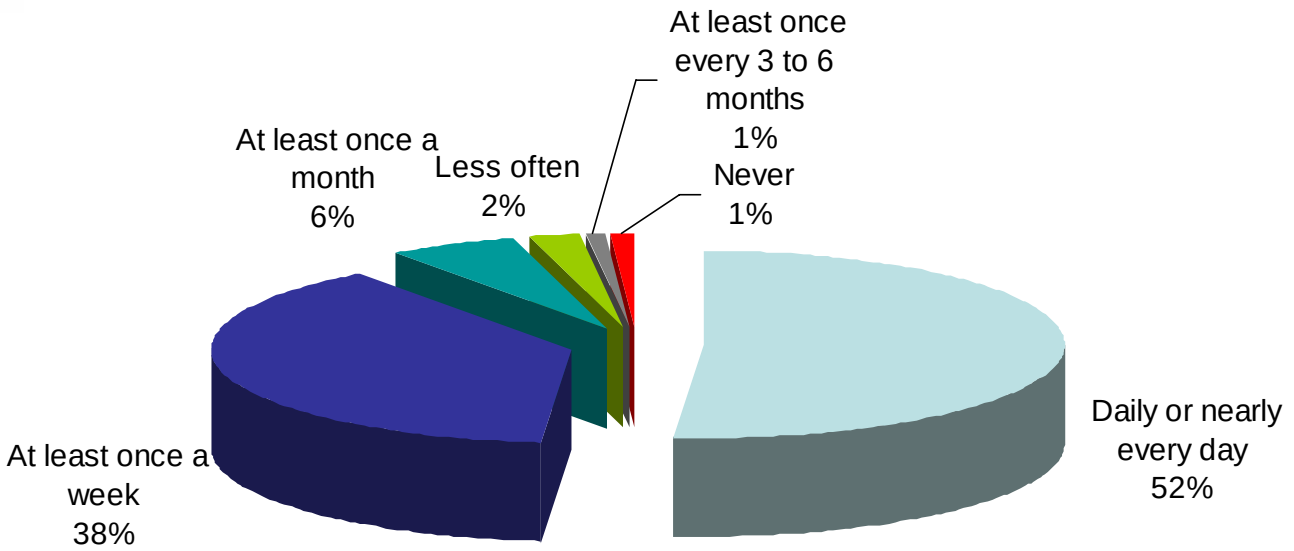
Of the 9% of respondents connected to the grid (a quota imposed for the purposes of the research), 94% have electricity which is working

Base: Total Sample n=1000

CONSUMER

Power Cut Frequency

Q. 9 "How often if ever do you experience power cuts?"



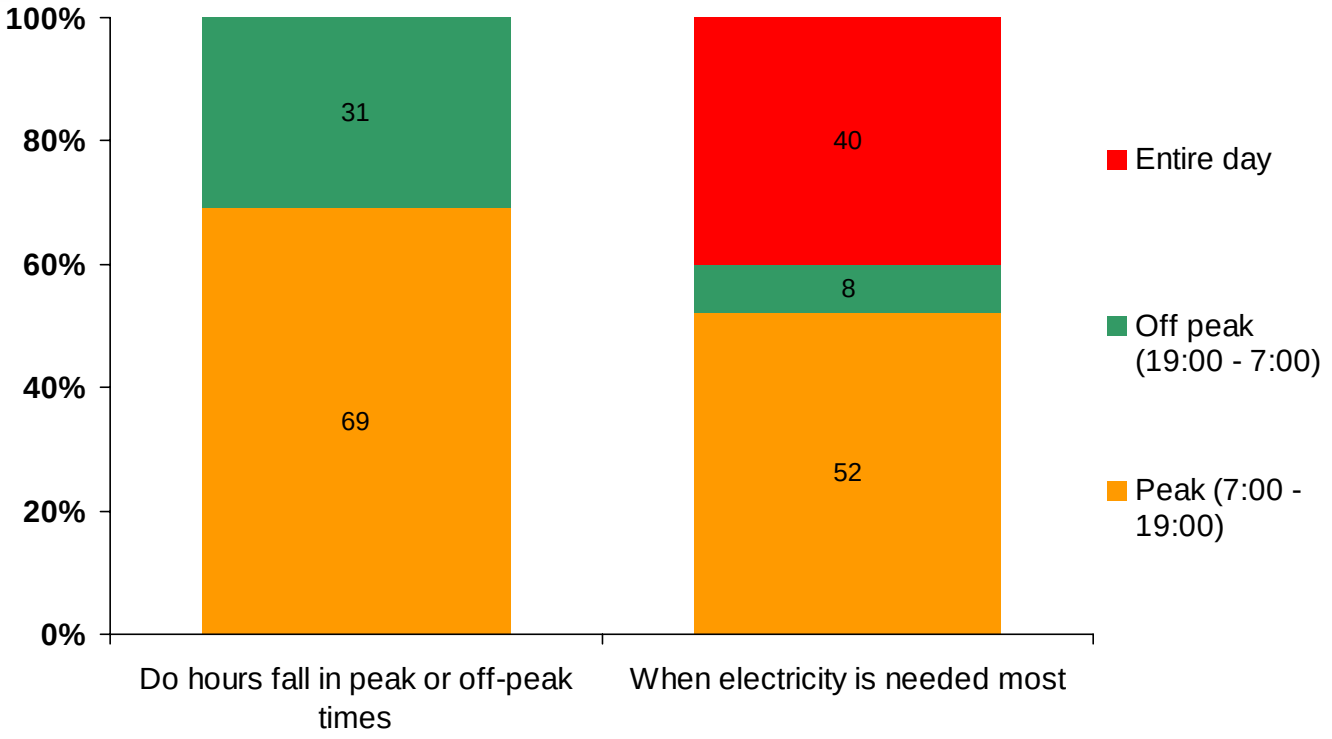
A very large percentage (89%)of households experience power cuts as frequently as daily to once a week indicating that the electricity network in Zambia really is in quite poor order.

Base: All with electricity currently working =81

CONSUMER

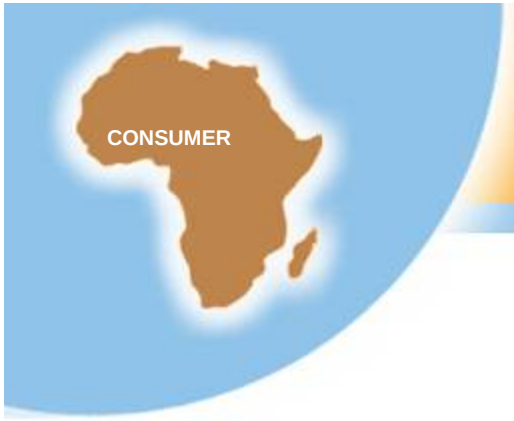
Time Power Cuts Occur

Q. 11 "Do power cuts hours 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?"

Conversion rate
1US $ = 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

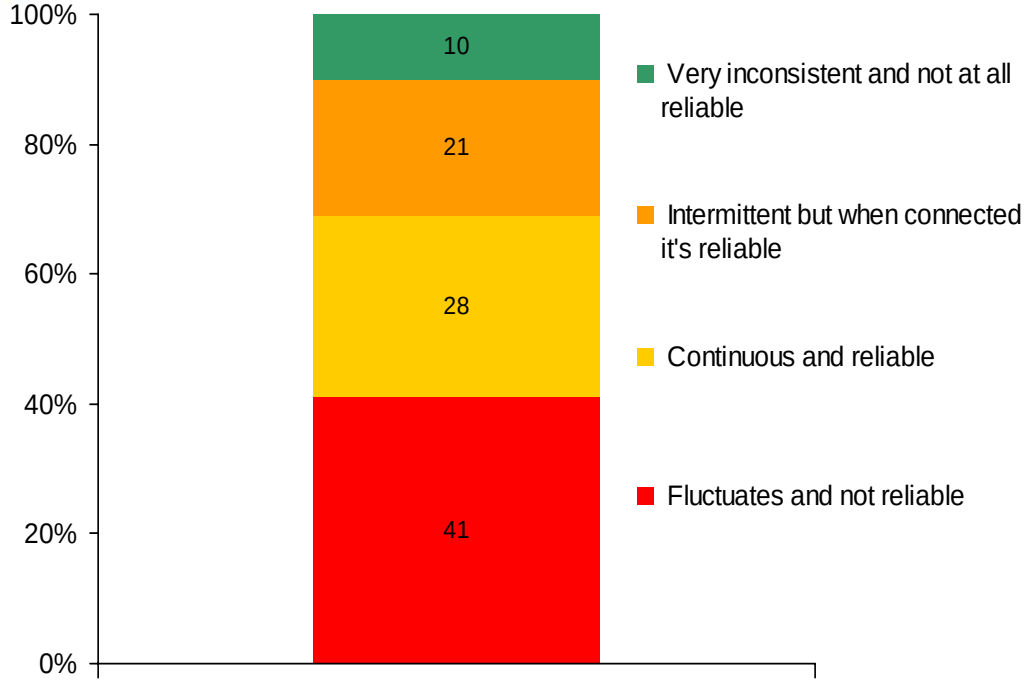
	Total	Lusaka	Central	Copper Belt	Eastern
Below US $0.15 (Below 500)	1	8	-	-	-
US $1.5 (ZMK 5000)	1	-	-	-	-
US $6 – 14.4 (ZMK 20000 - 80000)	5	-	-	16	-
US $15 – 18 (ZMK 50000 - 60000)	9	8	10	16	20
US $21 – 24 (ZMK 70000 - 80000)	15	8	20	16	-
US $25.5 – 30 (ZMK 85000 - 100000)	21	8	-	39	10
US $35.1 – 39 (ZMK 117000 -130000)	8	16	10	8	30
US $45 – 48 (ZMK 150000 - 160000)	17	23	30	-	30
US $53.4 – 60 (ZMK 178000 - 200000)	6	-	10	-	-
US $65.1 - 75 (ZMK 217000 -250000)	7	24	-	8	-
Mean	**US $52.7 ZMK175,700**	**$90.3 ZMK301,200**	**$36.7 ZMK122,300**	**$41.3 ZMK137,700**	**$34 ZMK113,300**

**Caution: Small bases

CONSUMER

Quality Of Electricity

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



***Q.14a Not charted- comment included in comment box**

Q. 14b Not analysed due to small base sizes

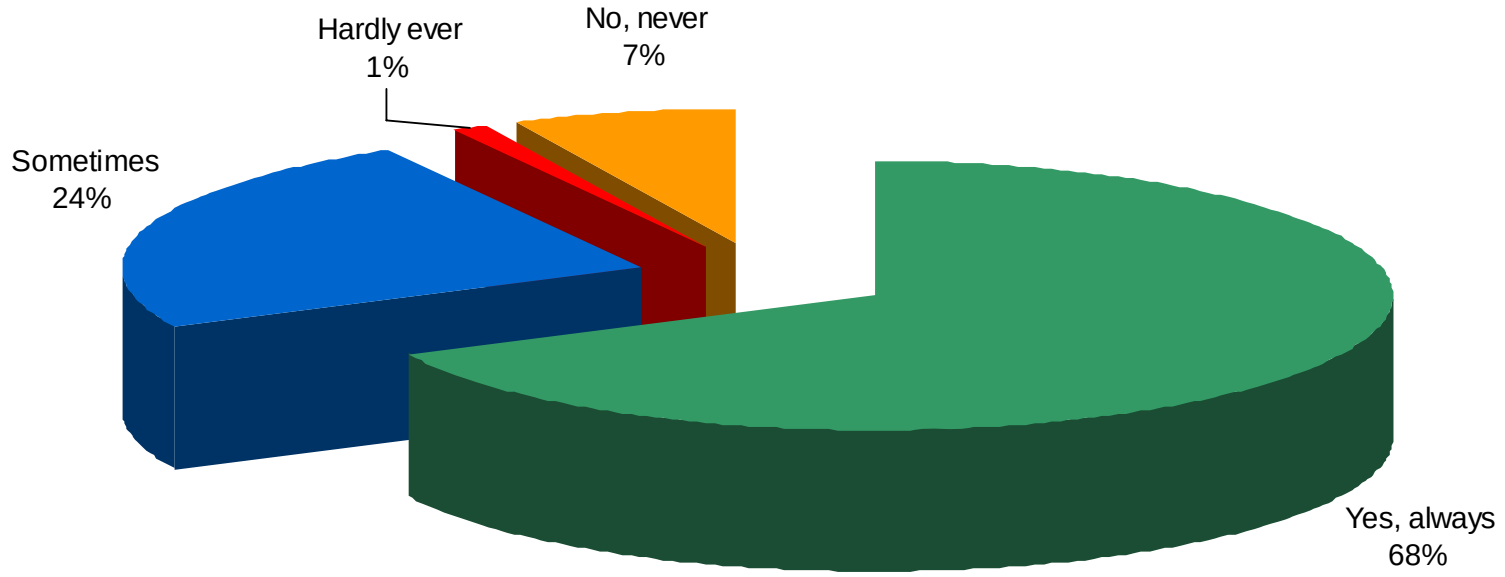
Households connected to electricity receive bills monthly. Only 26% of households state their electricity is continuous and reliable, while 72% of consumers are not satisfied with the quality of their electricity. This creates a need for alternative lighting devices to be used when electricity is not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

Base: All currently connected=86

CONSUMER

Voltage Sufficiency for Household Appliances

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

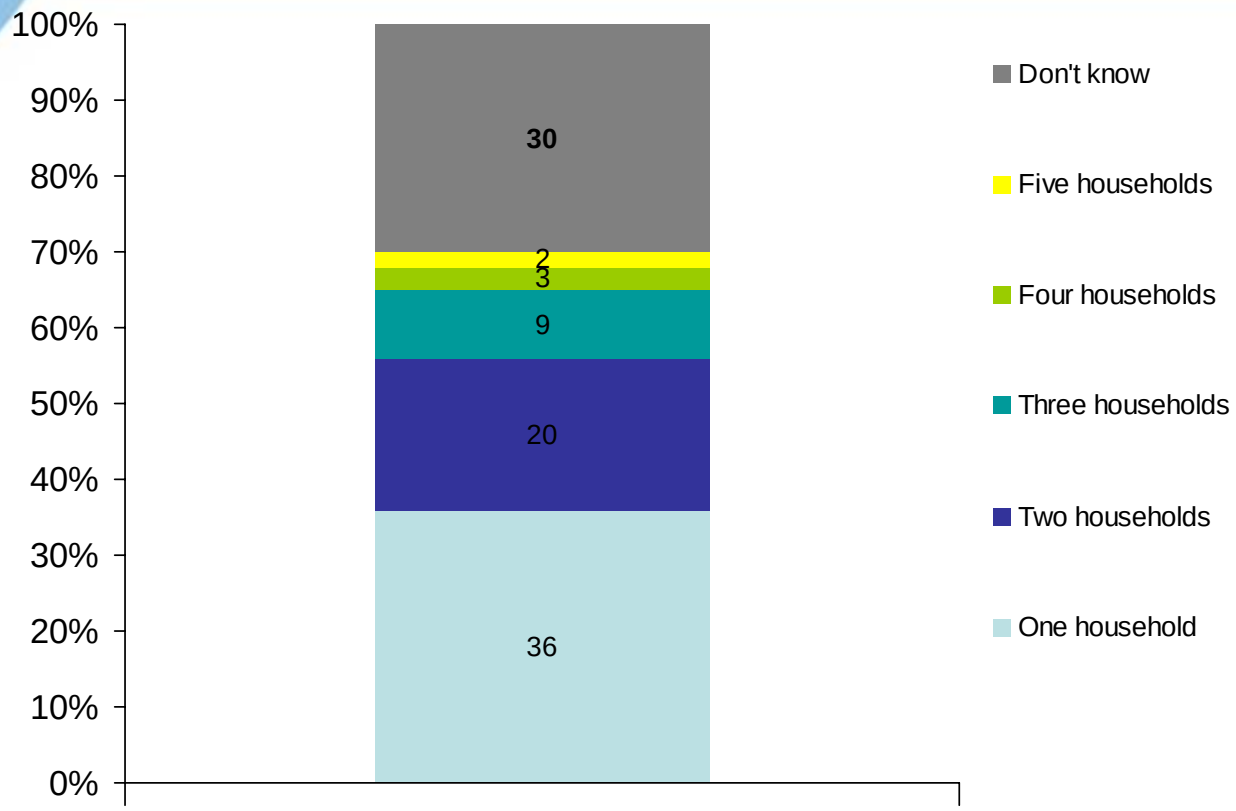


Base: All currently connected to main power grid

CONSUMER

No. Of Households Sharing Electricity

Q. 13 "How many households are sharing electricity from the same source"



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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Connection to Main Power Grid

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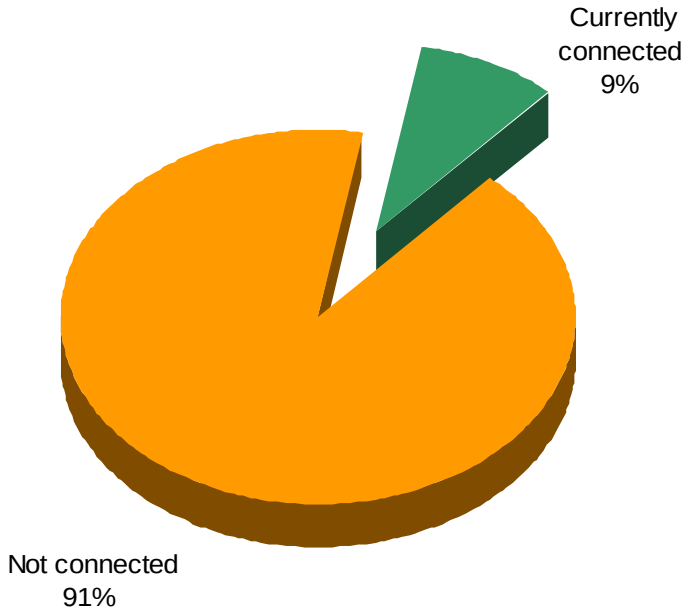
Q.6 "Is your business currently connected to the main power grid?"



Base: Total Sample=400

Q. 7 "Is the electricity currently working?"	Base = All Currently connected to main power grid = 34
Yes	88
No	12

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

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Power Cut Frequency

Q. 9 "How often, if ever, do you experience power cuts?"

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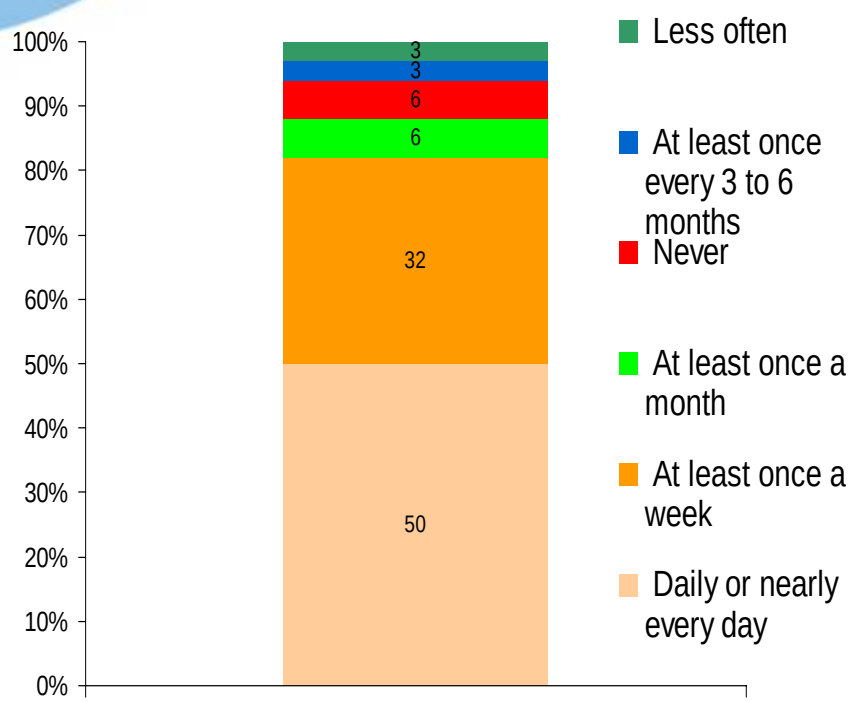
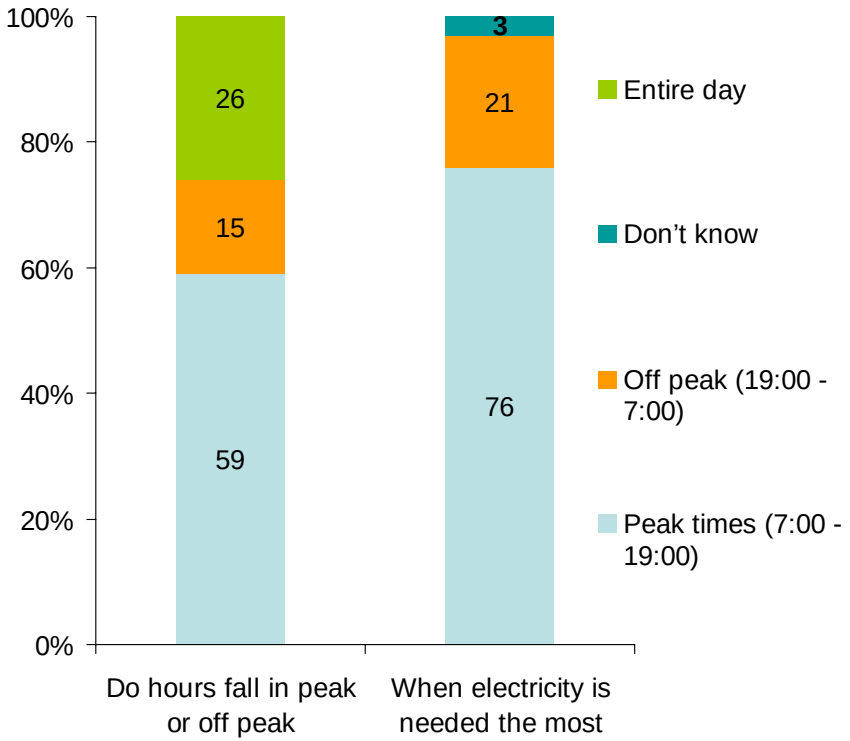


Q. 11 "Do the hours in which you receive electricity mainly fall in peak or off peak times?"



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

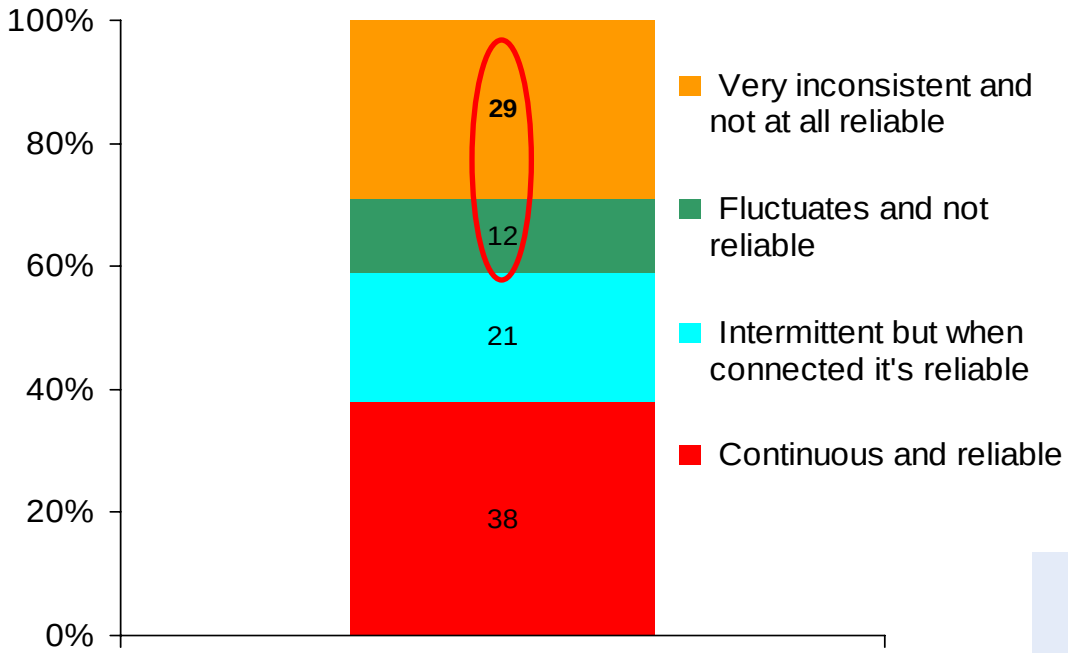
Q. 10 Could not be analysed due to small base sizes

Base: All with electricity currently working =34

Quality of Electricity

TRADER

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

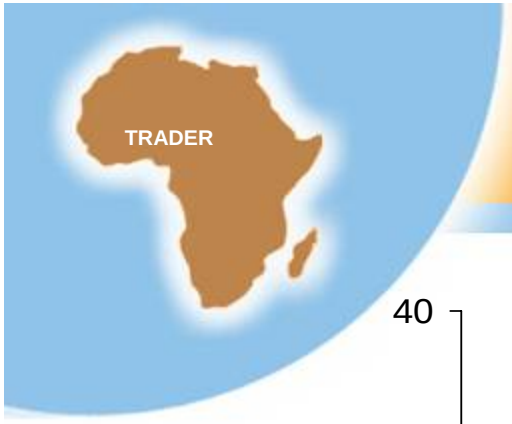


Base: All currently connected=34

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

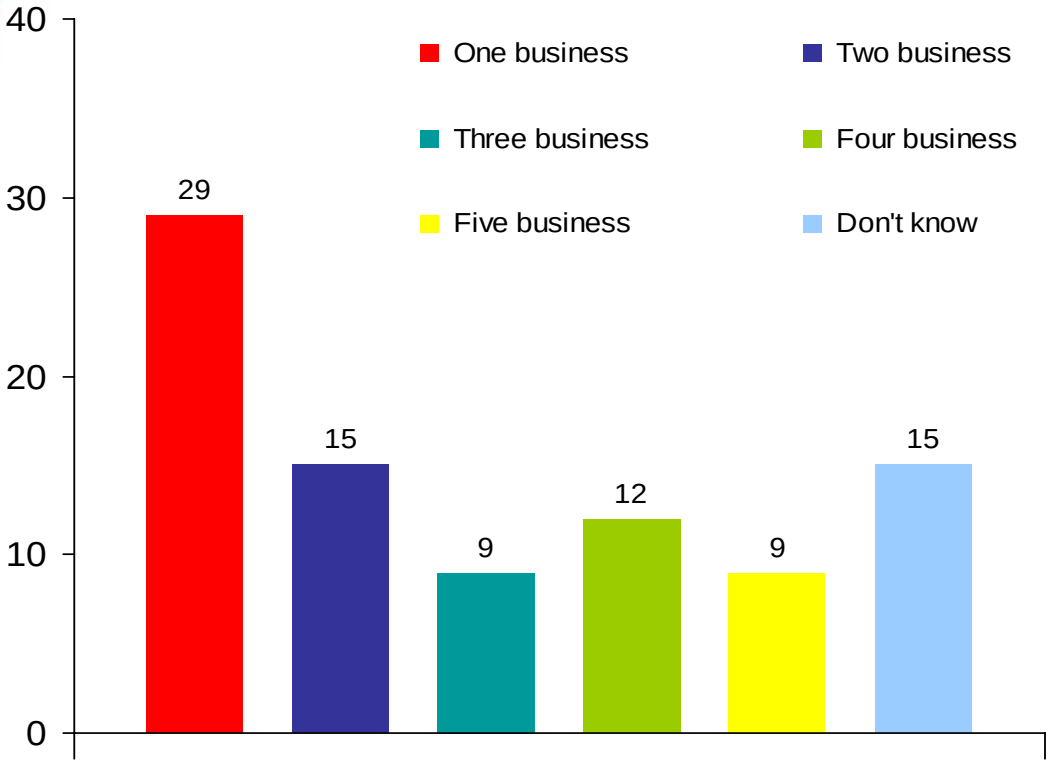
	Base = 34
Yes, always	74
Sometimes	24
Hardly ever	3

41% of those respondents connected to the grid affirm that the quality of electricity they receive is unreliable and inconsistent



Sharing Electricity from Same Source

Q. 13 "How many businesses/households are sharing electricity from the same source"



29% of businesses have their own electricity source while 45% are sharing 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 same electricity source happens on a regular basis.

Base: All currently connected = 34

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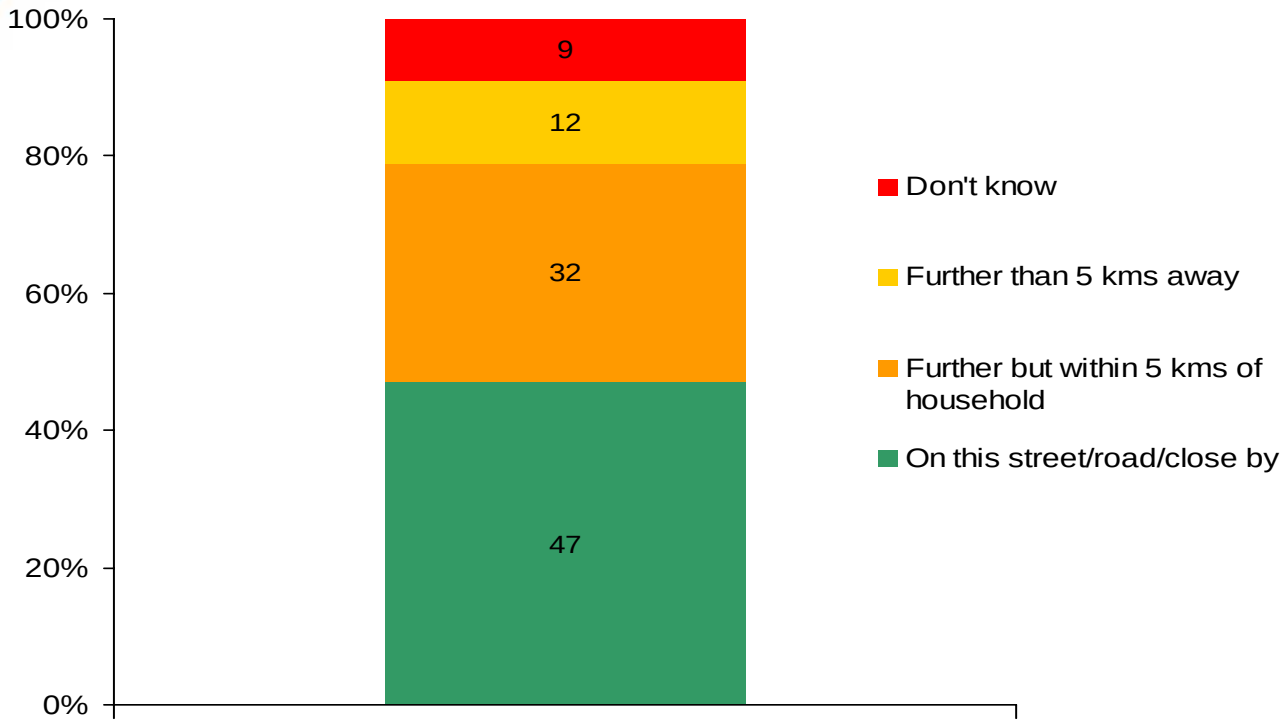
Proximity To Power Line

Q 18 "How close is your nearest mains power line?"



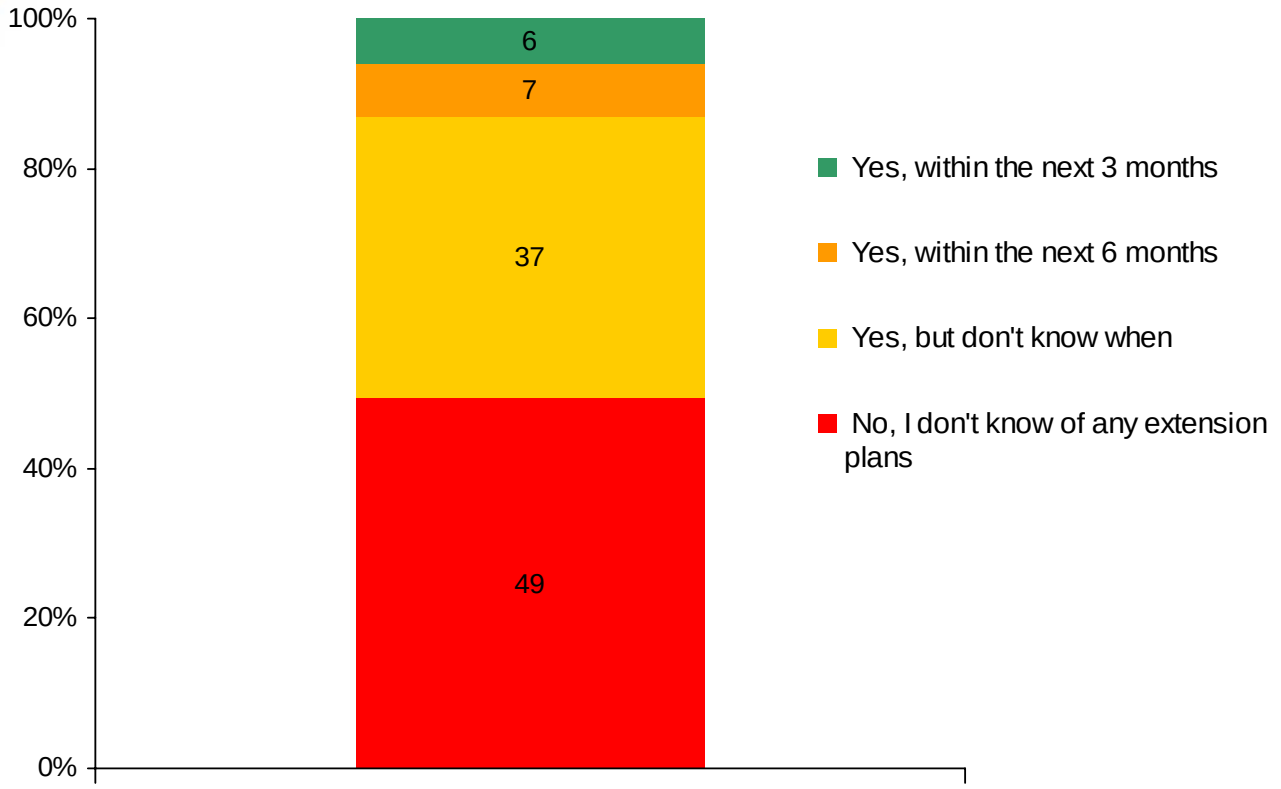
Only 12% of the households not connected to a power grid are further away than 5 km from main power line, distance thus not being the major inhibitor to power grid connection. It is more likely to be the very high cost of electricity which is prohibitive of the majority of consumer connecting to the grid.

Base: All those not connected = 914

CONSUMER

Connection of Unconnected Household to Grid

Q. 19 "You mentioned that the nearest mains power line was close to your household. Do you know of any immediate extension plans to include your household to the grid?



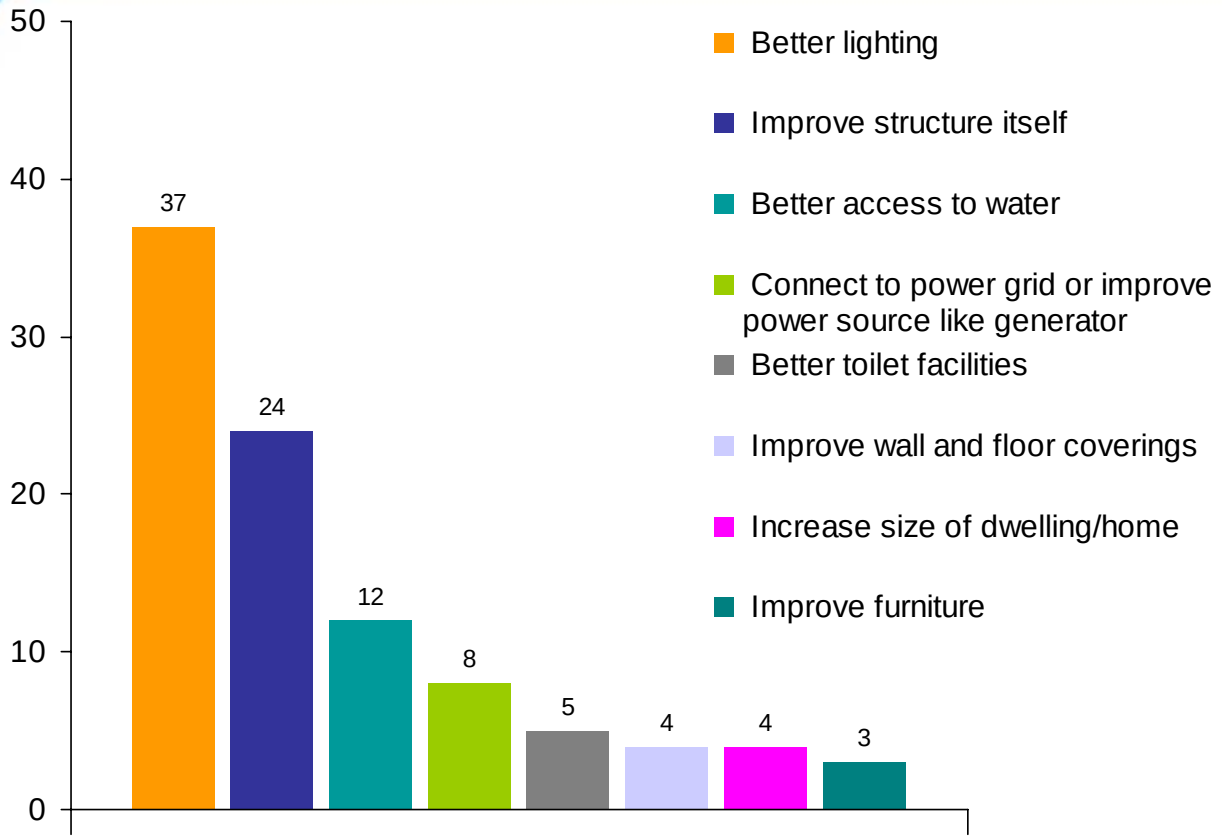
A majority are not aware of any immediate plans to get their households connected to main power grid and those who are aware don't know when the connection will take place

Base: All those close to the main power line= 431

CONSUMER

Improvements to Household

Q. 4 "If there was one thing you could do to improve your household or its facilities what would it be?"



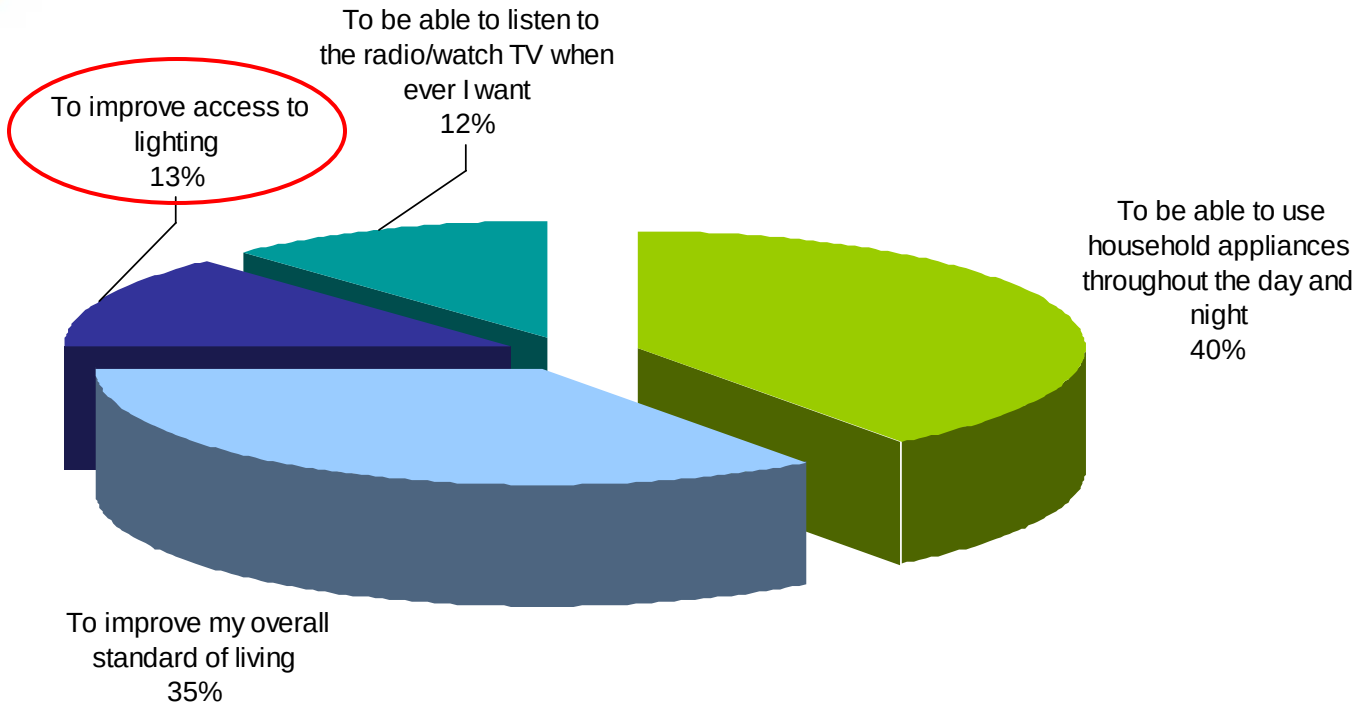
37% of consumers state they would improve the lighting in their household as their main priority. The second highest mention was for improving the structure itself – doors, windows fittings etc. 8% state they would connect to the power grid or improve the main power source.

Base: Total Sample=1000

CONSUMER

Reasons for Wanting to Improve Power Source

Q. 5 "You mentioned you would like to connect to a power grid or improve your power source by purchasing a generator. Please can you tell me the main reason why you would want to do this?"



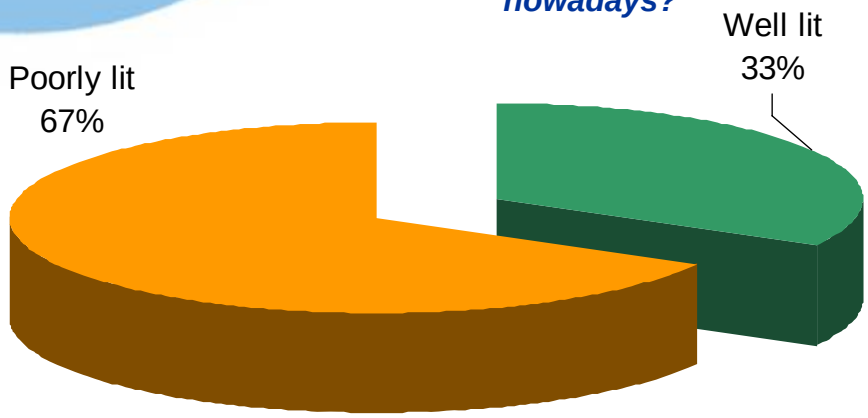
The need for improving household power sources mainly stems from wanting to use household appliances throughout as this would make their life easier and comfortable e.g. ironing, watching TV, cooking etc, however an additional 13% state they would improve their lighting.

Base: All who would connect to power grid or purchase a generator=75

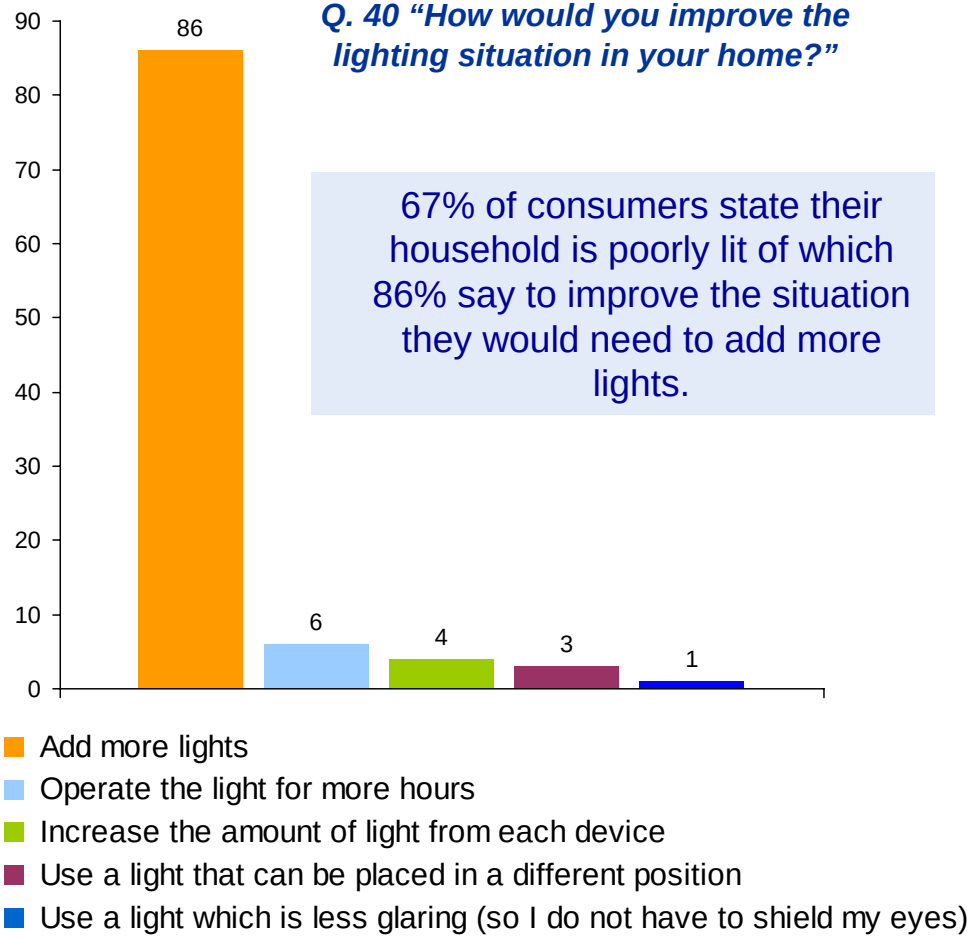
In-home Lighting

CONSUMER

Q. 38 "How would you rate the lighting in your home nowadays?"



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.

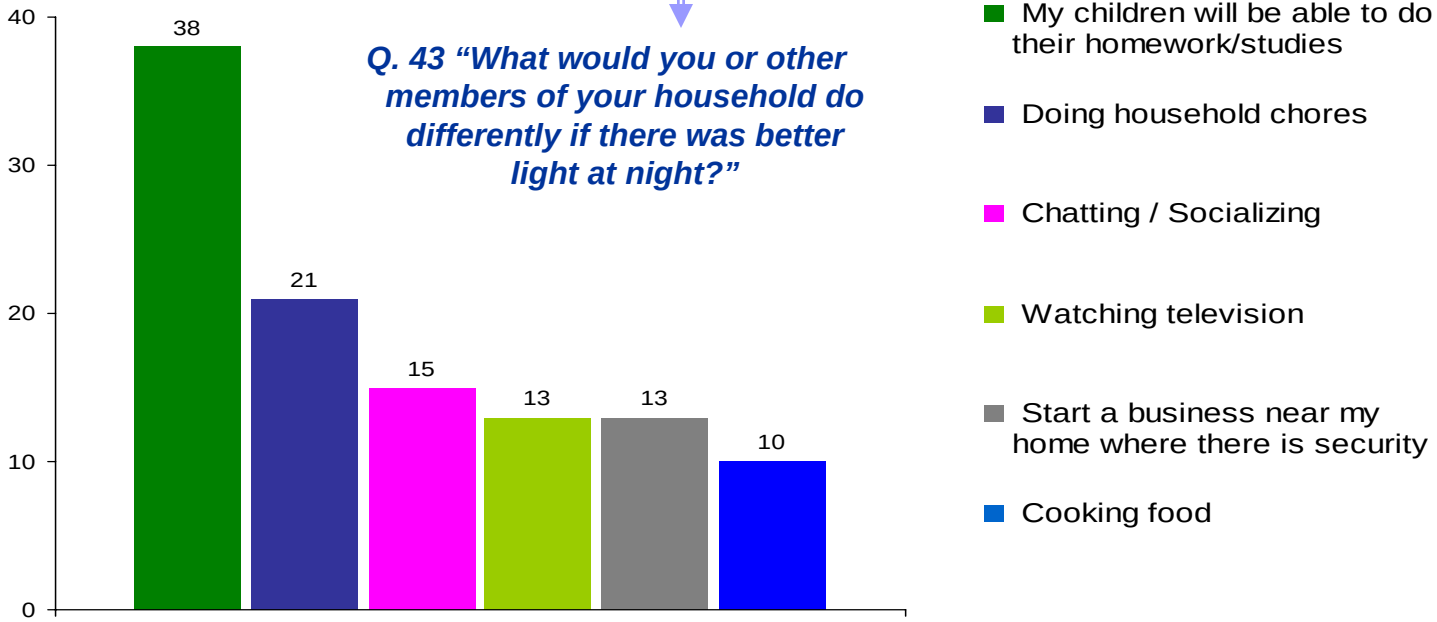
Base: Households whose light can be improved n = 706

CONSUMER

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?"	Base = 1000
Yes	56
No	44

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



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

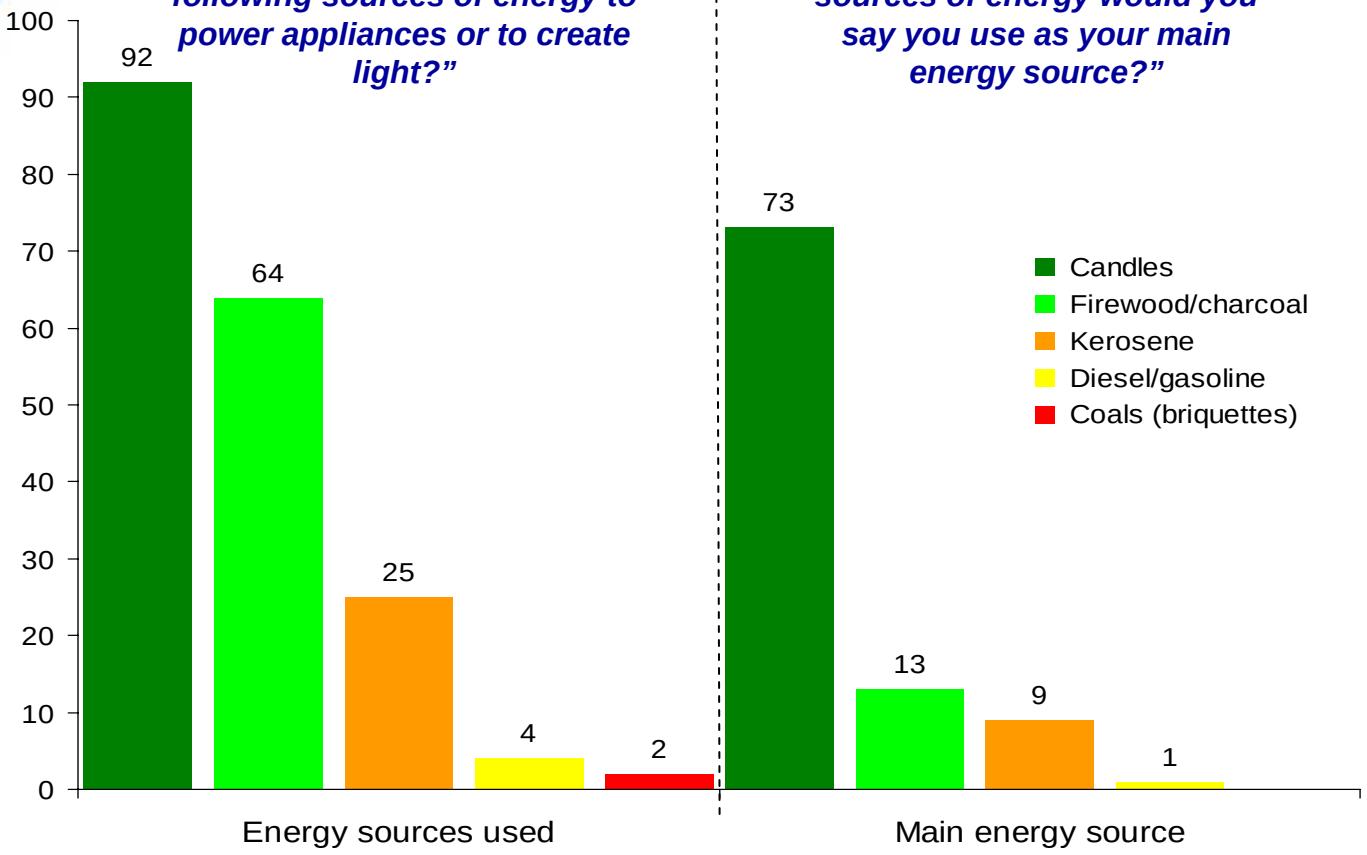
Base: All those who could do things differently = 564

CONSUMER

Use of Energy Sources to Power Appliances / Provide Light

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

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



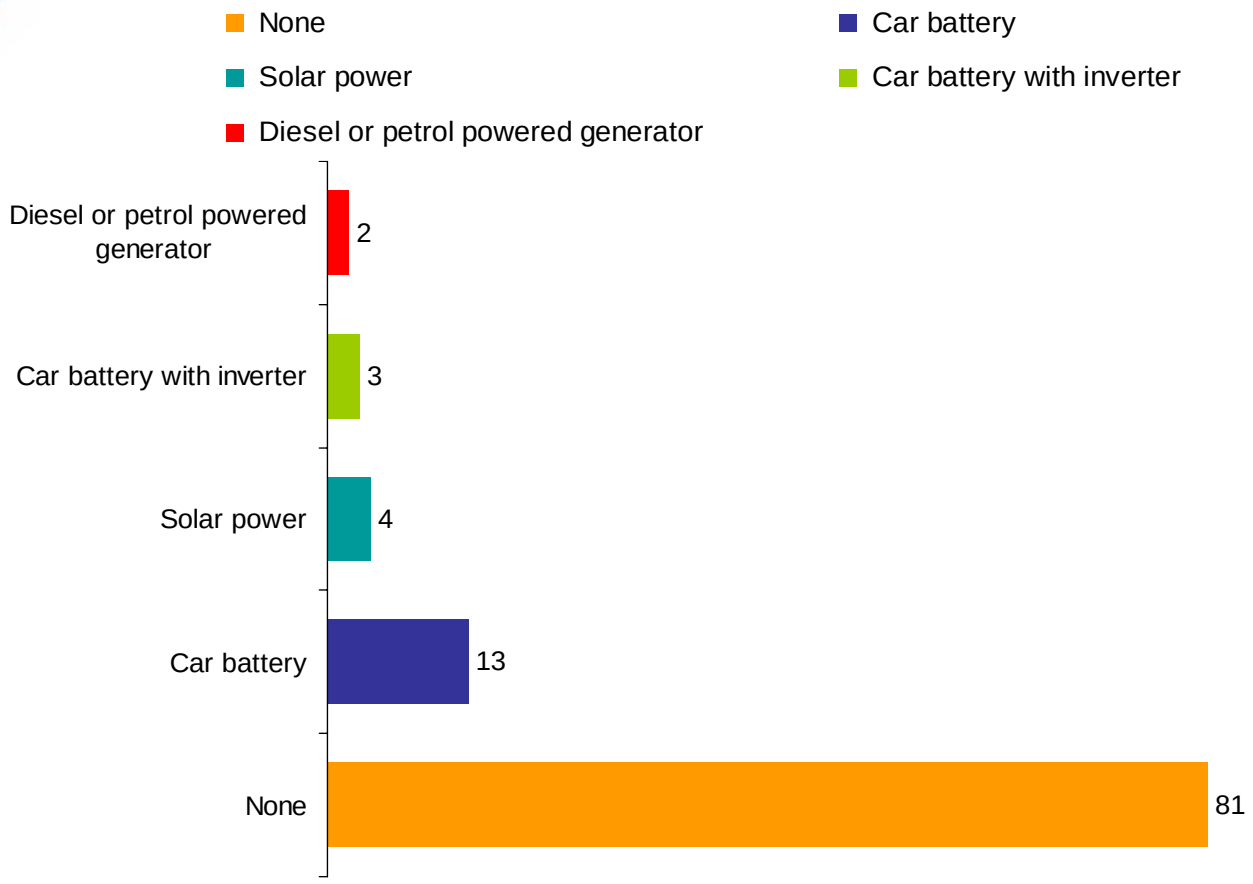
In Zambia there is a very high level of candle usage as the main light and power source, followed by a relatively high incidence of Firewood and charcoal. Kerosene, the main power source in most other Lighting Africa research countries is not used much in Zambia which may be due to cost.

Base: Total Sample = 1000

CONSUMER

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?"*



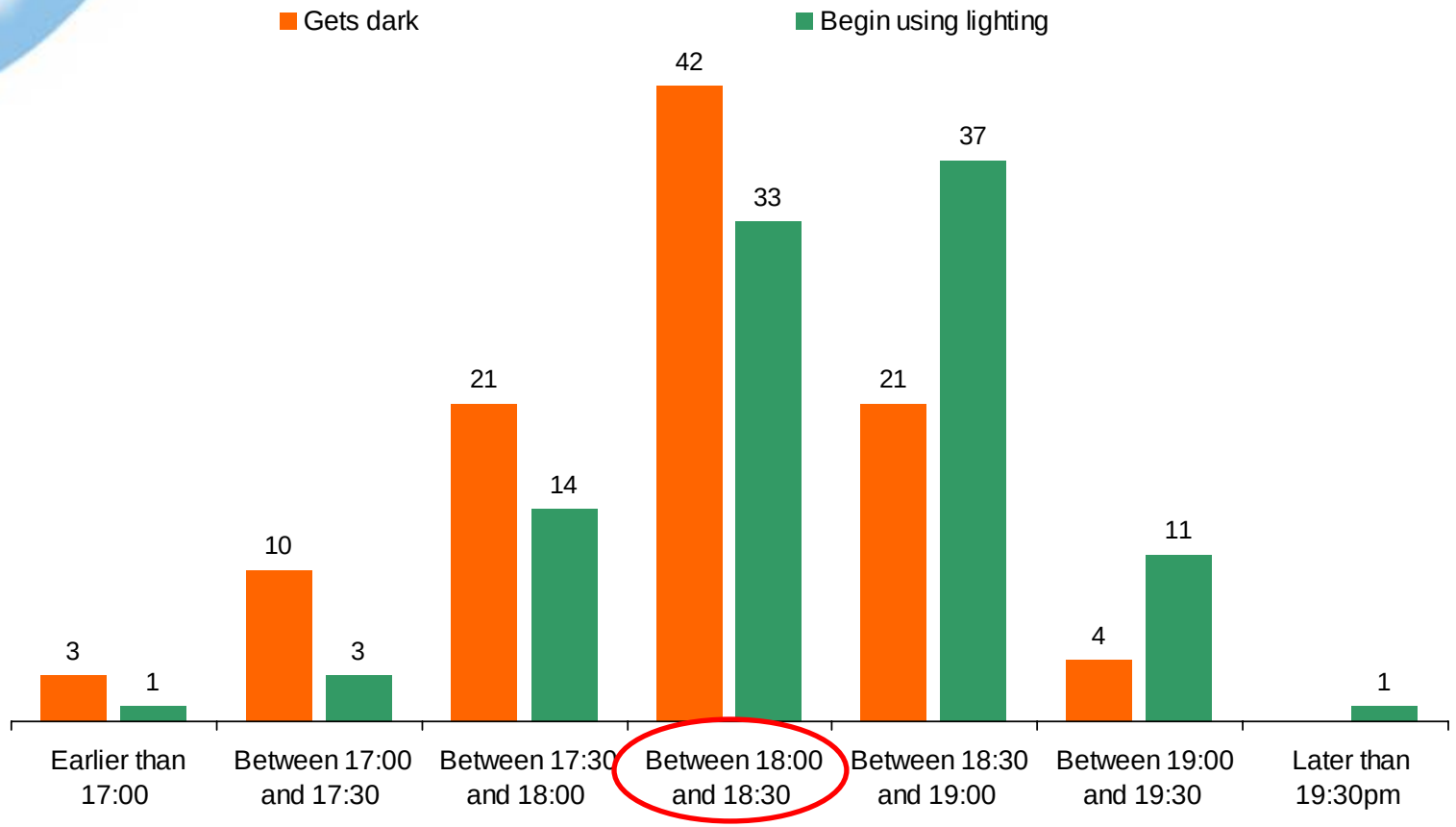
Apart from the candles and firewood the majority of Zambian consumers do not have any other power sources available to them. 13% improvise with car batteries and 9% with other power sources.

Base :Total sample = 995

CONSUMER

Time Lighting Products are Switched on

Q.23"On average, what time does it get dark indoors?"
Q.24"When do you begin using lighting products/devices each night?"



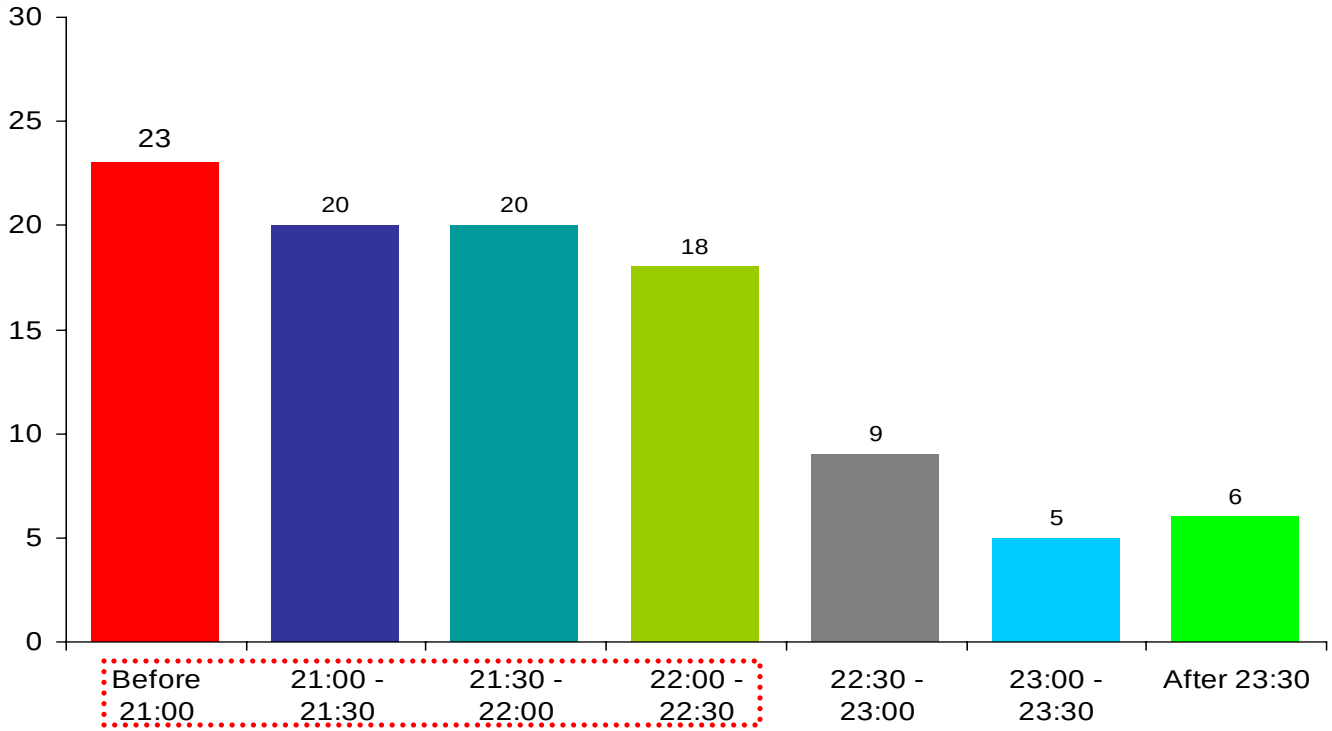
On average, it gets dark indoors between 18.00 and 18.30 while majority of the respondents begin using lighting products between 18.30 and 19.00 each night – the delay in switching on lighting devices is likely a way of saving fuel for when it is completely dark.

Base: Total Sample = 1000

CONSUMER

Time Lighting Products are Switched off

Q. 25 "What time did the last light go off in the household last night?"



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 used is used by many other countries.

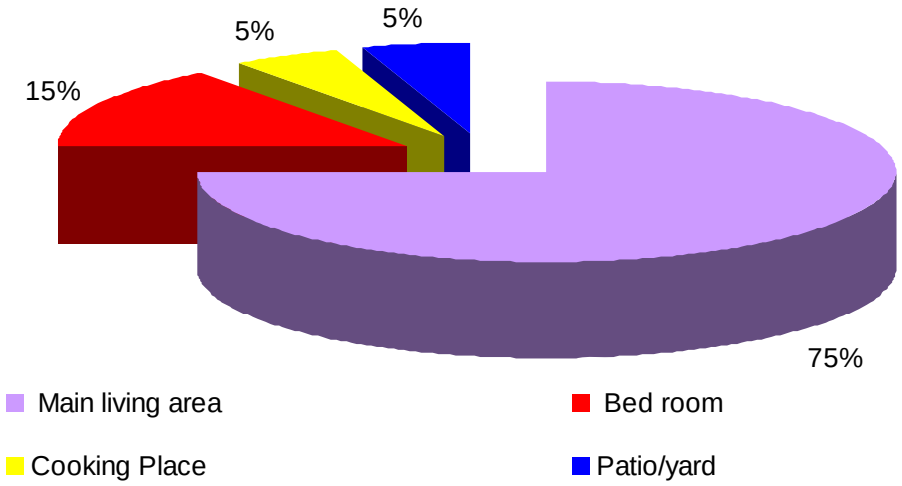
Base: Total sample =1000

Use of Light in the Rooms

CONSUMER

	Q. 27 "How many rooms in this dwelling were used after dark yesterday evening?"	Q. 28 "How many rooms in this dwelling were lit at all yesterday evening?"
1 room	17	30
2 rooms	40	35
3 rooms	18	18
4 rooms	13	10
>5 rooms	10	7
Median	**2**	**2**
Mean	**2.7**	**2.35**

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

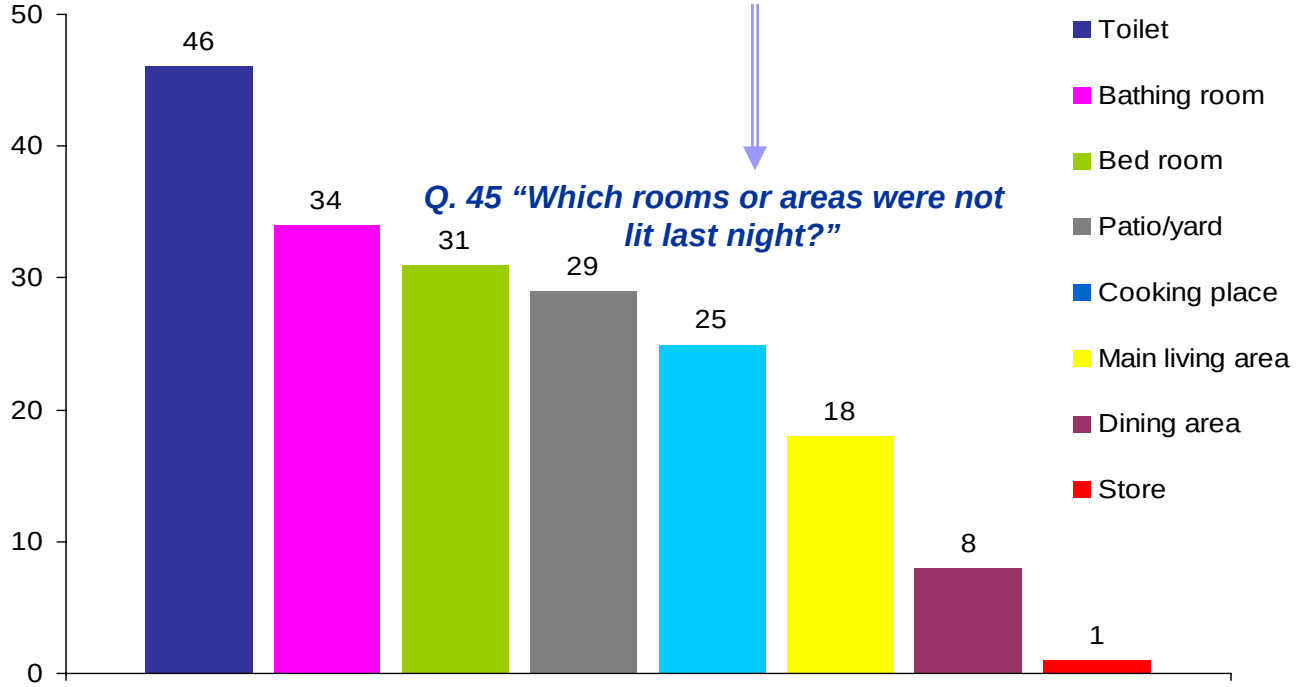
Base: Total sample =1000

CONSUMER

Rooms Not Lit Last Night

Q. 44 "Was your home lit in all the areas that you needed it last night?"	**Base = 1000**
Yes	45
No	50

Q. 45 "Which rooms or areas were not lit last night?"



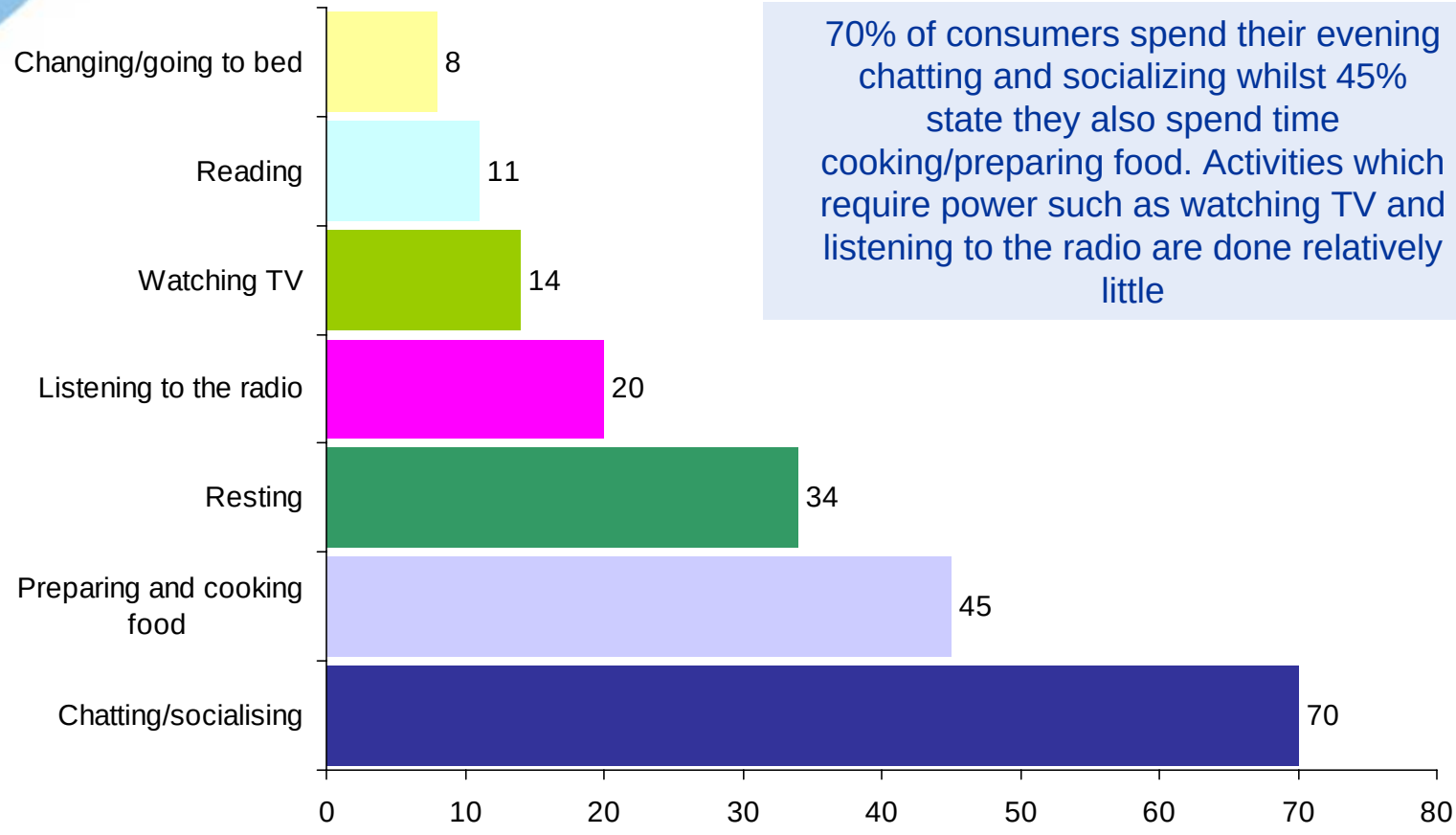
Rooms which were not lit over the last night are those which are not used continuously or often such as the toilet or the bath room.

Base: All those with homes not lit in all areas =551

CONSUMER

Night Time Activities

Q. 31 "What activities were people doing last night?"



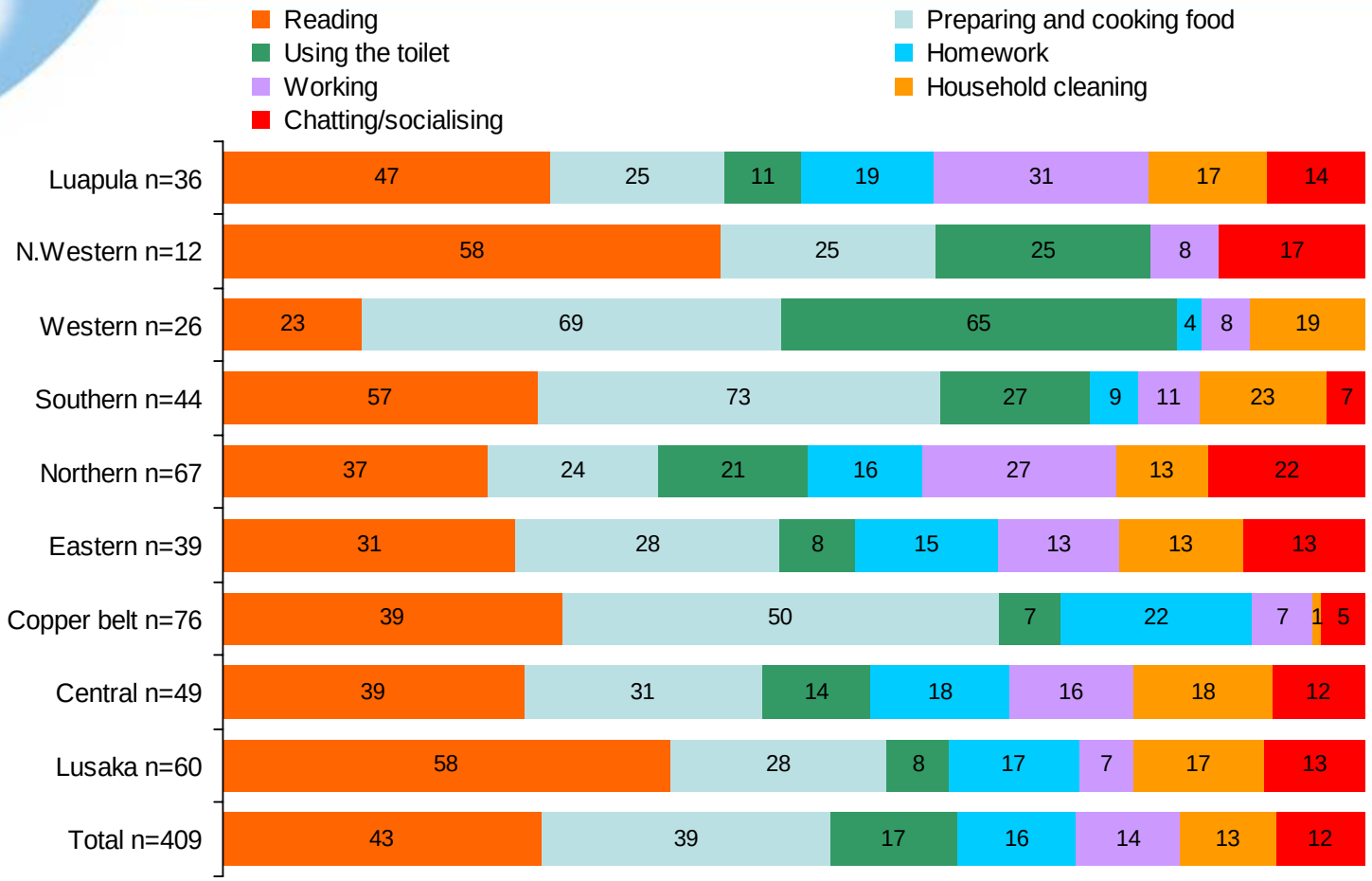
70% of consumers spend their evening chatting and socializing whilst 45% state they also spend time cooking/preparing food. Activities which require power such as watching TV and listening to the radio are done relatively little

Base: Total sample =1000

CONSUMER

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?"



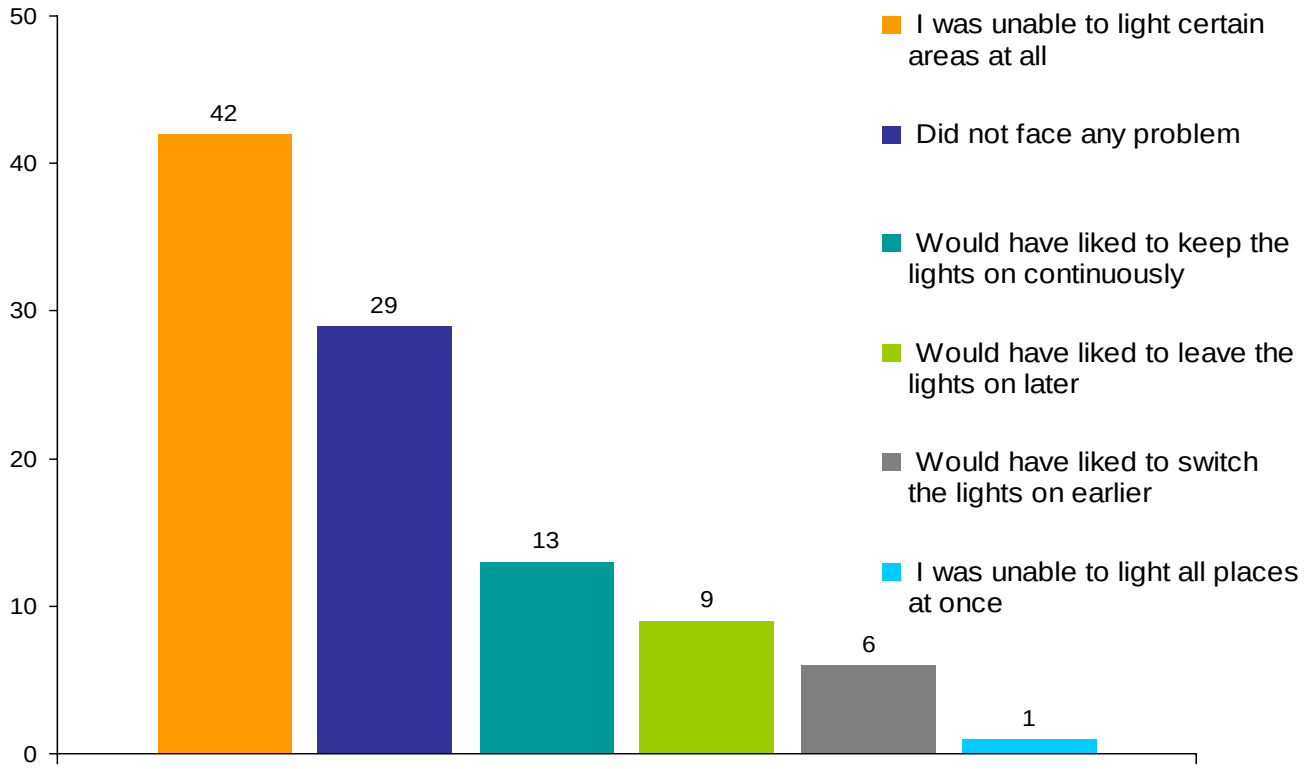
Reading, cooking and using the toilet are the activities which are mainly impaired due to lack of lighting.

Base: All not comfortable doing activities

CONSUMER

Problems Faced when Lighting Home

Q. 46 "What was the main problem you faced when trying to light your home last night ?"



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.

Base: Total Sample = 1000

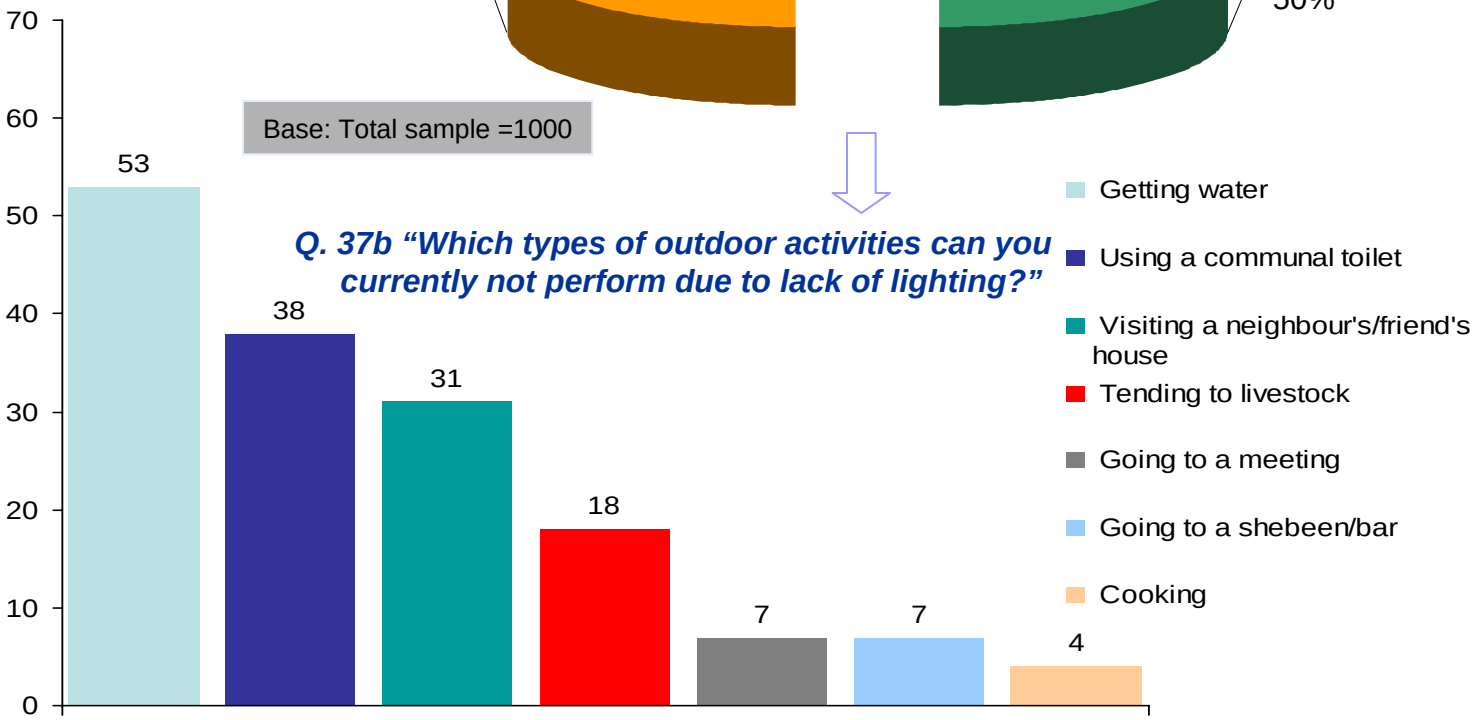
Outdoor Activities Unable to do Due to Lack of Lighting

CONSUMER

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

Base: Total sample =1000

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



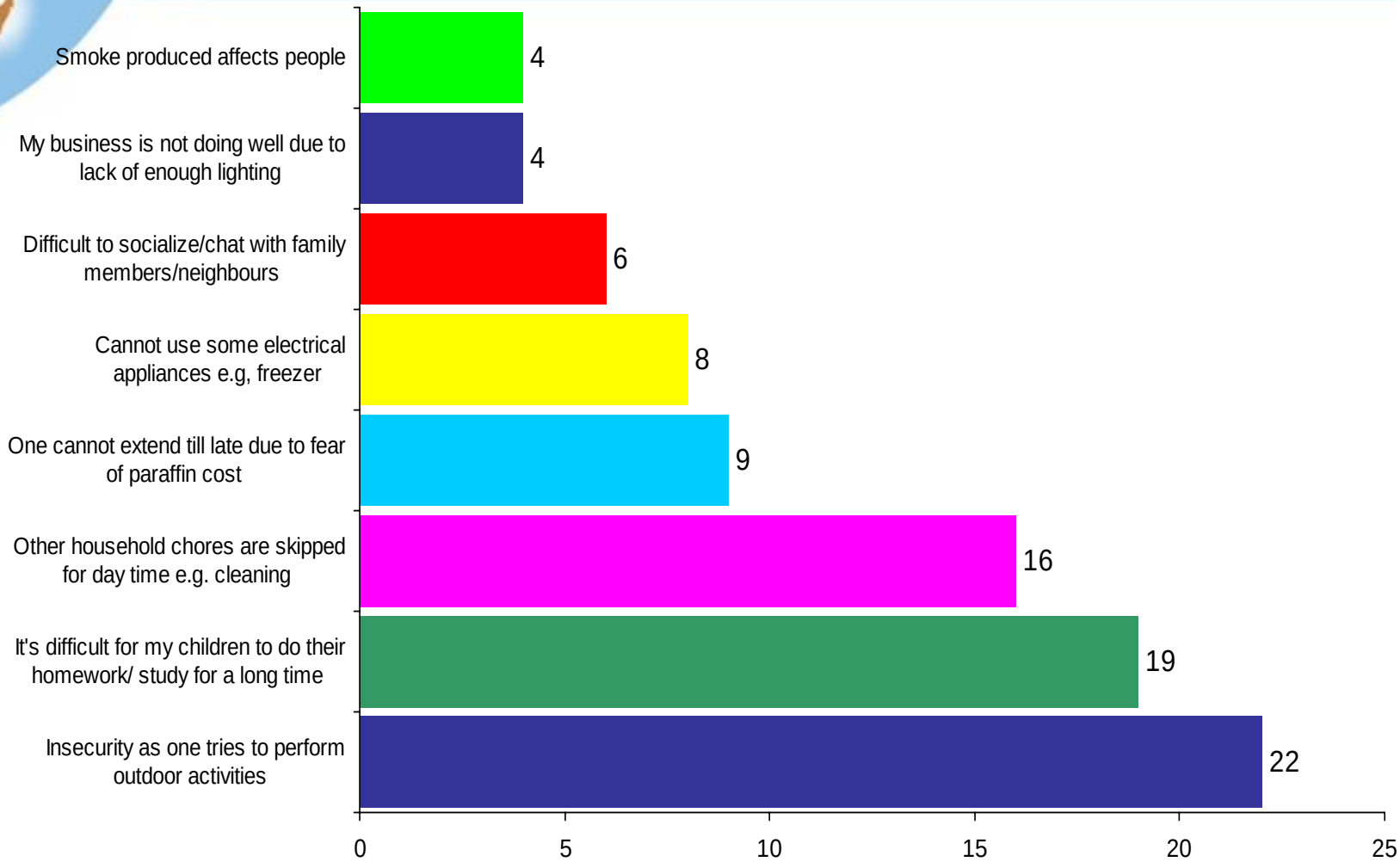
Outdoor activities which are inhibited are getting water, using the communal toilet and visiting neighbors.

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

CONSUMER

Problems Experienced Due to Lack of Lighting

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

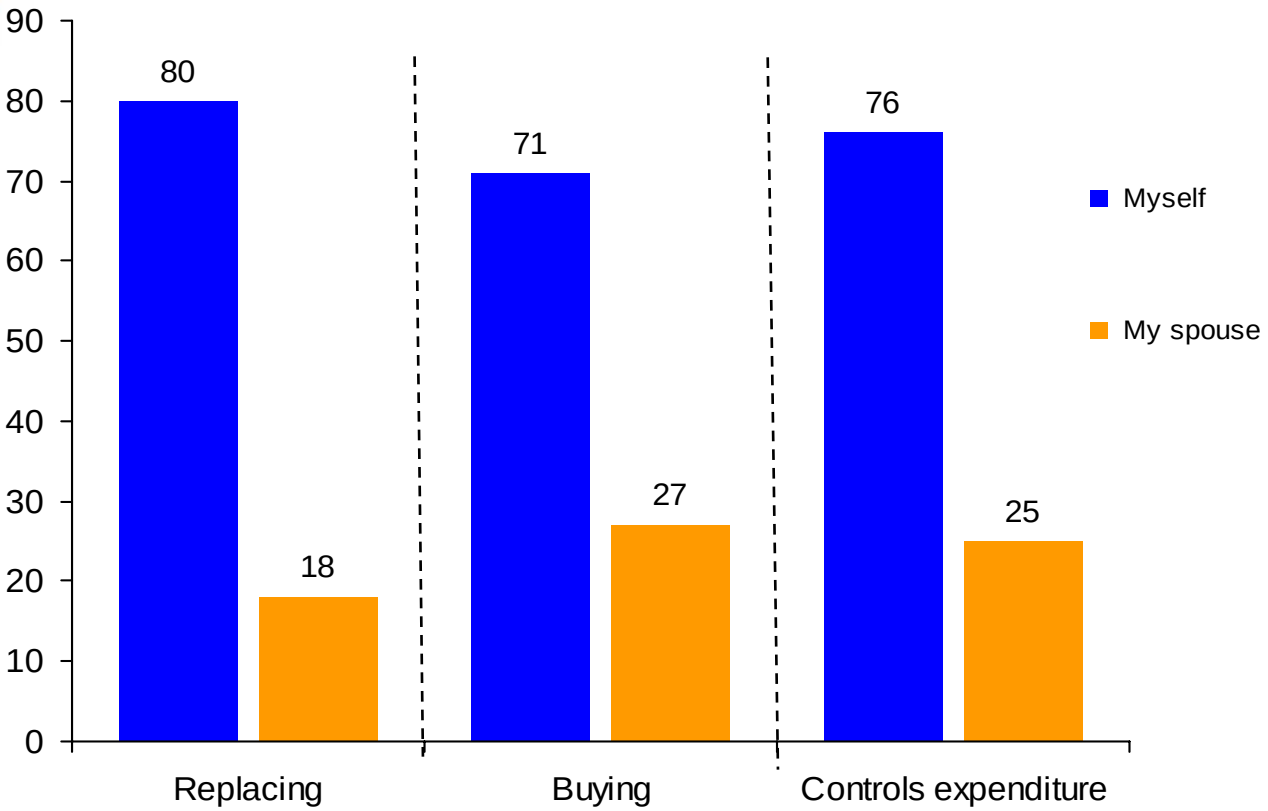


Base: All households whose light can be improved = 706

CONSUMER

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

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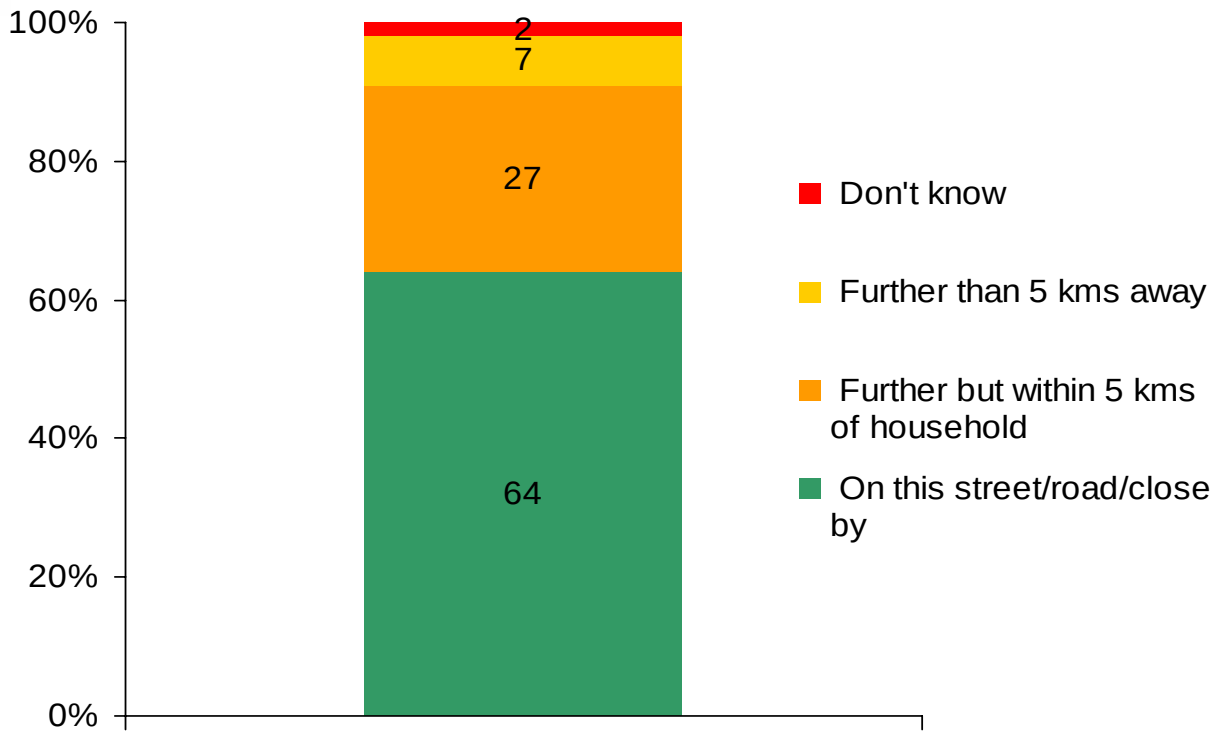
Proximity to Power Line

Q 18 "How close is your nearest mains power line?"



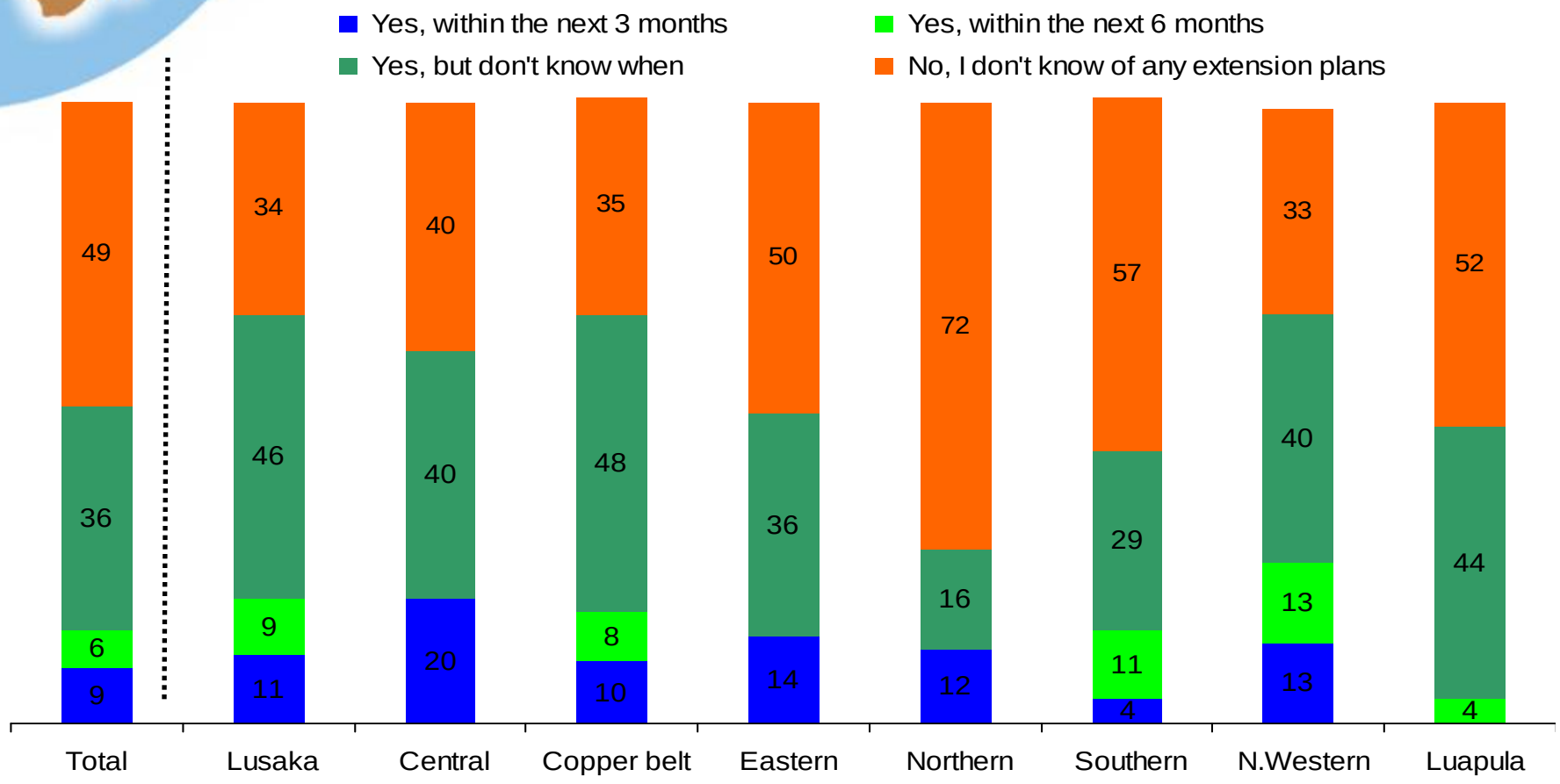
64% of businesses are close to the mains power line, and 27% within 5 km. Thus its clear that proximity to the power line might not be the main reason for not being connected. Traders seem to be much more savvy with regards to their electricity connections with only 2% of those connected not knowing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

Base: All those not connected = 362

TRADER

Connection Potential

Q. 19 "You mentioned that the nearest mains power line was close to your business. Do you know of any immediate



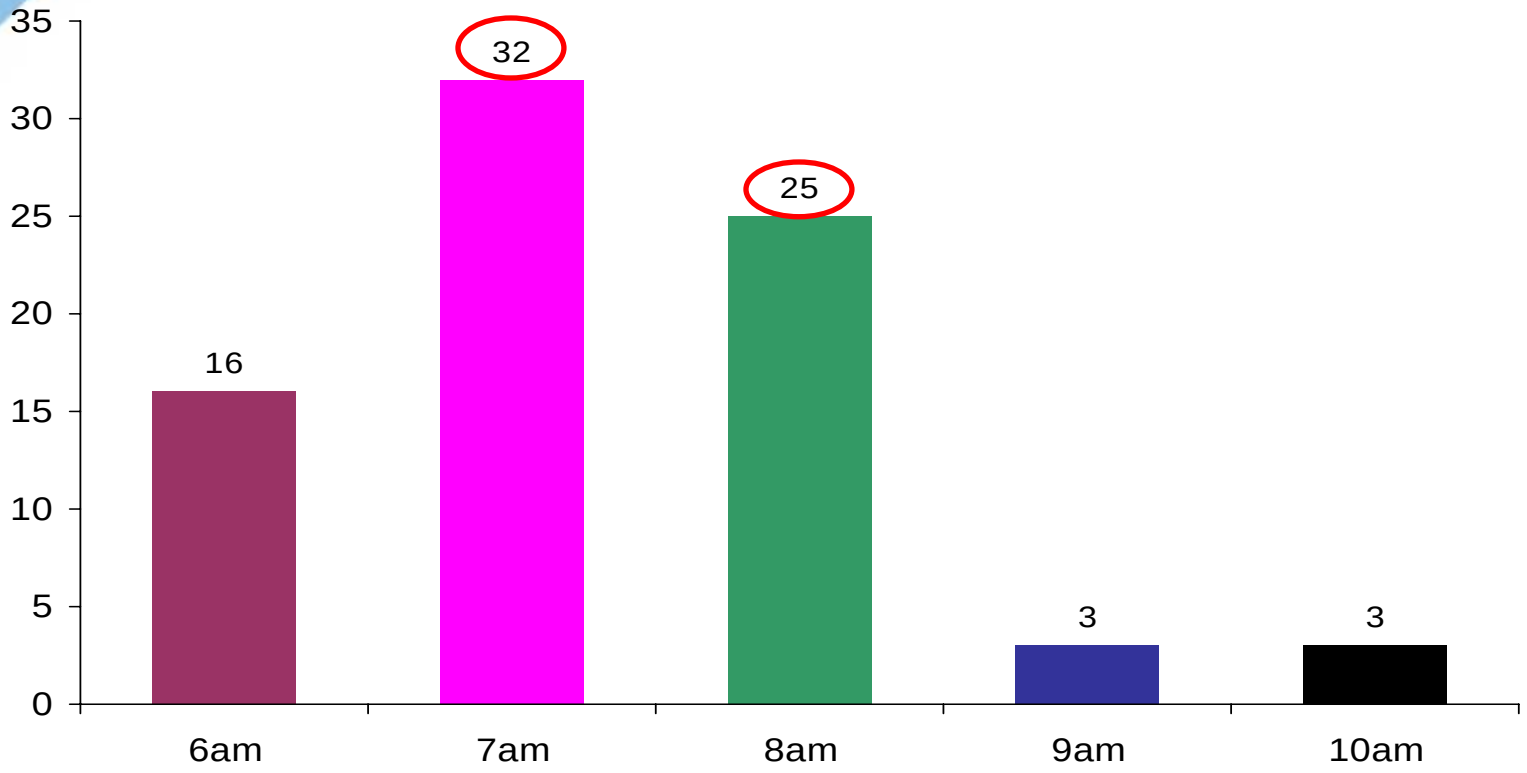
The majority of the traders don't know of any extension plans or if they have heard of them they have no idea when these will take effect on their business.

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

TRADER

Opening Time

Q. 24a "What time does your business usually open?"



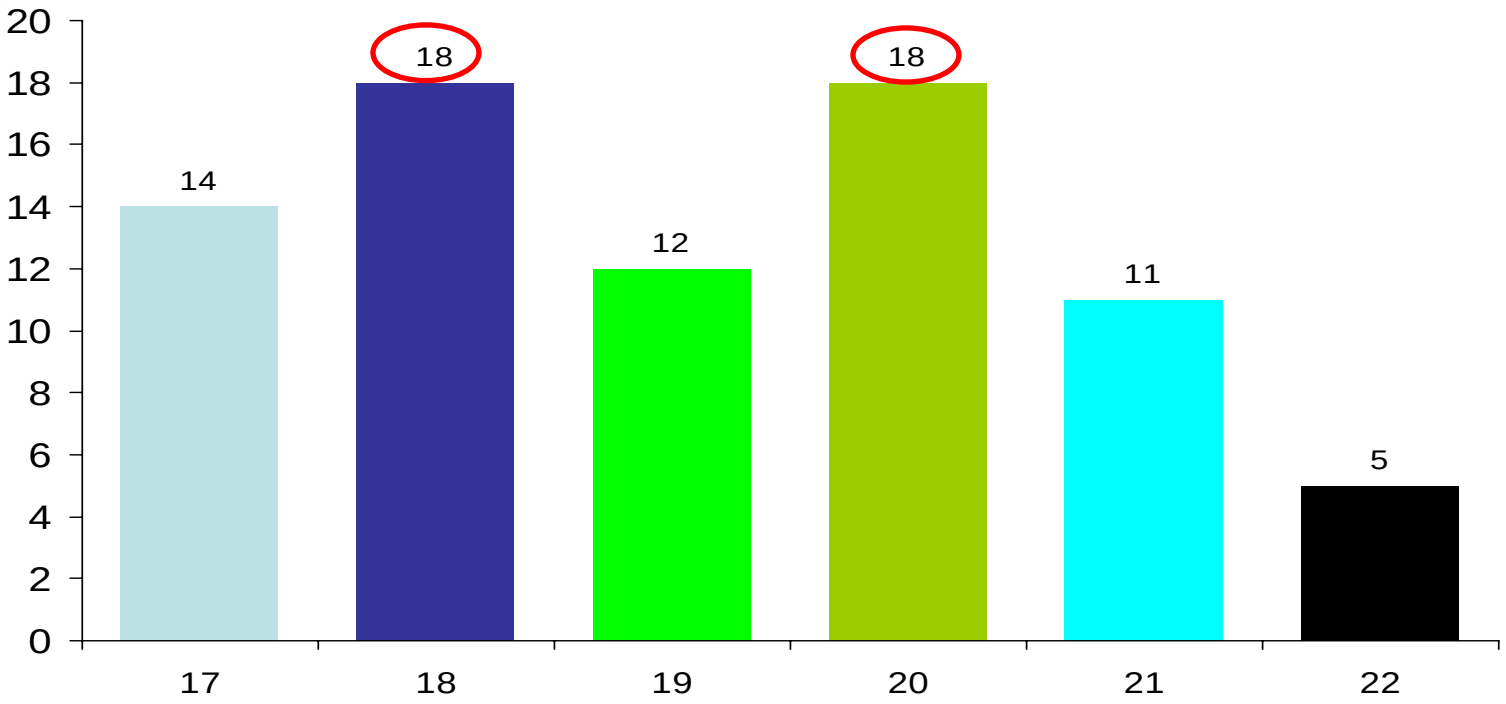
Most traders operate daily throughout the week with 55% opening on Sunday and a majority 57% opening between 7.00am and 8.00am daily.

Base: Total Sample = 396

TRADER

Closing Time

Q. 24b "What time does your business usually close?"



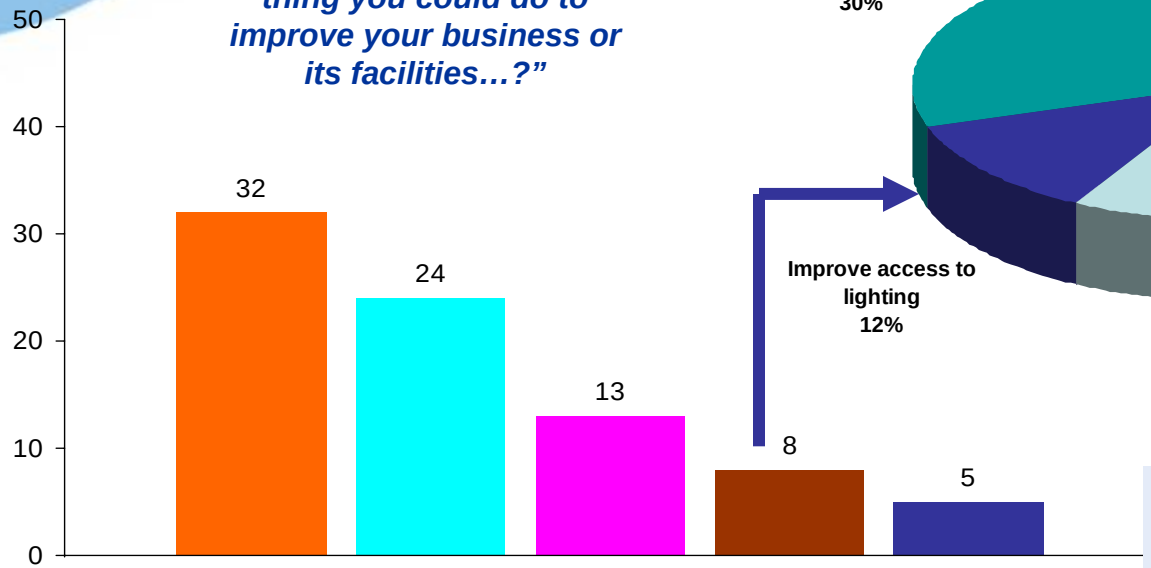
Many businesses close between 18:00 and 20:00 in the evening. It is likely that traders close before darkness has set in completely and thus lighting devices may not yet be required.

Base: Total Sample = 396

Improvements To Business

TRADER

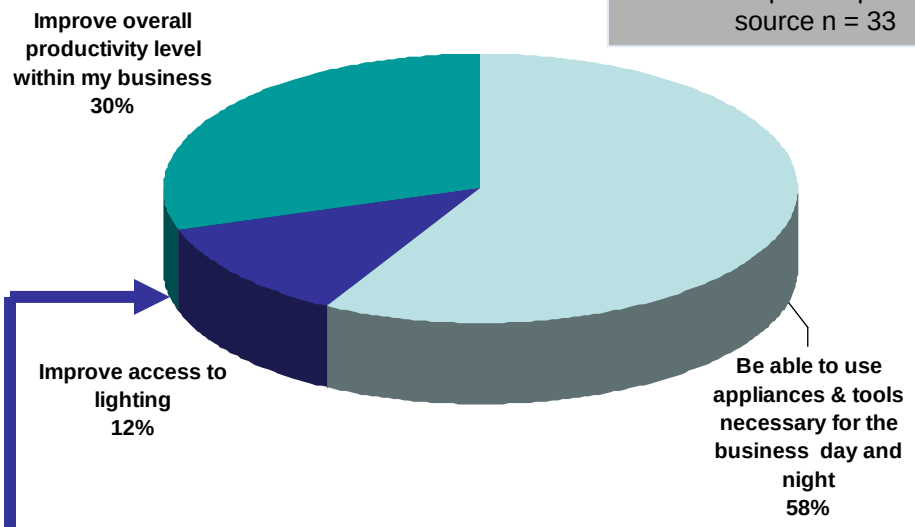
Q. 4 "If there was one thing you could do to improve your business or its facilities…?"



Base: Total Sample = 395

- **Improved lighting**
- **Improved structure itself**
- **Better shelving / display**
- **Getting a power connection / improved power source e.g. generator**
- **Tools and equipment**

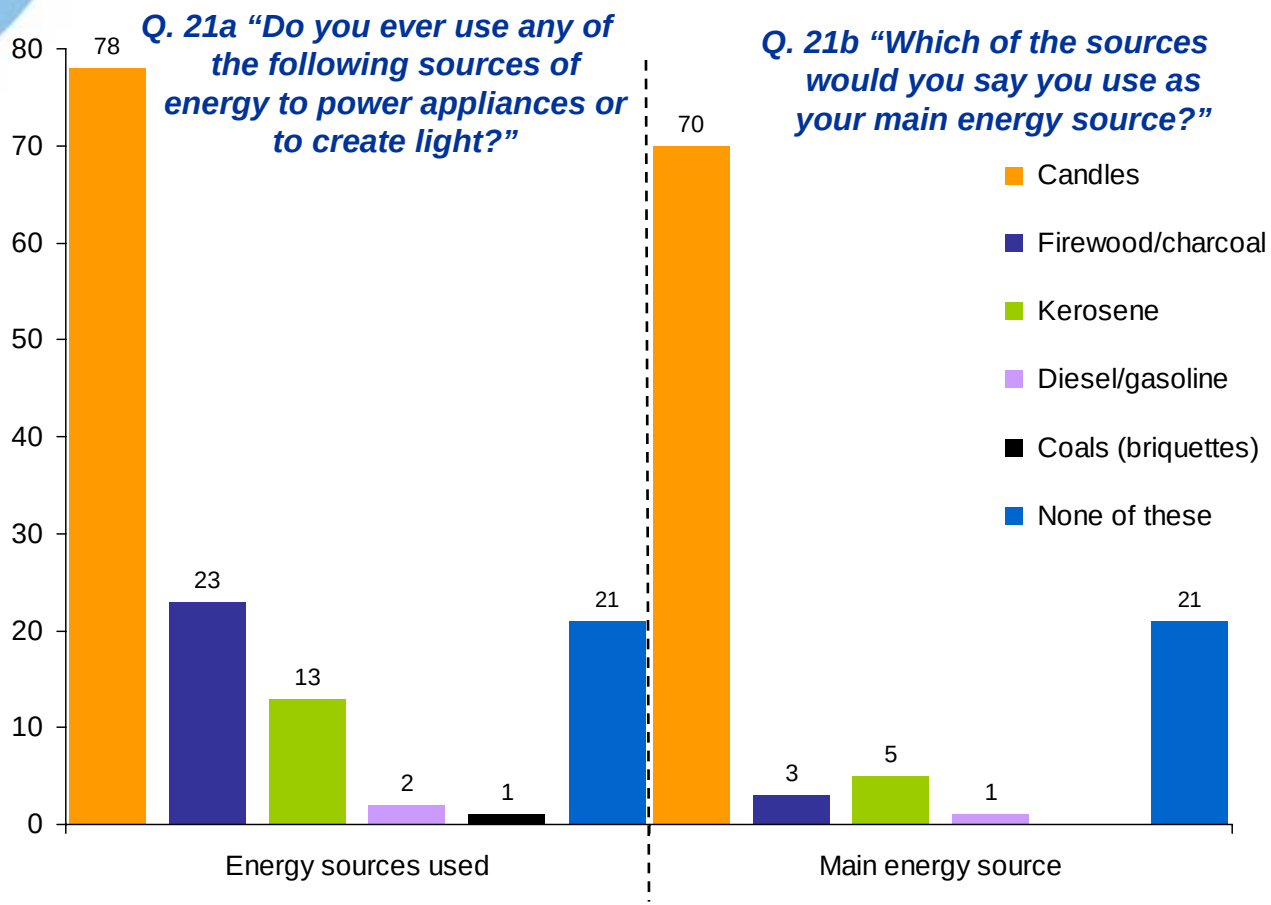
Base: Improved power source n = 33



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

TRADER

Use of Energy Sources to Power Appliances/Provide Light

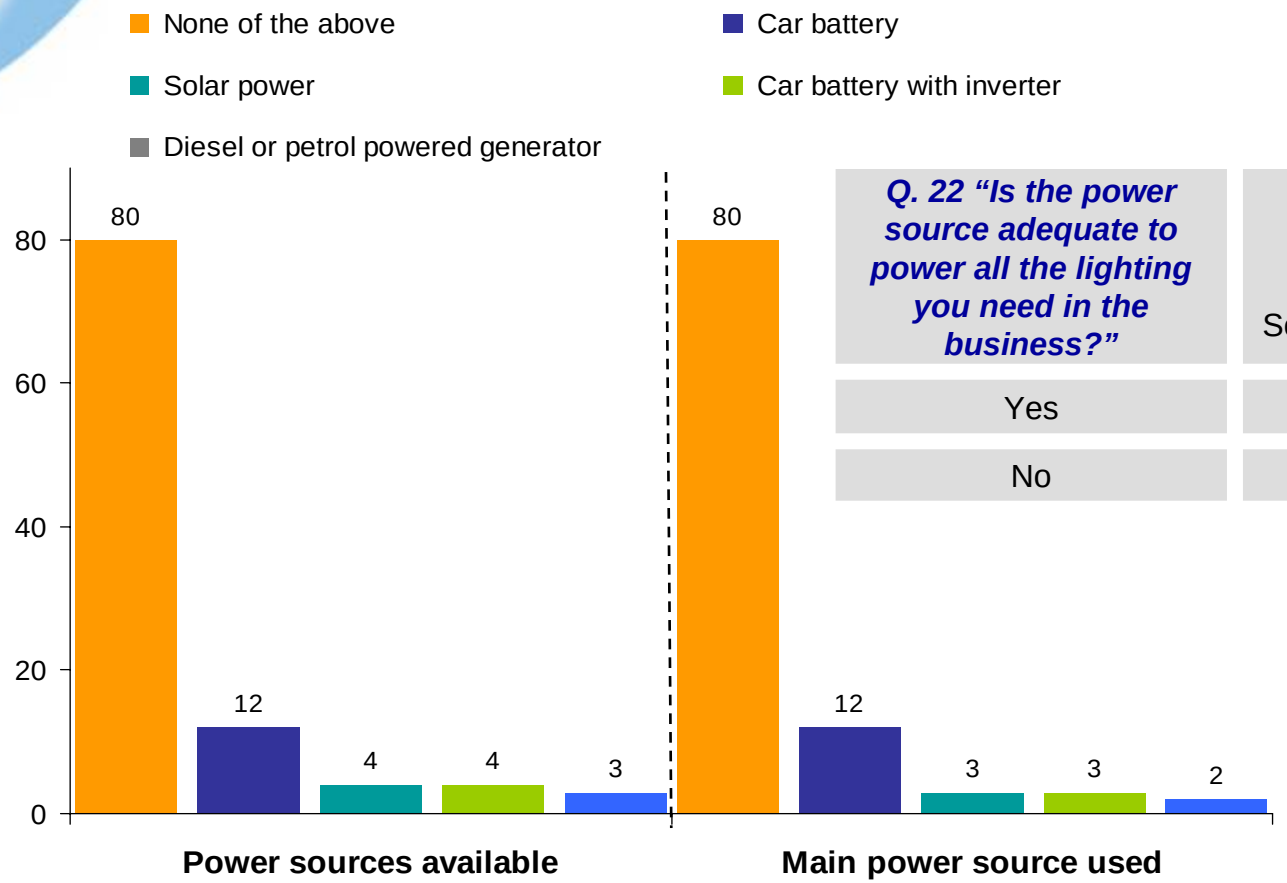


As in households, traders mainly use candles as their main energy and lighting source. There is a large percentage of Zambian traders (compared to the other research countries) at 21% who do not have ANY power/lighting source available to them on a regular basis.

Base: Total Sample=396

Other Energy Sources

Q. 20 "Do you have any of the following power sources in this business providing power generally to the business?"



Q. 22 "Is the power source adequate to power all the lighting you need in the business?"	Base: All who use other power Sources as main Source of power =78
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.

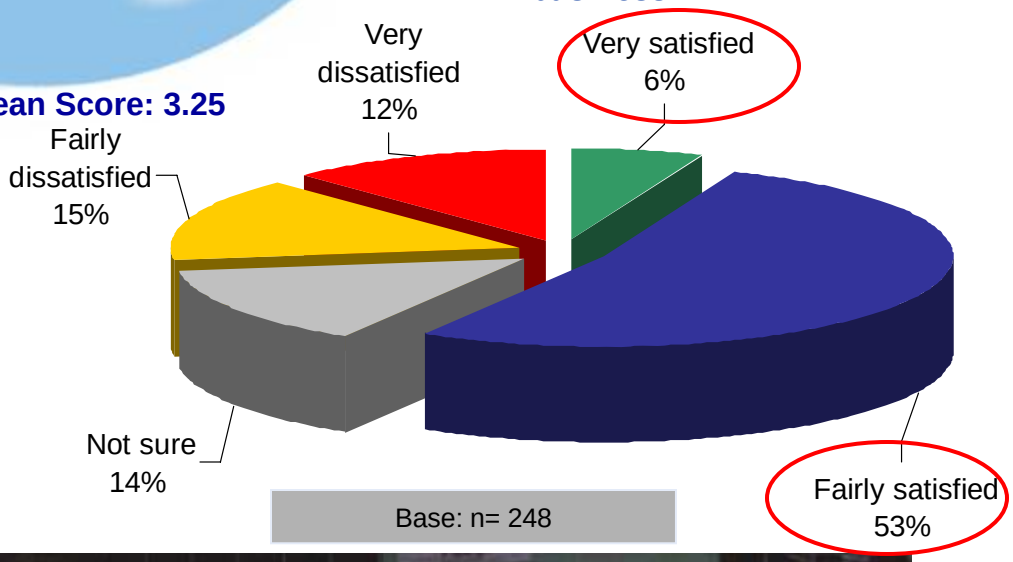
Base: Total Sample=396

Satisfaction Level and Limitations With Current Lighting

TRADER

Q. 39 "How satisfied are you with the lighting in your business?"

Mean Score: 3.25



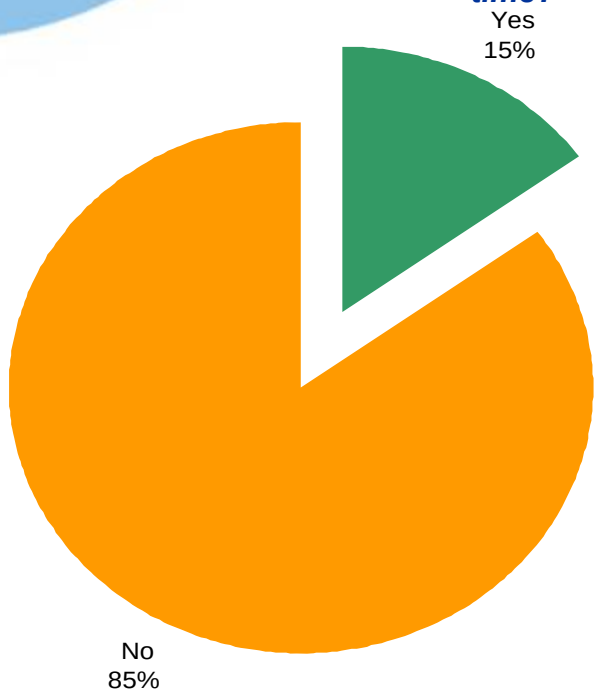
Base: n= 248

Limitations of current lighting

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

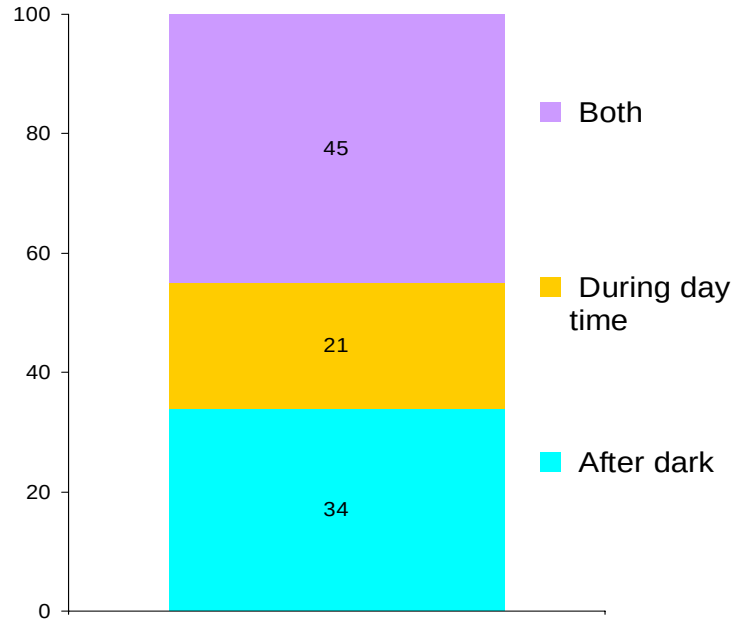
Use of Light

Q. 31 "Are any lights used at the premises during the day time?"



Base: Total Sample=396

Q. 32 "Do you use these same lights after dark or during the day time or both?"



Base: (Business) All who use lights during day and after dark=53

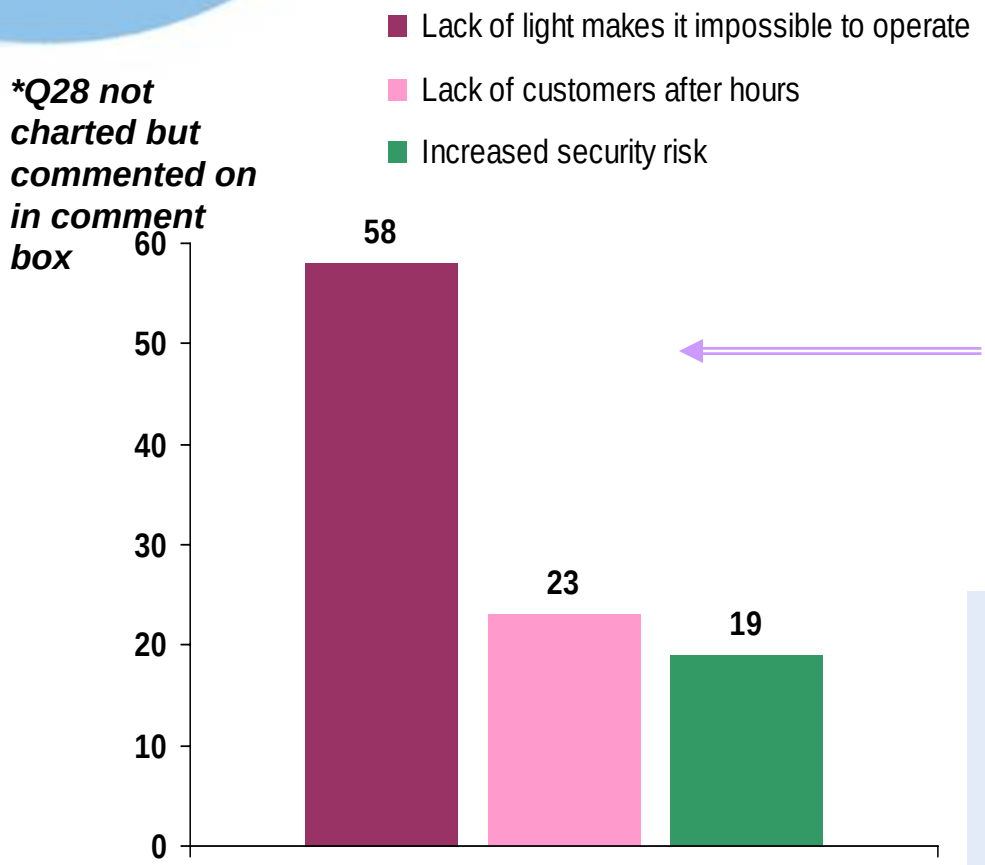
59% of traders show some level of satisfaction with the lighting of their premises – however this high number is likely to be driven by the fact that most do not open their shop when it is dark. Most who do use lights on their premises use the same ones both during the day and after dark, 45%.

Operating the Business After Dark

TRADER

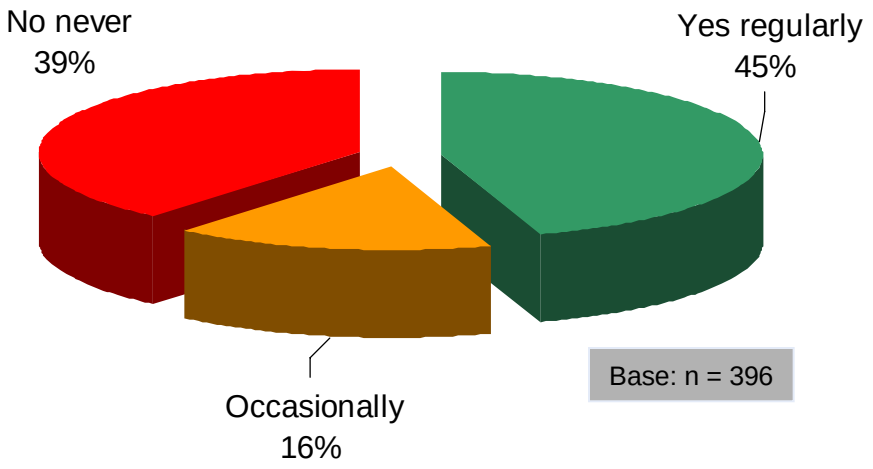
Q28 not charted but commented on in comment box

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



Base: All who do not open regularly after dark=220

Q. 25 "Does this business ever operate after dark?"



Base: n = 396

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'

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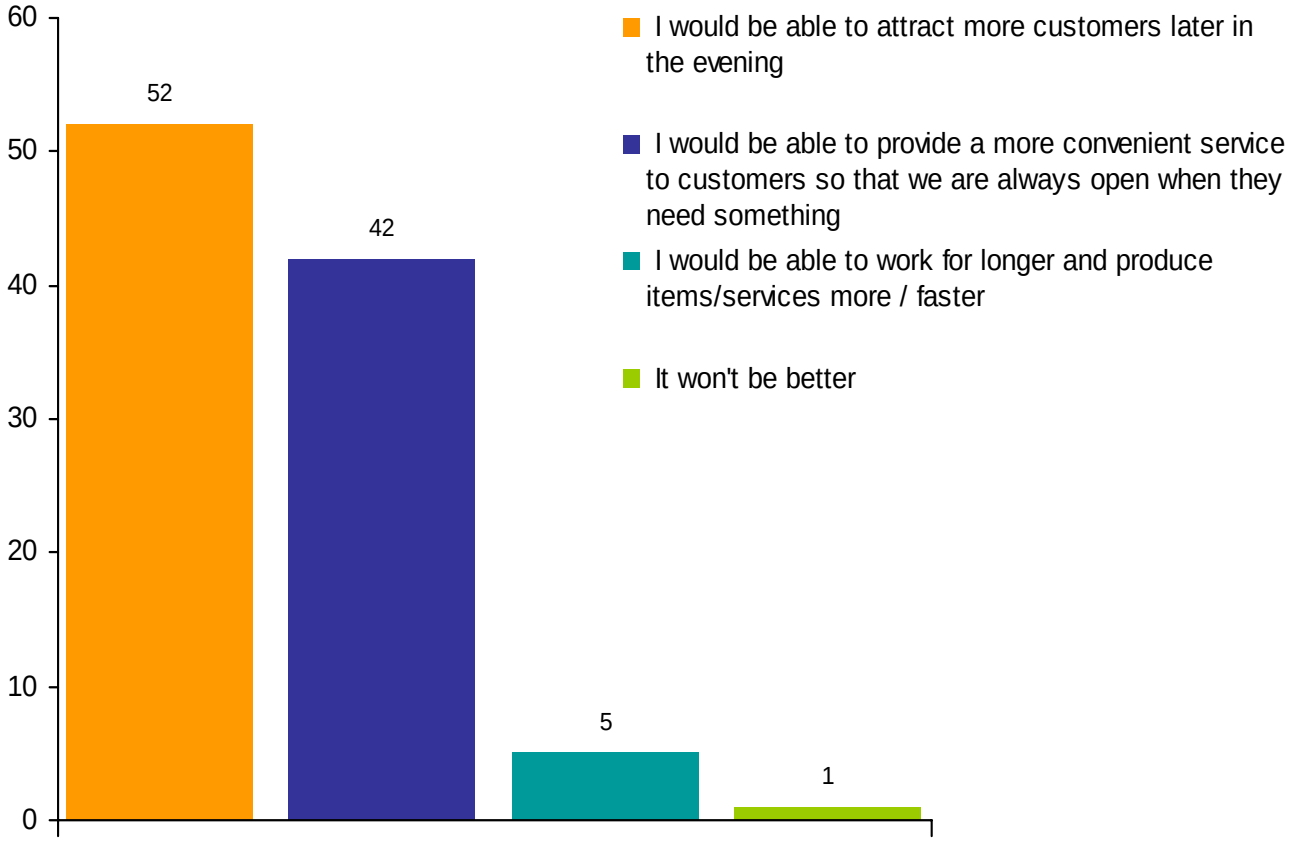
Opening after Dark

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



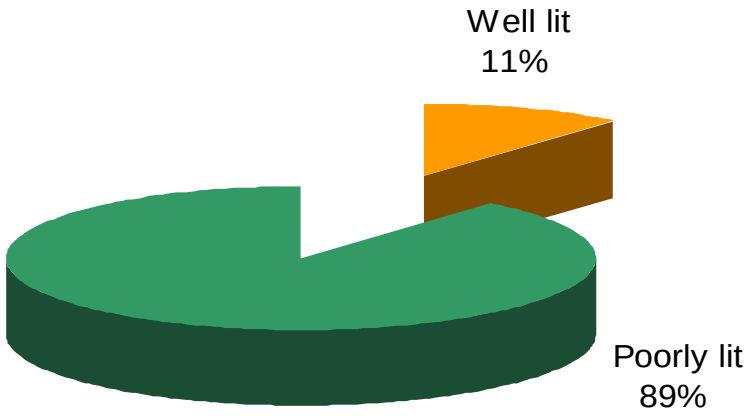
The main sentiment of traders on how customers would respond to them opening after dark is that 'they would be able to attract more customers' or 'would be able to provide better service' - indicating their definitely is a market for late night shoppers.

Base: All who would open after dark = 150

Rating for Lighting Outside the Business and its Limitations

TRADER

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



Base: All who light their business= 45

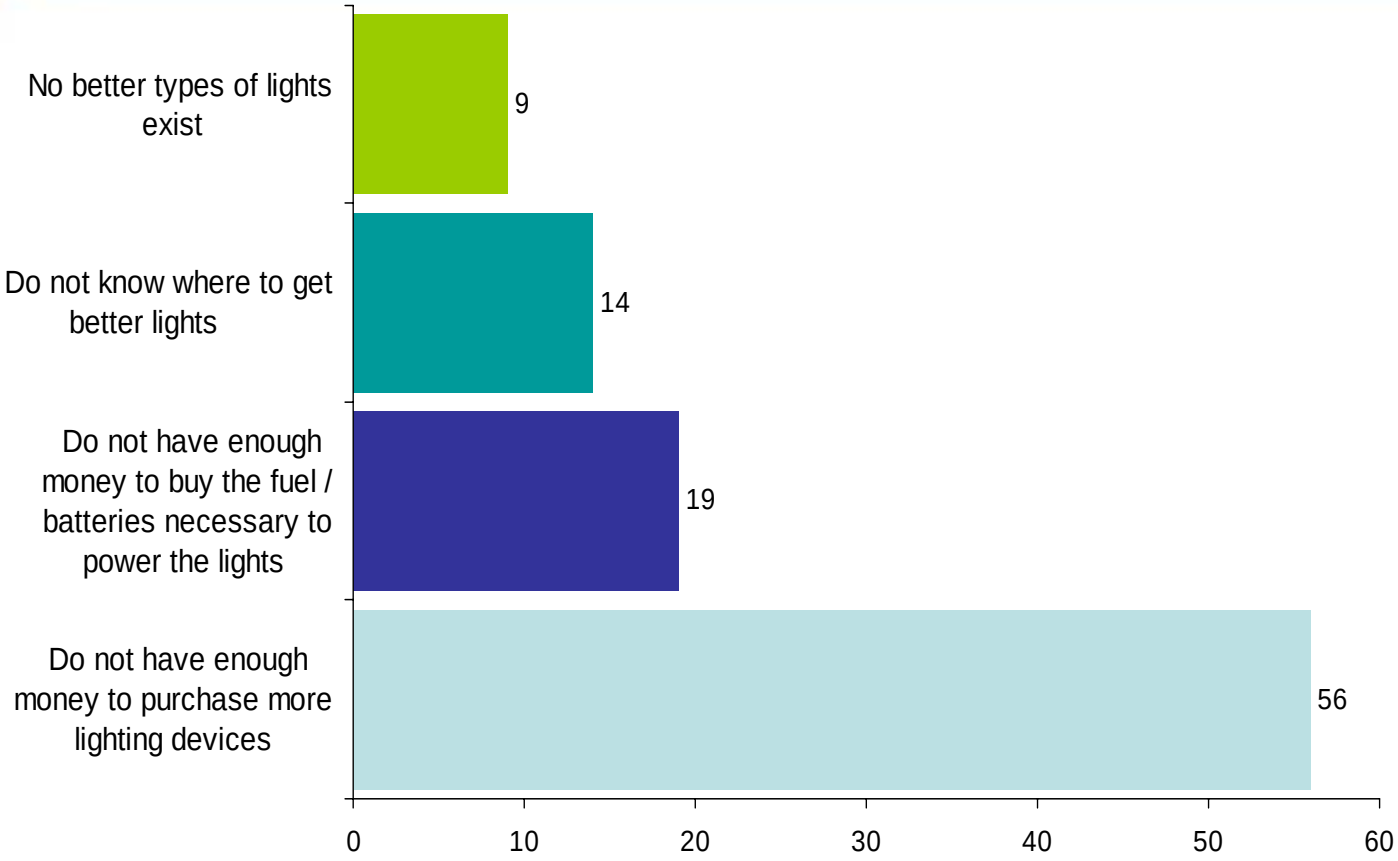
89% of traders see the outside of their business as poorly lit – one of the main issues mentioned concerning poor outside business lighting is lack of security.

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

Customers don't see the shop clearly, so they don't shop after dark	27%
There is no security, hence cannot operate The business after dark	22%
Sometimes customers tend to think that the Business has closed down due to lack of enough light	22%
I cannot see customers' faces clearly, because They buy from outside	13%
It is hard to display goods outside the shop after dark	11%
It is expensive	7%

Barriers to Improving Lighting

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



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

Base: All who light their business=248

LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

CURRENT LIGHTING DEVICES

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LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

CONSUMERS

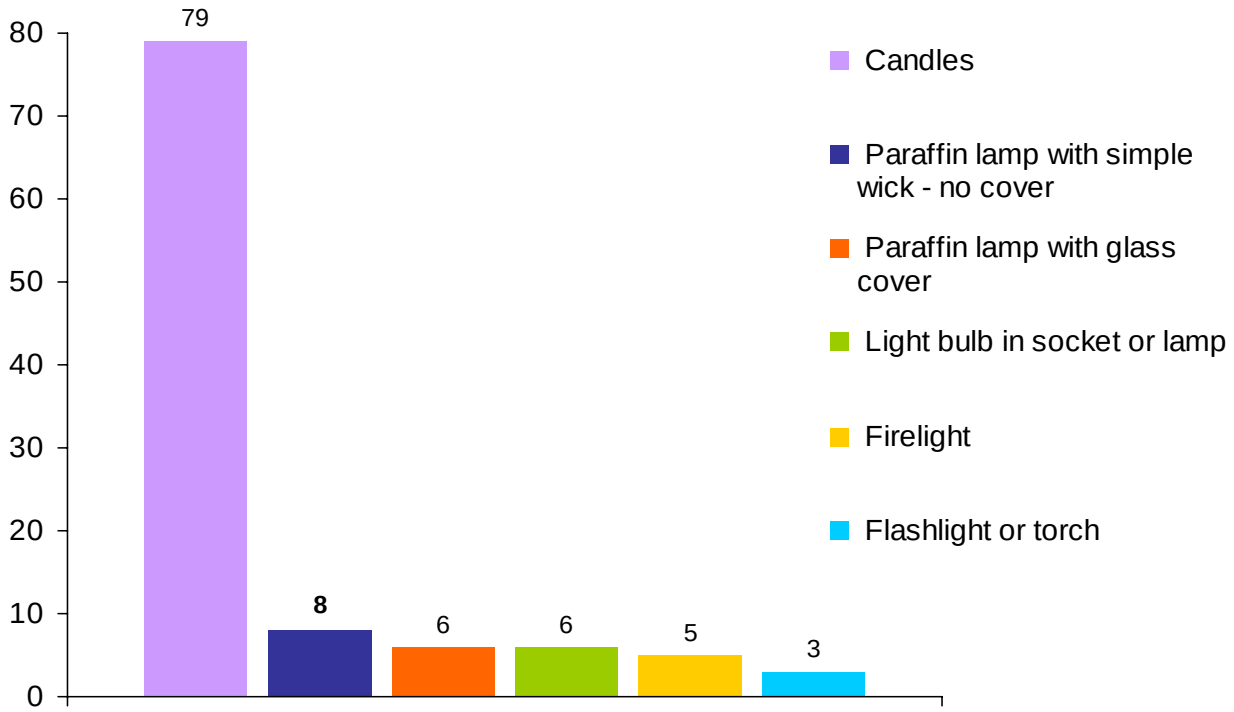
IFC International Finance Corporation
World Bank Group

THE WORLD BANK

CONSUMER

Types of Lighting Devices Used

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



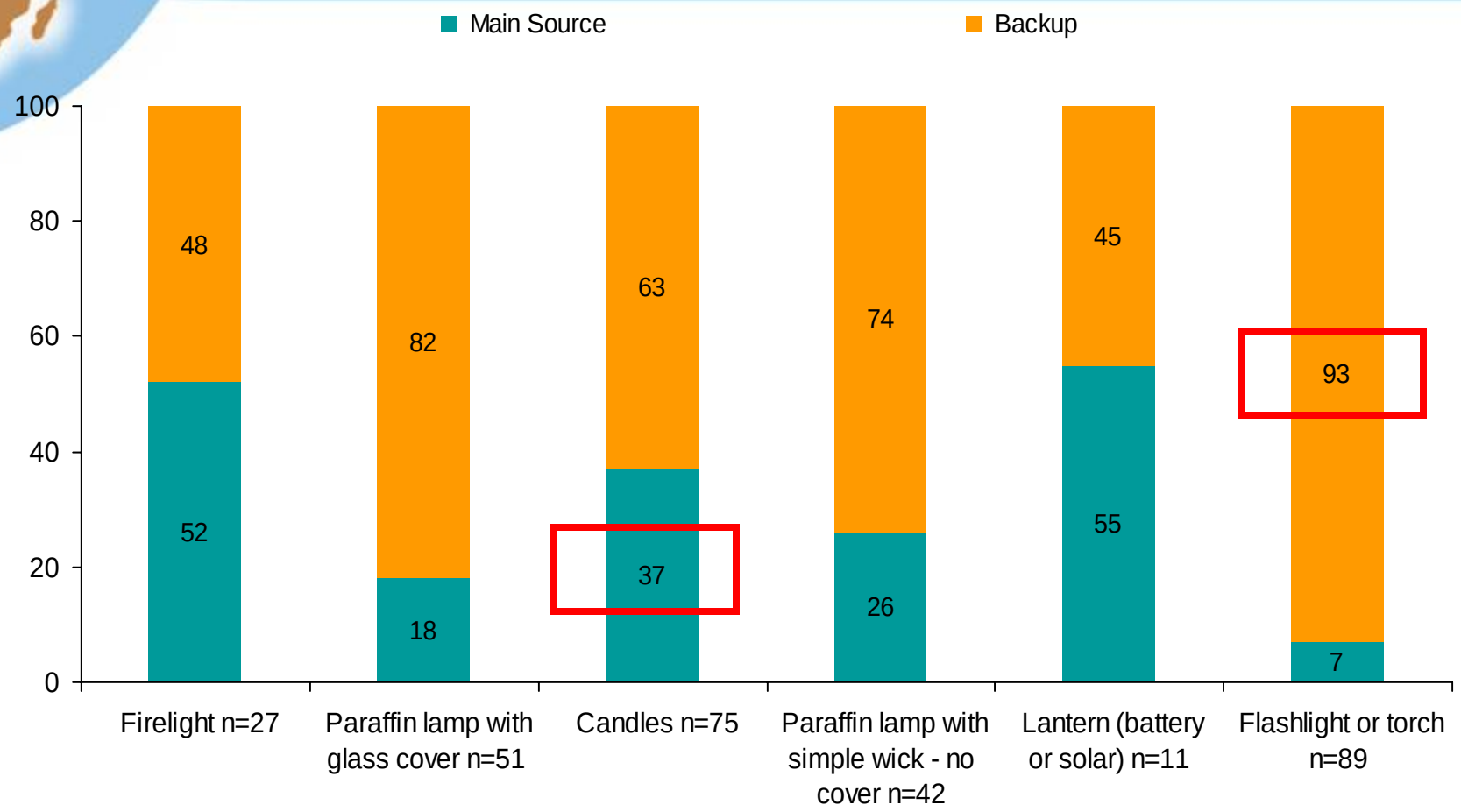
79% of households use candles for lighting in the main room, other forms of lighting are used at a much lower levels. Paraffin lamp is only used by 8% of consumers compared to 67% in Kenya.

Base: Total sample =1000

CONSUMER

Back-Up Lighting

Q. 49d "Generally do you use …… as a main source or a back-up when main lighting not available?"



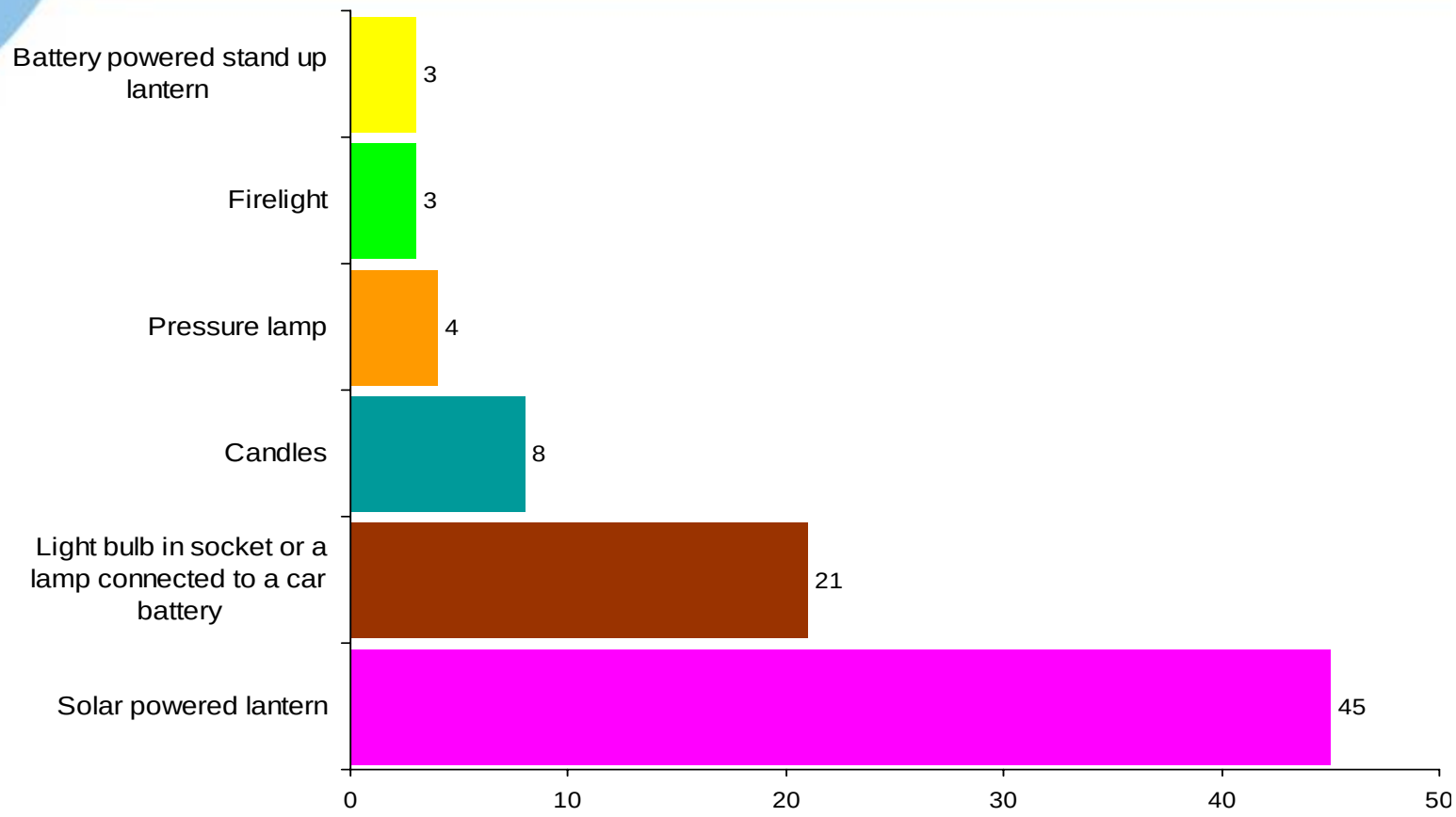
Candles are the main consumer method of lighting the household, The flashlight is the main used backup method.

Base: All with other lighting devices in working order

CONSUMER

Preferred Type of Lighting Device

Q. 58 "What is your preferred type of light excluding mains powered light bulbs?"



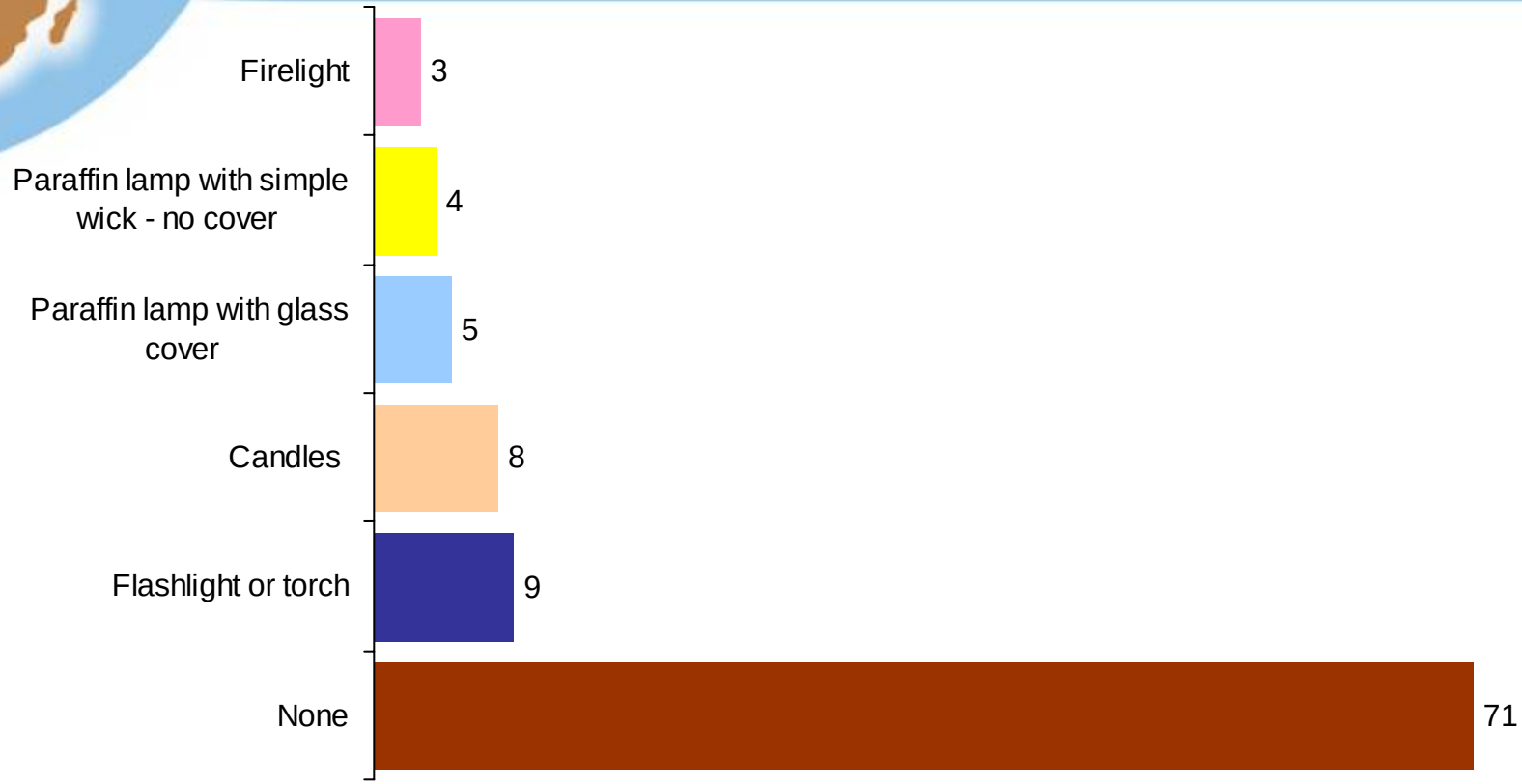
Out of the list of lighting products presented to the consumer they prefer the 'solar powered lantern', this is likely to be sue to the fact it is safe and clean and does not require refueling. A far second is a light bulb in socket or lamp connected to a car battery

Base: Total sample = 1000

CONSUMER

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?"



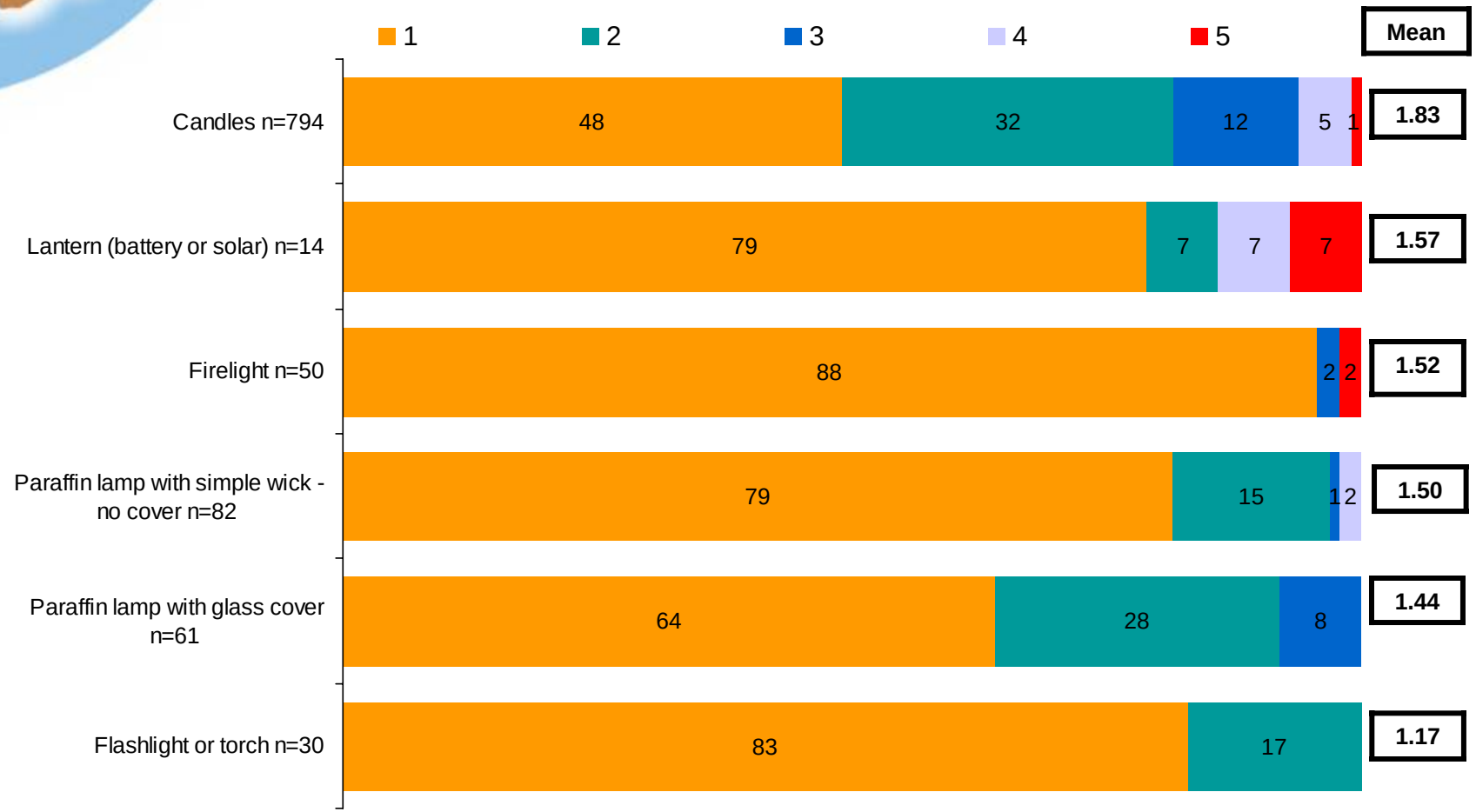
Comparative to other markets Zambian households have very few lighting devices available to them beside the ones which they use on a regular basis in the evenings (71%). Only a very low percentage of consumers have a flashlight, candles as backup devise or some form of paraffin lamp available to them.

Base = Total sample=1000

CONSUMER

Number of Each Lighting Device Used

Q. 35 "How many of each lighting device were used?"



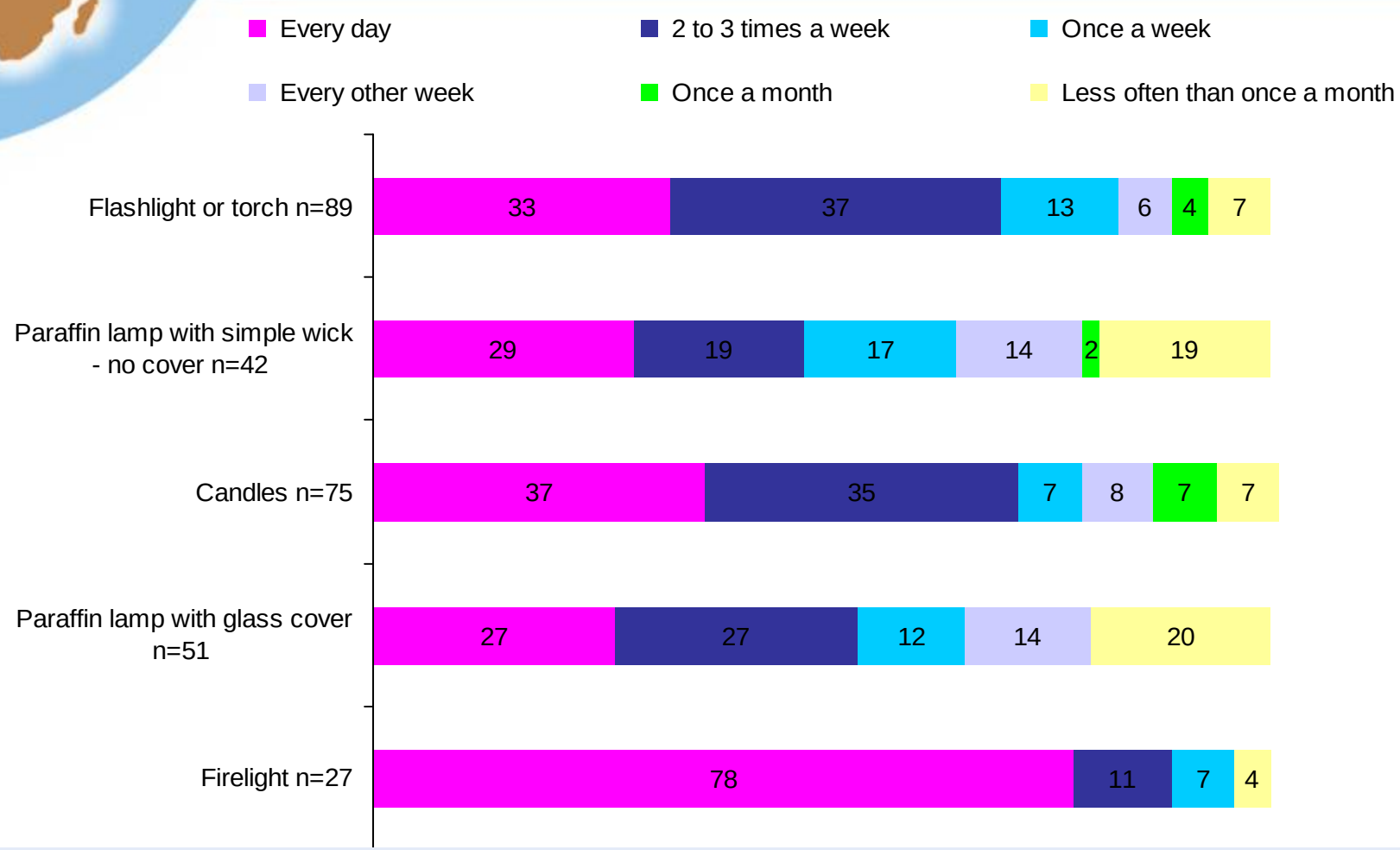
On average between 1 and 2 lighting devices are used to light an area of the household.

Base: all who used light last night

CONSUMER

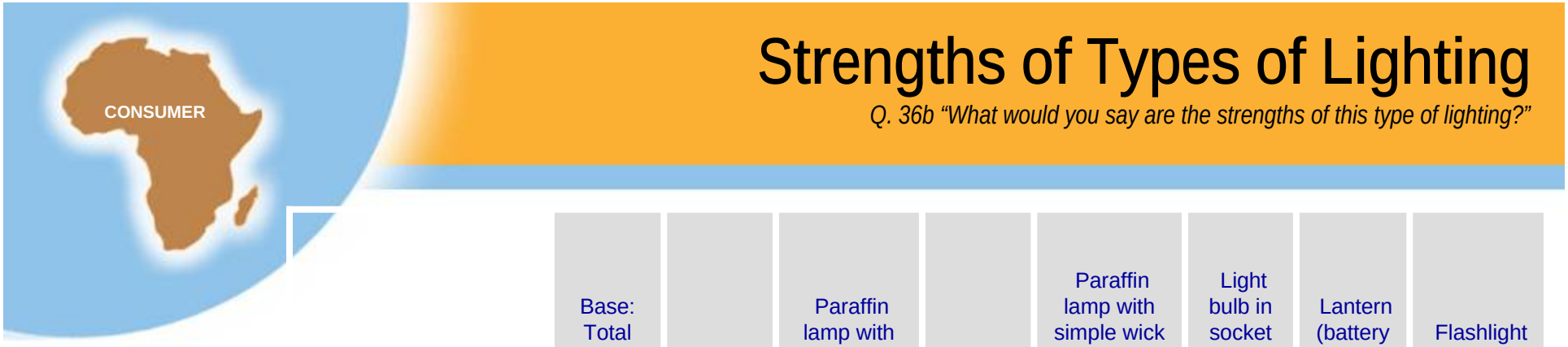
Frequency of Using Lighting Devices

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



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

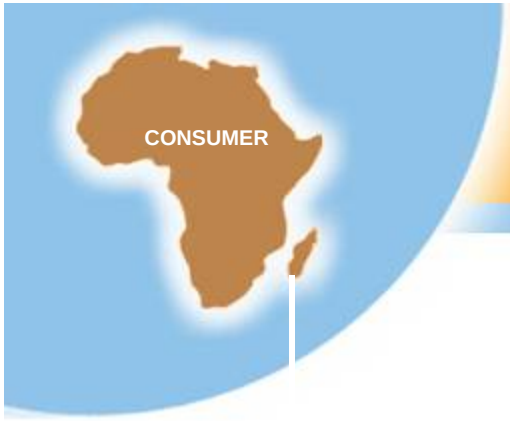


Strengths of Types of Lighting

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

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.

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



Weaknesses of Types of Lighting

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

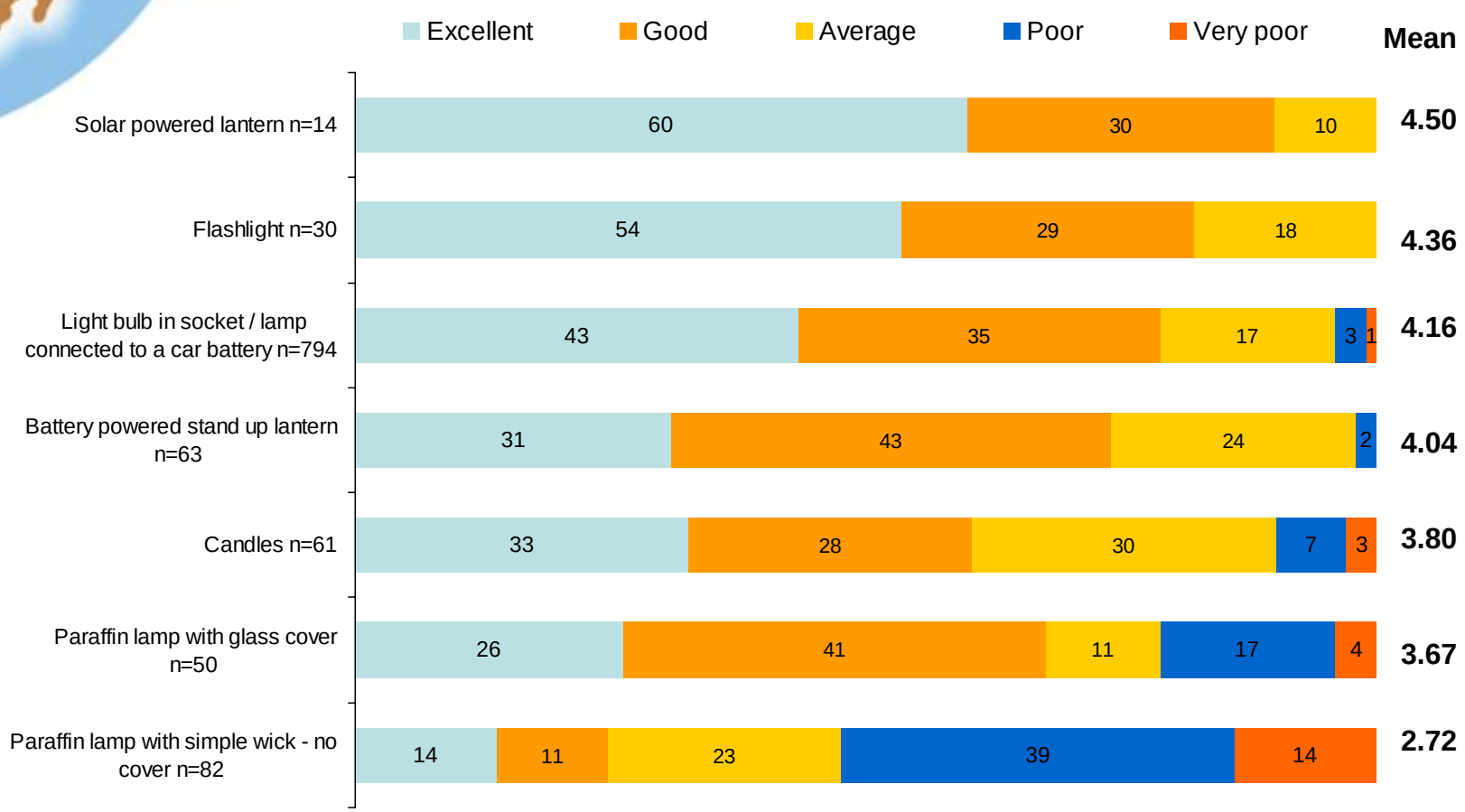
The main drawback of candles is that they do not last long. Paraffin lamps are mainly seen to be a health hazard

	Base: Total Sample	Firelight	Paraffin lamp with glass cover	Candles	Paraffin lamp with simple wick - no cover	Light bulb in socket or lamp	Lantern (battery or solar)	Flashlight or torch
Base: Total Sample	***1000***	***50***	***61***	***794***	***82***	***63***	***14***	***30***
It is expensive	14	4	15	15	10	19	50	20
Go off easily when blown by wind	10	8	3	11	5	6	-	-
Does not provide adequate lighting.	12	16	11	12	11	-	7	10
It's delicate hence must be handled with care	3	2	2	2	2	11	7	-
It's not long lasting	41	58	18	50	22	6	29	40
It can easily burn the house	20	6	10	23	11	3	7	17
It's limited to one place therefore carrying it to other places is tedious	1	2	-	1	-	3	-	-
Some activities can not be done e.g. reading as little light is produced	1	-	2	1	2	5	-	-
It is a health hazard	15	30	49	8	68	-	-	13
Long hours to recharge the solar panel	1	-	-	n	-	2	7	-

CONSUMER

Rating on General Quality

Q. 56 "For each of the devices that I read, how would you generally rate the quality?"

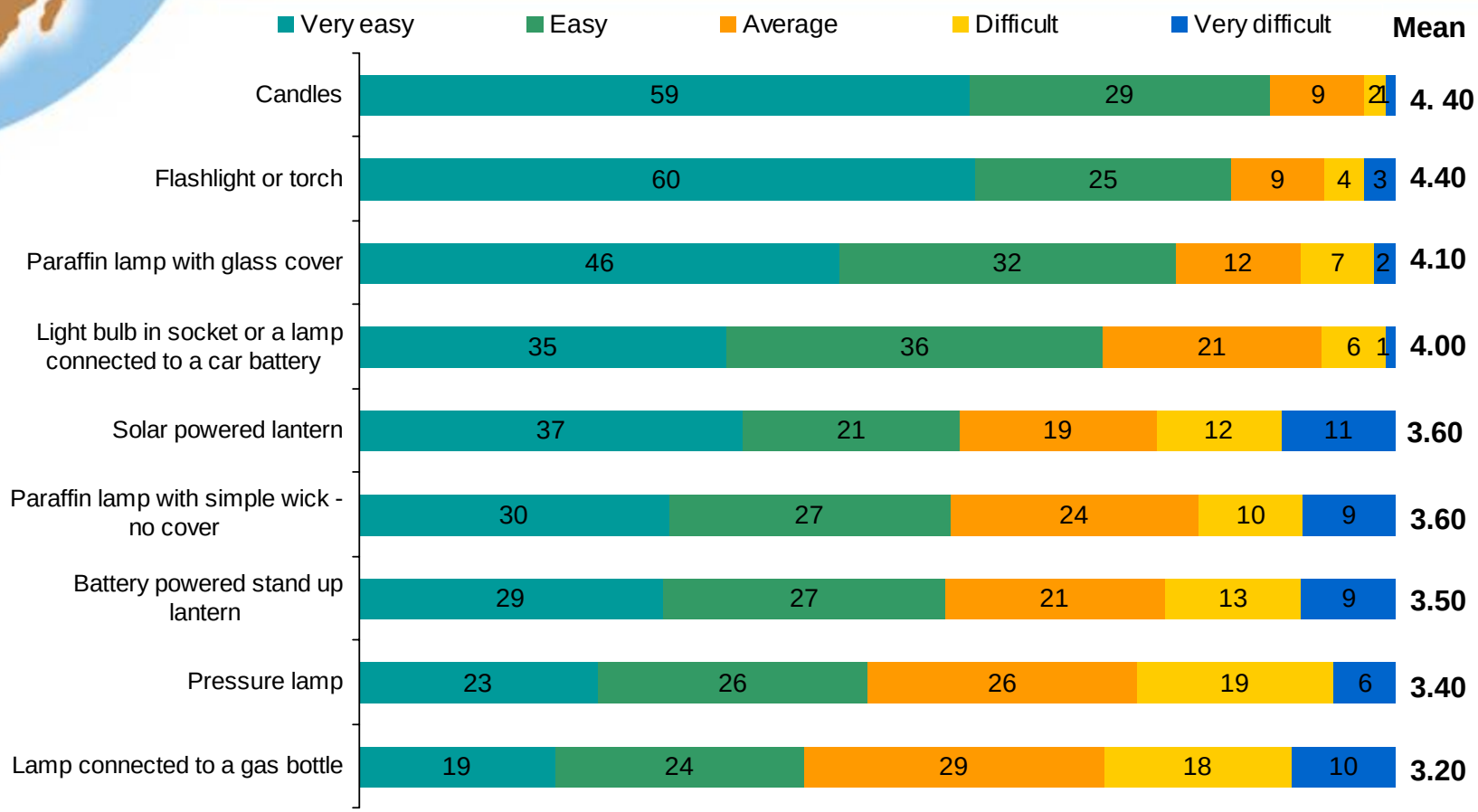


Flashlight and Solar Powered Lanterns are considered to be of the highest quality and are thus the most preferred. Interestingly Zambian consumer rate candles to be better quality than paraffin lamps – something which is not prominent in other Lighting Africa markets

CONSUMER

Rating on Ease of Operation

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



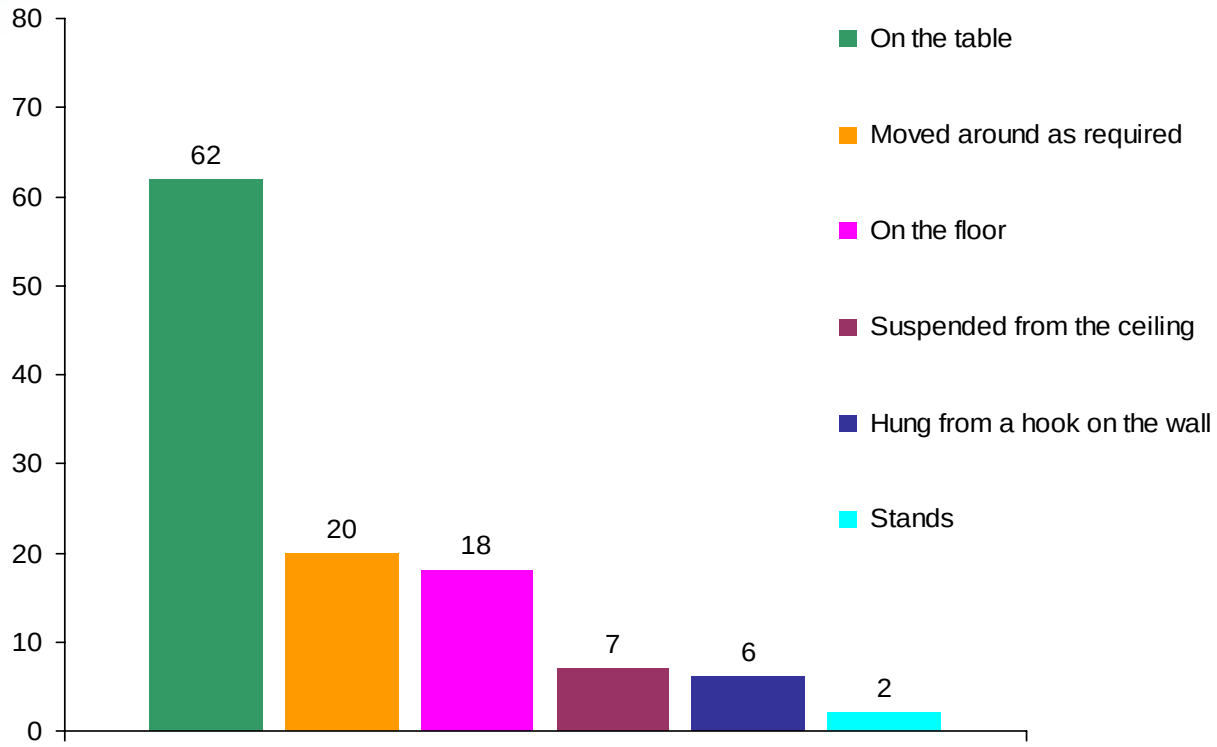
Candles and flashlights are considered the easiest to operate with lamp connected to a gas bottle and pressure lamps considered the most difficult devices to operate.

Base: Total sample = 1000

CONSUMER

Placement of Lighting Devices

Q. 36a "Where were the lights in the main room located?"



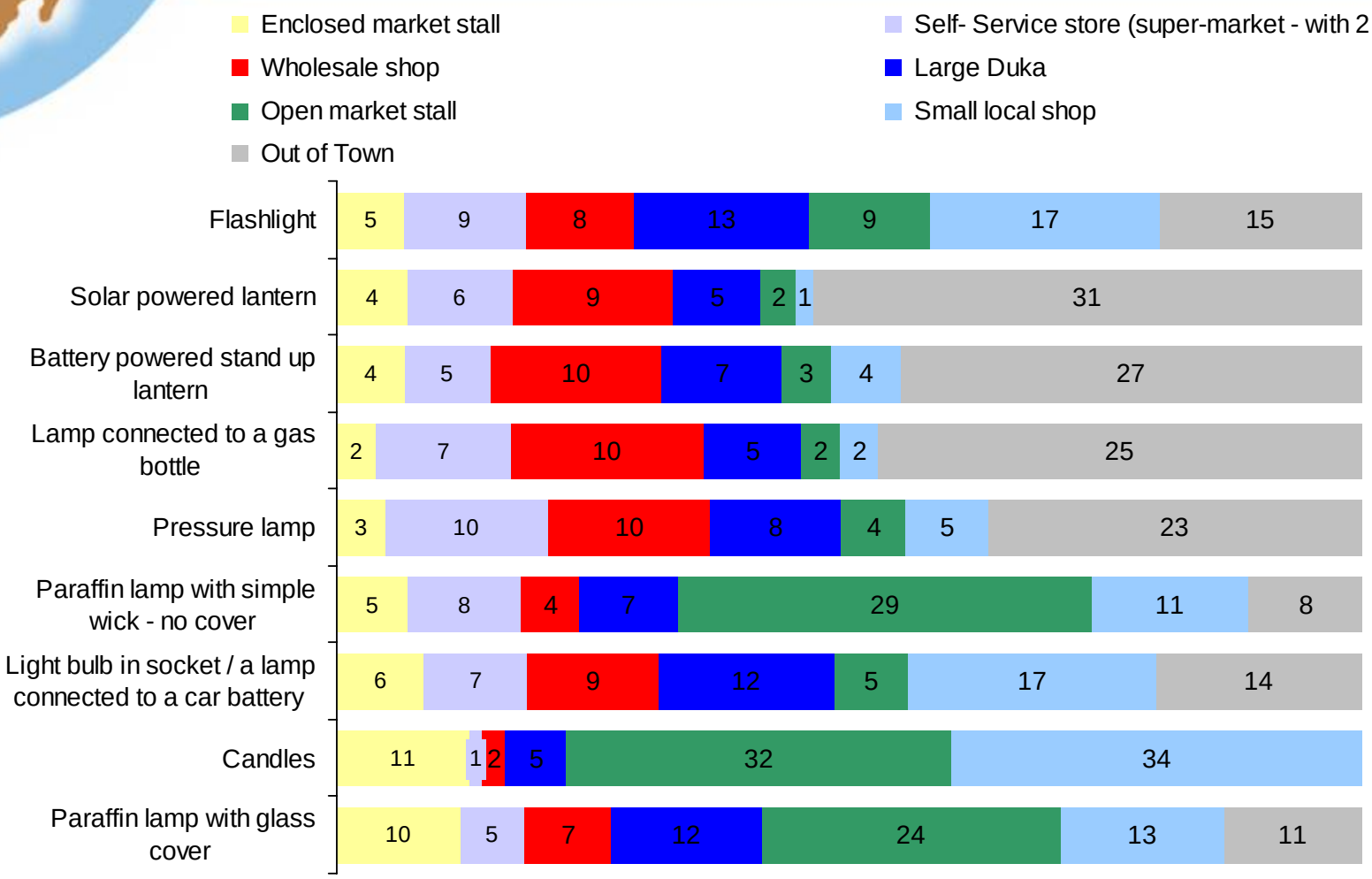
Lights are usually placed in a central place in the room like on the table so the greatest benefit is had from them.

Base: Total sample =1000

CONSUMER

Place of Purchase

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?"



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

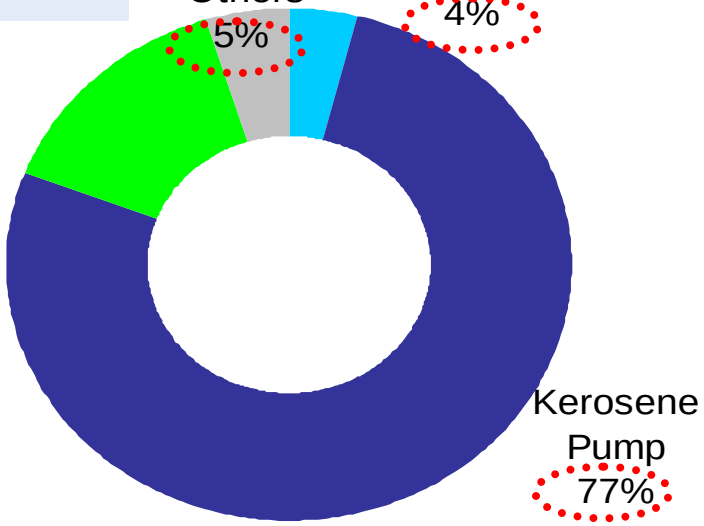
Base: Total Sample=1000

CONSUMER

Purchasing Paraffin/Kerosene

Q. 51 "How do you usually buy your paraffin/kerosene; in litres or another measurement?"

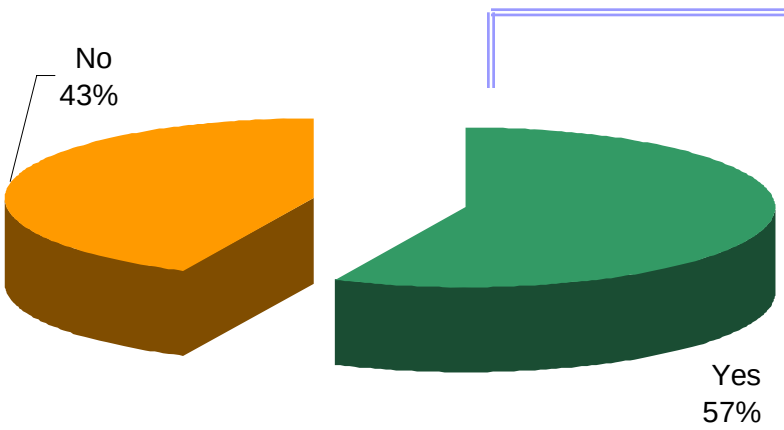
Besides lighting a percentage of Zambian consumers use paraffin for cooking. In this market cooking is done more often with paraffin than lighting. Paraffin is mainly bought from the pump (77%) and bottles and Gallon containers are also used to carry Kerosene bought in litres from pumps



Health Effects of Paraffin / Kerosene

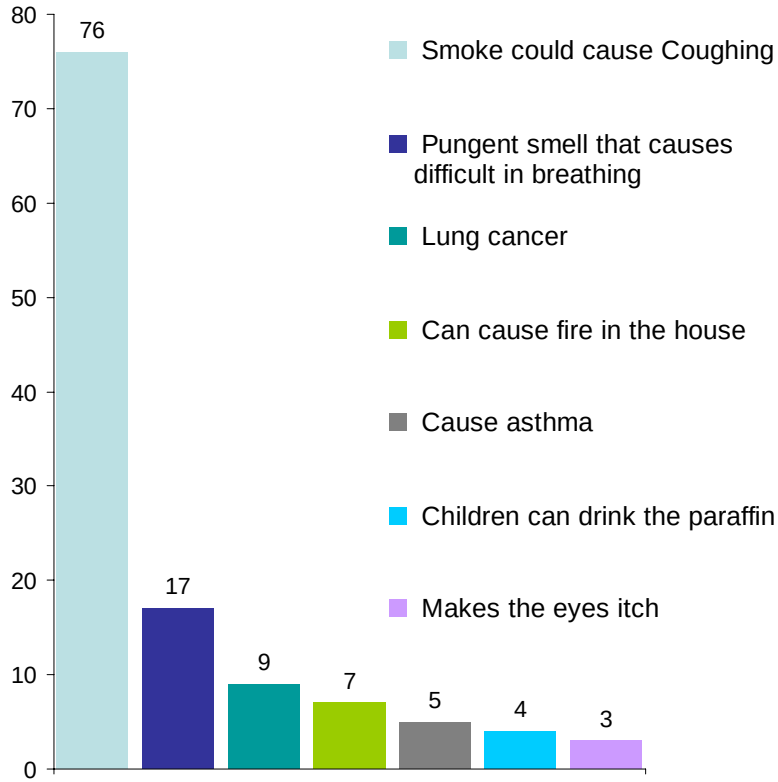
CONSUMER

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



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

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



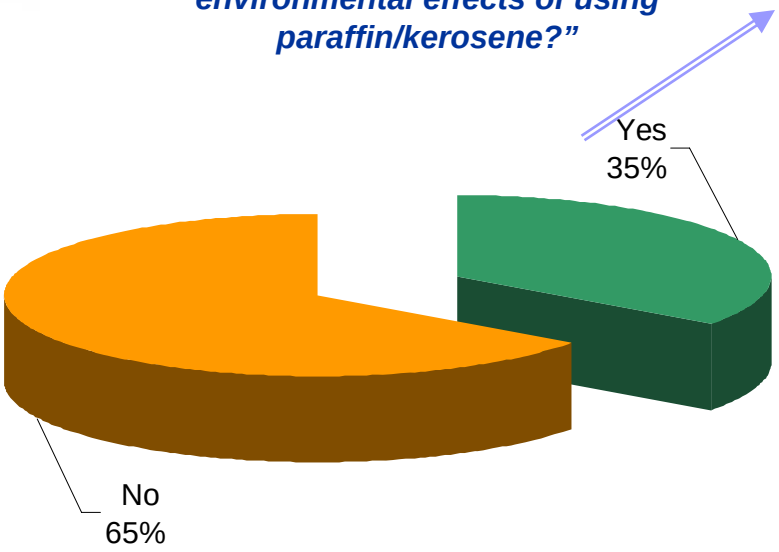
Base: All who worry about health effects= 103

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

CONSUMER

Environmental Effects of Paraffin / Kerosene

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



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

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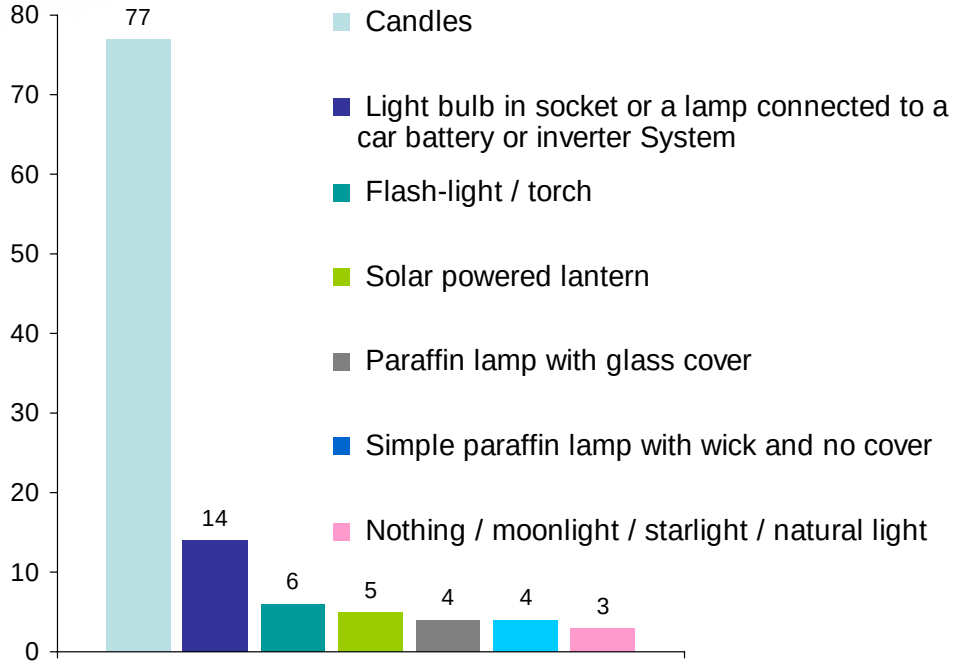
Types of Lighting Devices and where Used

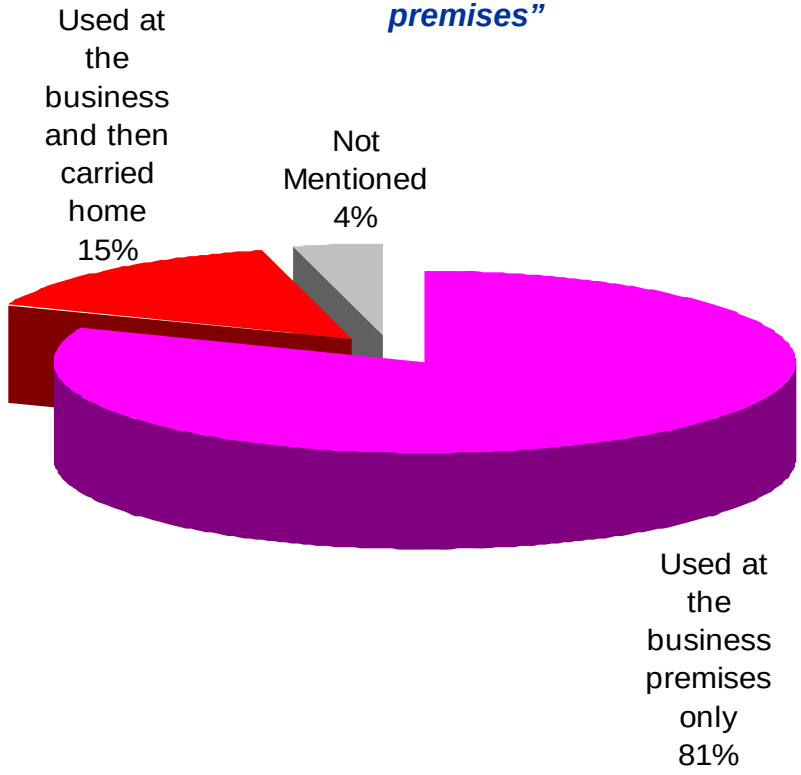
TRADER

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



Base: All who use lights in their business = 248

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



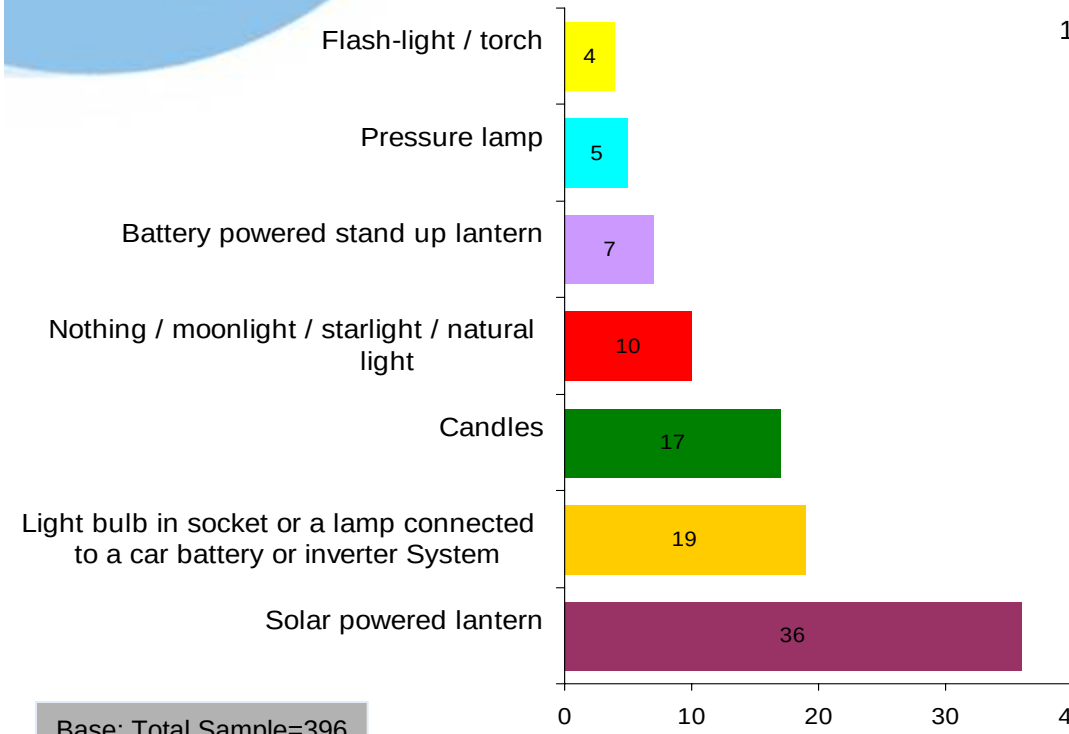
Base: All who use lights in their business = 248

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.

Preferred Type of Light (Apart from Mains) and Preferred Positioning

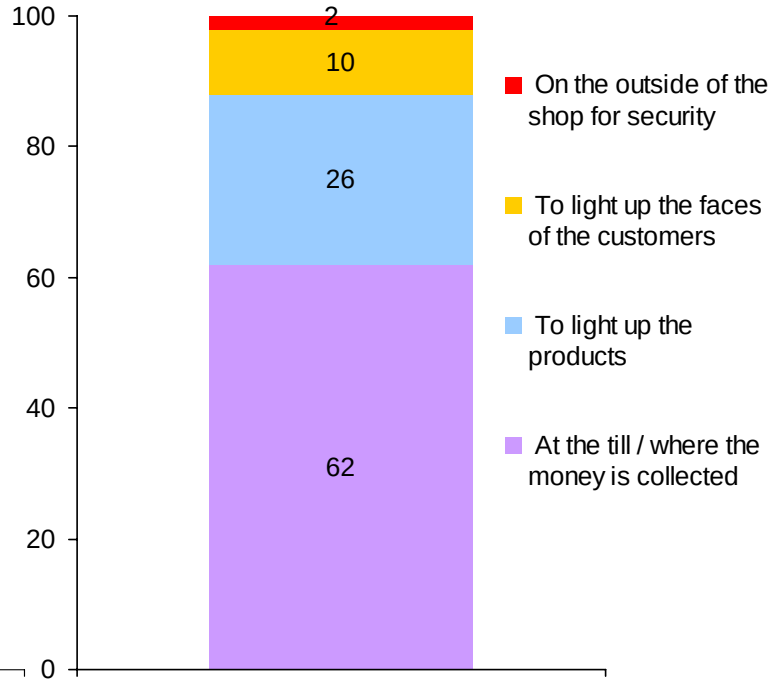
TRADER

Q. 43 "What is your preferred type of light …?"



Base: Total Sample=396

Q. 44a "What or where in the shop would you like to position lamps?"



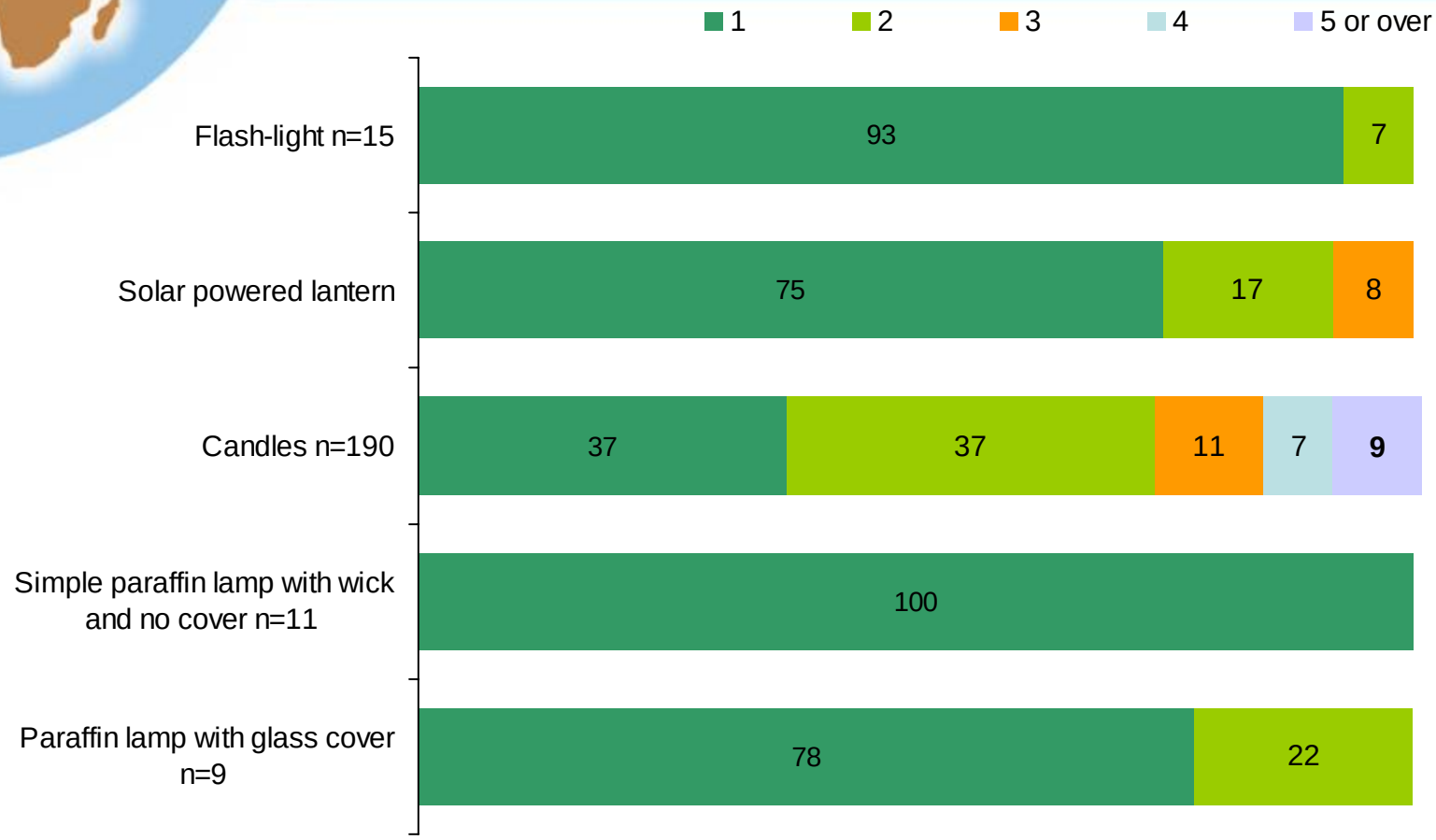
Base: Retail shops=377

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

TRADER

Number Of Each Lighting Device Used

Q. 34 "How many of each type of light do you use at the business currently?"



The majority of traders only use one lighting devise 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 devises last?"

Base: All who use light in their business

	Paraffin lamp with glass cover	Simple paraffin lamp with wick and no cover	Pressure lamp	Light bulb in socket	Solar powered lantern	Flash-light / torch
Base	**9**	**11**	**3**	**35**	**12**	**15**
< 1 year	67	82	33	77	42	80
1 to 1.5 years	-	18	67	20	33	7
1.6 to 2 years	11	-	-	3	17	-
2.1 to 2.5 years	11	-	-	-	-	-
3.1 to 3.5 years	11	-	-	-	-	-
3.6 to 4 years	-	-	-	-	8	7
> 6 years	-	-	-	-	-	7

****Caution: Small bases**

LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

LIGHTING COSTS

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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?"

Conversion rate
1US $ = ZK 3,333.33

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

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?"

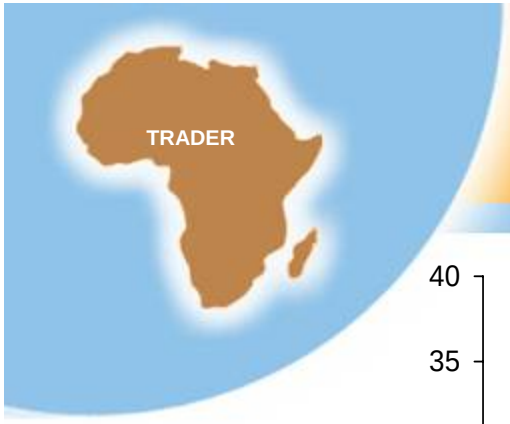
Conversion rate
1US $ = ZK 3,333.33

	Base	No. Owned	Cost of running a month	Cost of buying now
Paraffin lamp with glass cover	*9*	1	US $3.00 (ZK 10,300)	US $1.80 (ZK 6,000)
Simple paraffin lamp with wick and no cover (often could be home made)	*11*	1	US $14.00 (ZK 45,000)	US $1.05 (ZK 3,500)
Light bulb in socket or a lamp connected to a car battery or inverter System or to a non-mains power source	*35*	2	US $3.90 (ZK 13,000)	US $4.62 (ZK 15,400)
Candles	*190*	2	US $5.00 (ZK 16,600)	US $0.42 (ZK 1,400)
Solar powered lantern (has a solar panel specifically to power it only)	*12*	1	US $4.00 (ZK 13,400)	US $5.70 (ZK 19,000)
(Batteries for) battery powered flashlight or torch	*15*	1	US $3.78 (ZK 12,600)	US $1.74 (ZK 5,800)

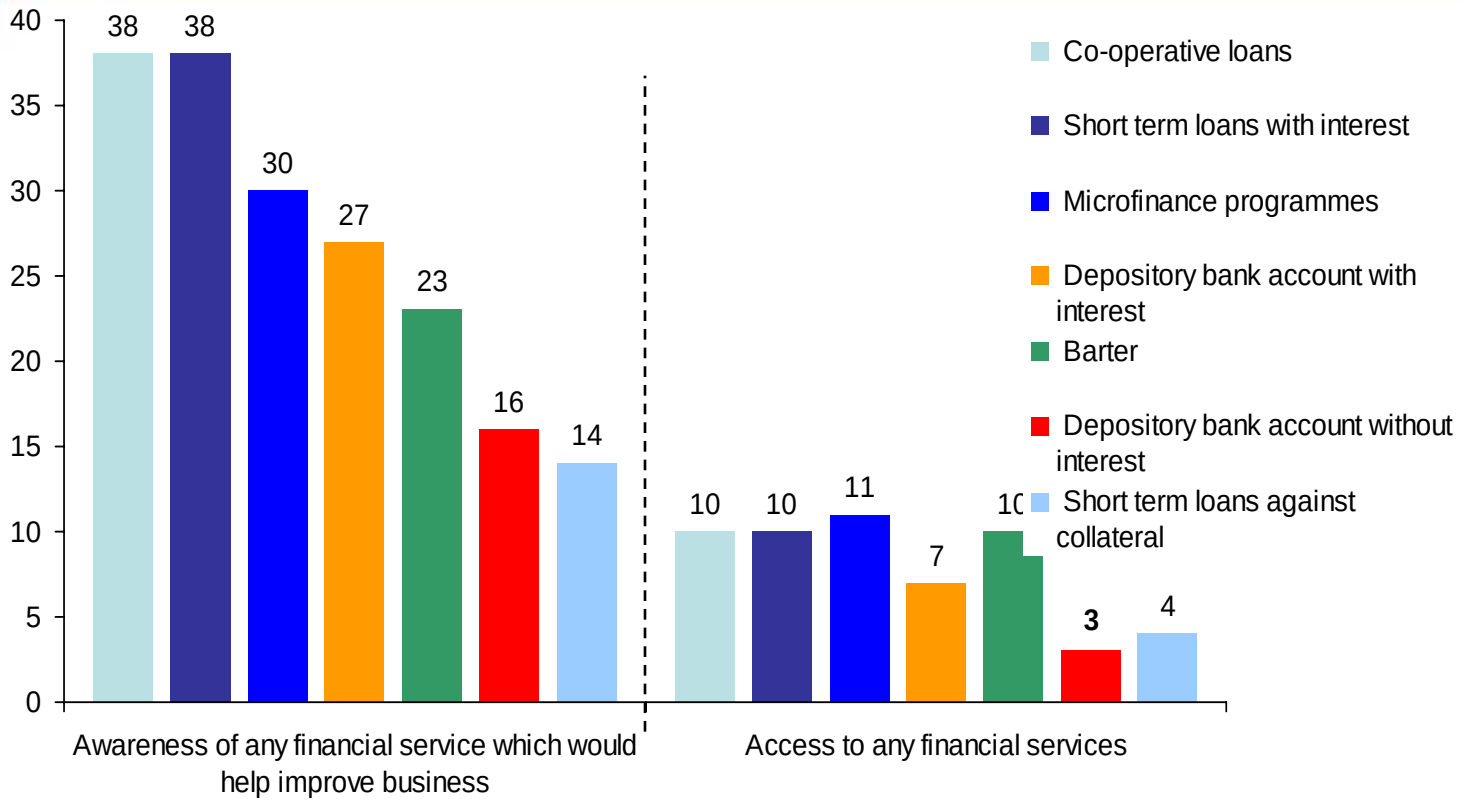
Summary: Average Claimed Spend per Month on Current Lighting Devices

Conversion rate
1US $ = ZK 3,333.33

Type of power/lighting device	App. Running costs per month		Cost of buying actual item	
	CONSUMER	TRADER	CONSUMER	TRADER
(Paraffin for) paraffin lamp with glass cover	US $3.54 (ZK 11,800)	US $3.00 (ZK 10,300)	US $1.98 (ZK 6,600)	US $1.80 (ZK 6000)
(Paraffin for) paraffin lamp with wick and no cover	US $4.65 (ZK 15,500)	US $14.00 (ZK 45,000)	US $2.46 (ZK 8,200)	US $1.05 (ZK 3,500)
Candles	US $4.74 (ZK 15,800)	US $5.00 (ZK 16,600)	US $0.33 (ZK 1,100)	US $0.42 (ZK 1,400)
(Batteries for) battery powered flash-light or torch	US $2.34 (ZK 7,800)	US $3.78 (ZK 12,600)	US $1.32 (ZK 4,400)	US $1.74 (ZK 5,800)



Traders: Financial Services



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

LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

MODERN LIGHTING PRODUCT EVALUATION

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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

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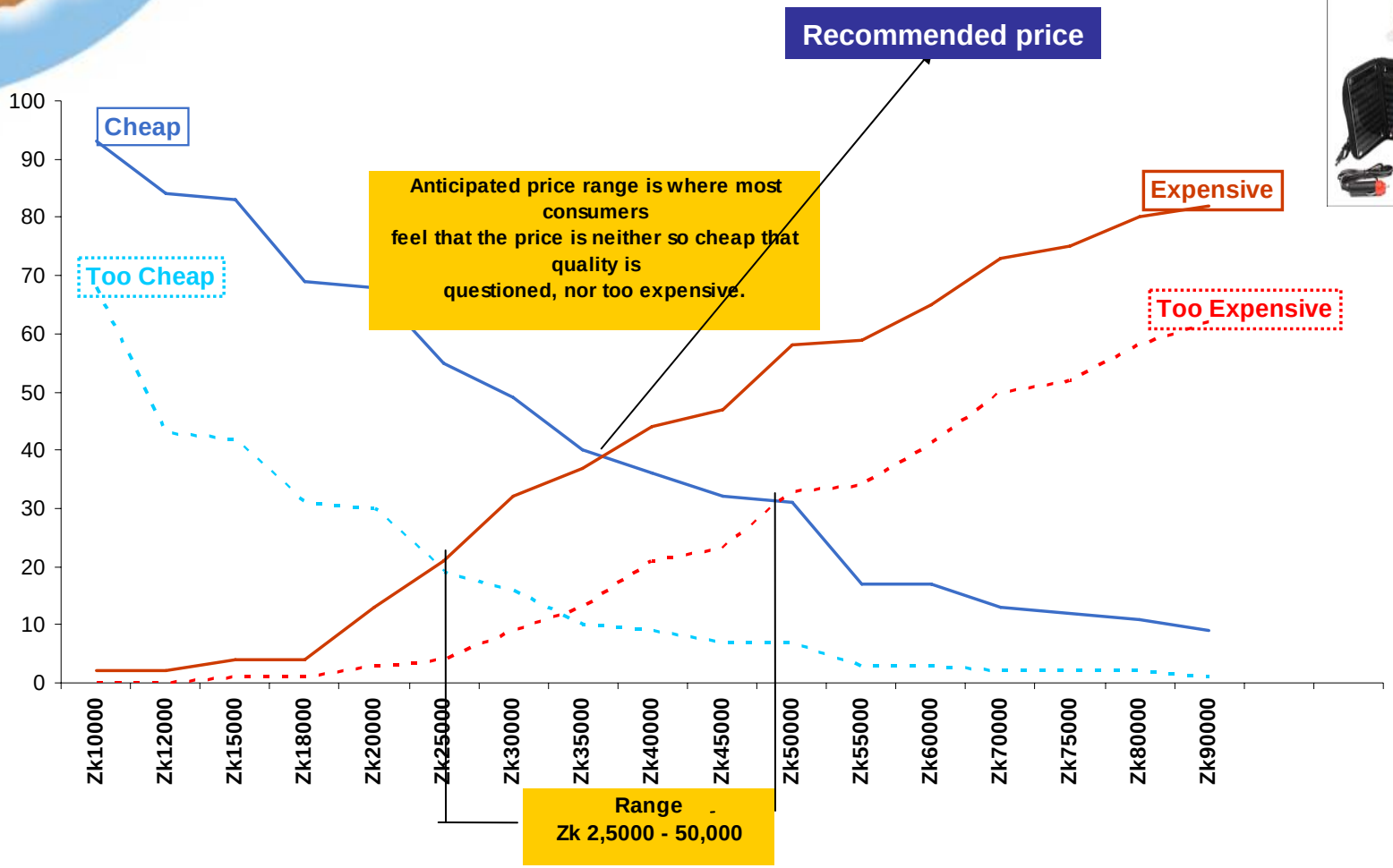
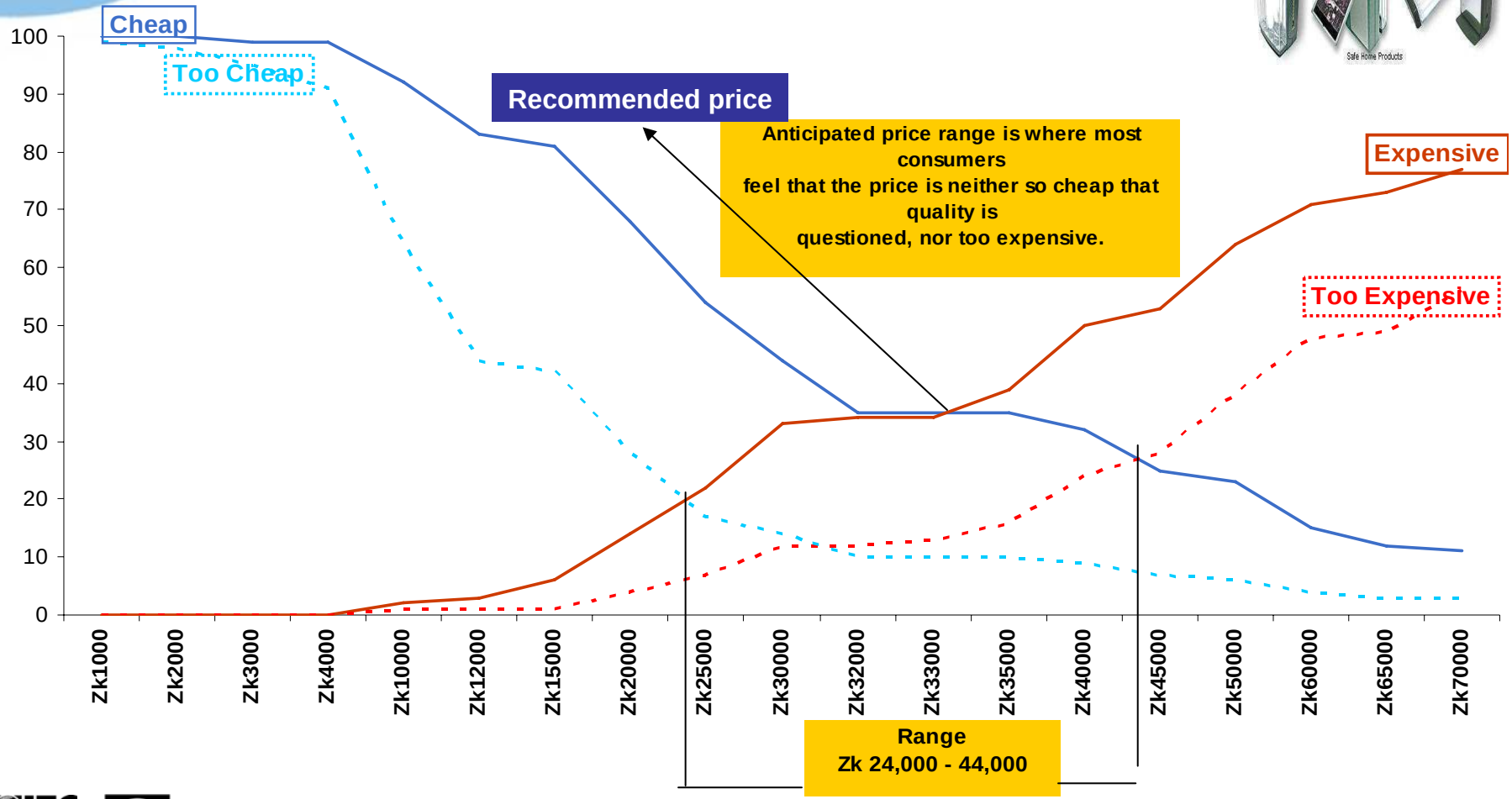
CONSUMER

PSM: Rechargeable Lantern



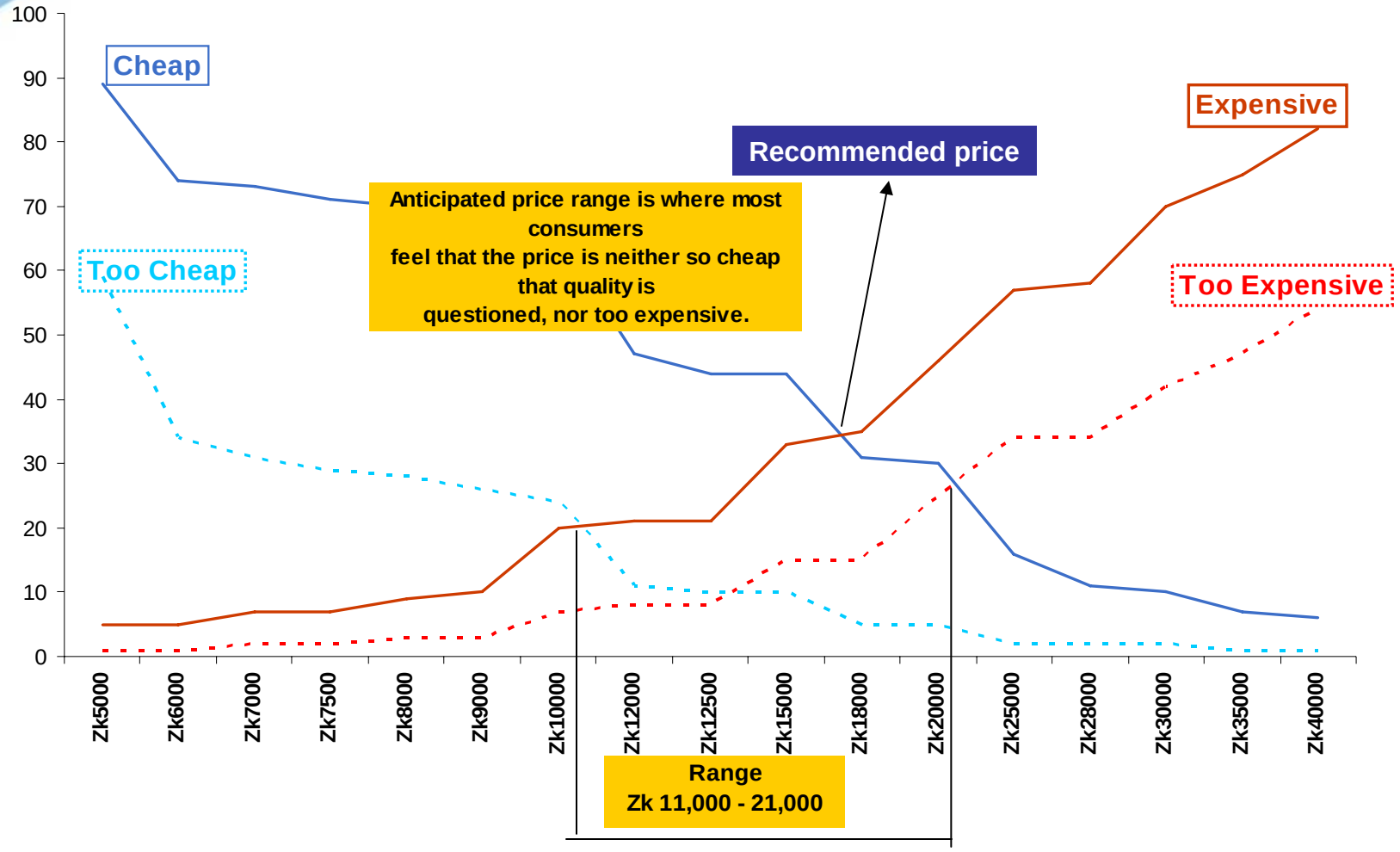
CONSUMER

PSM: Rechargeable Task Light



PSM: Rechargeable Torch

CONSUMER



LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

TRADERS

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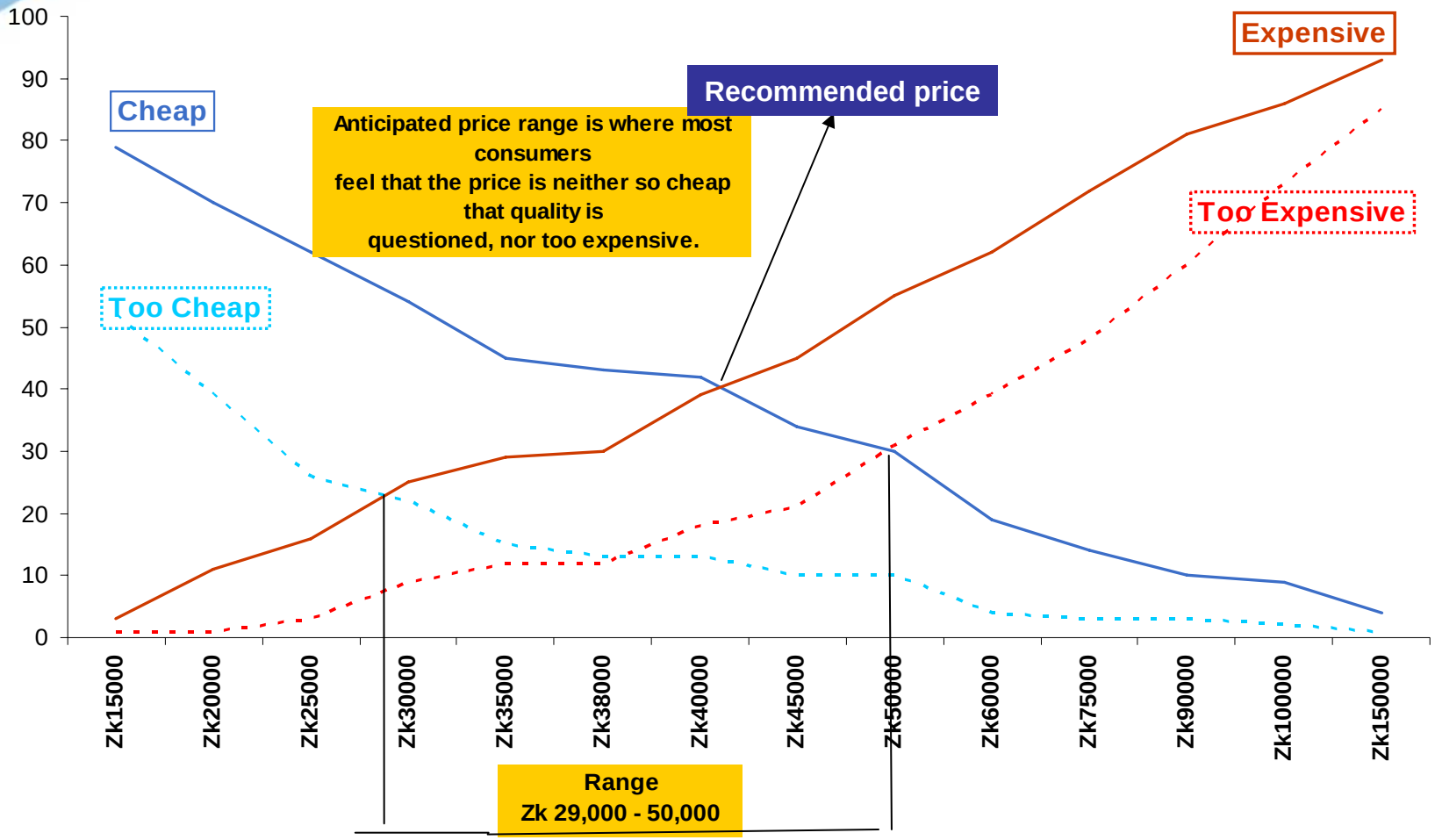
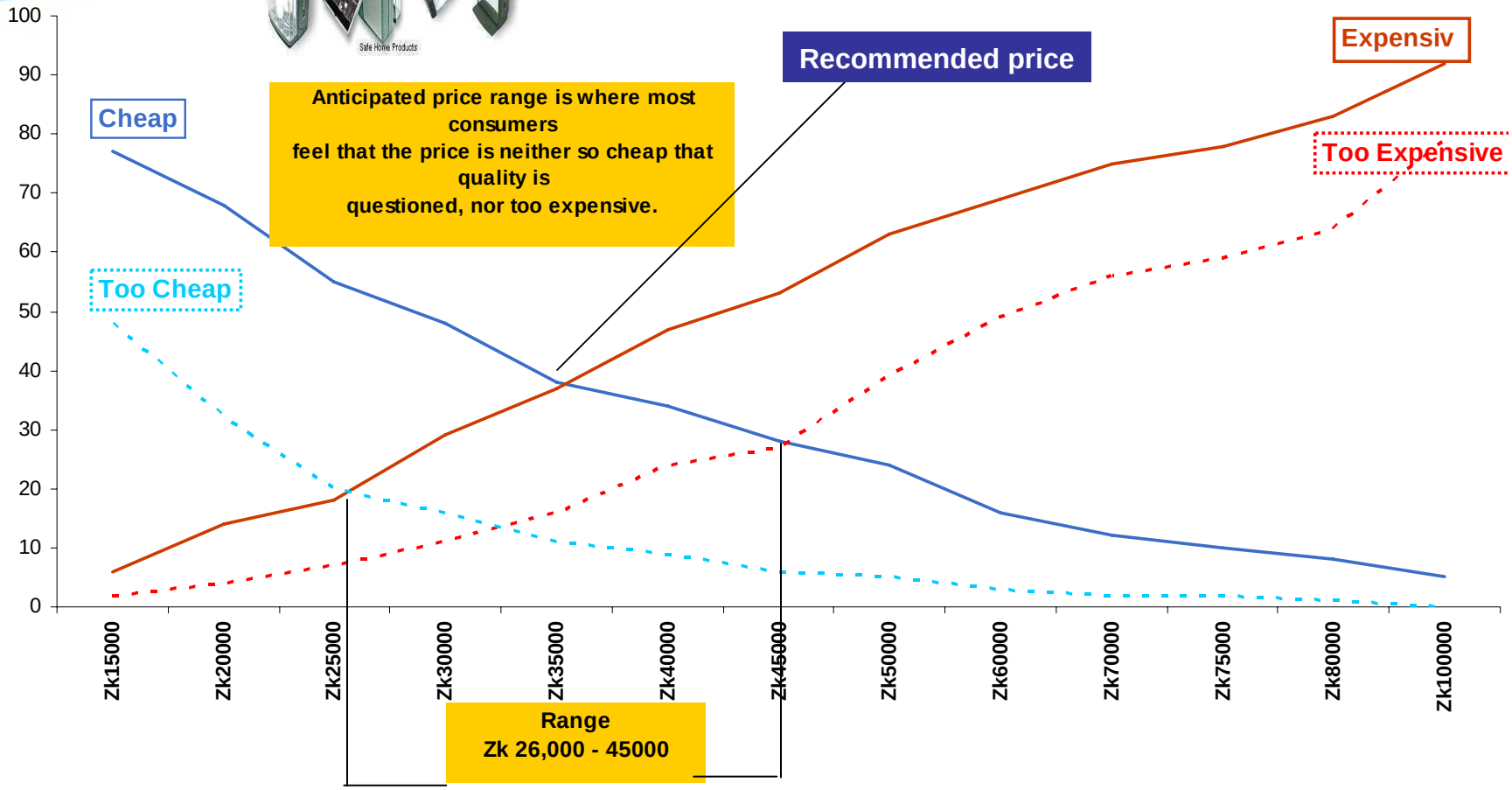
PSM: Rechargeable Lantern

TRADER



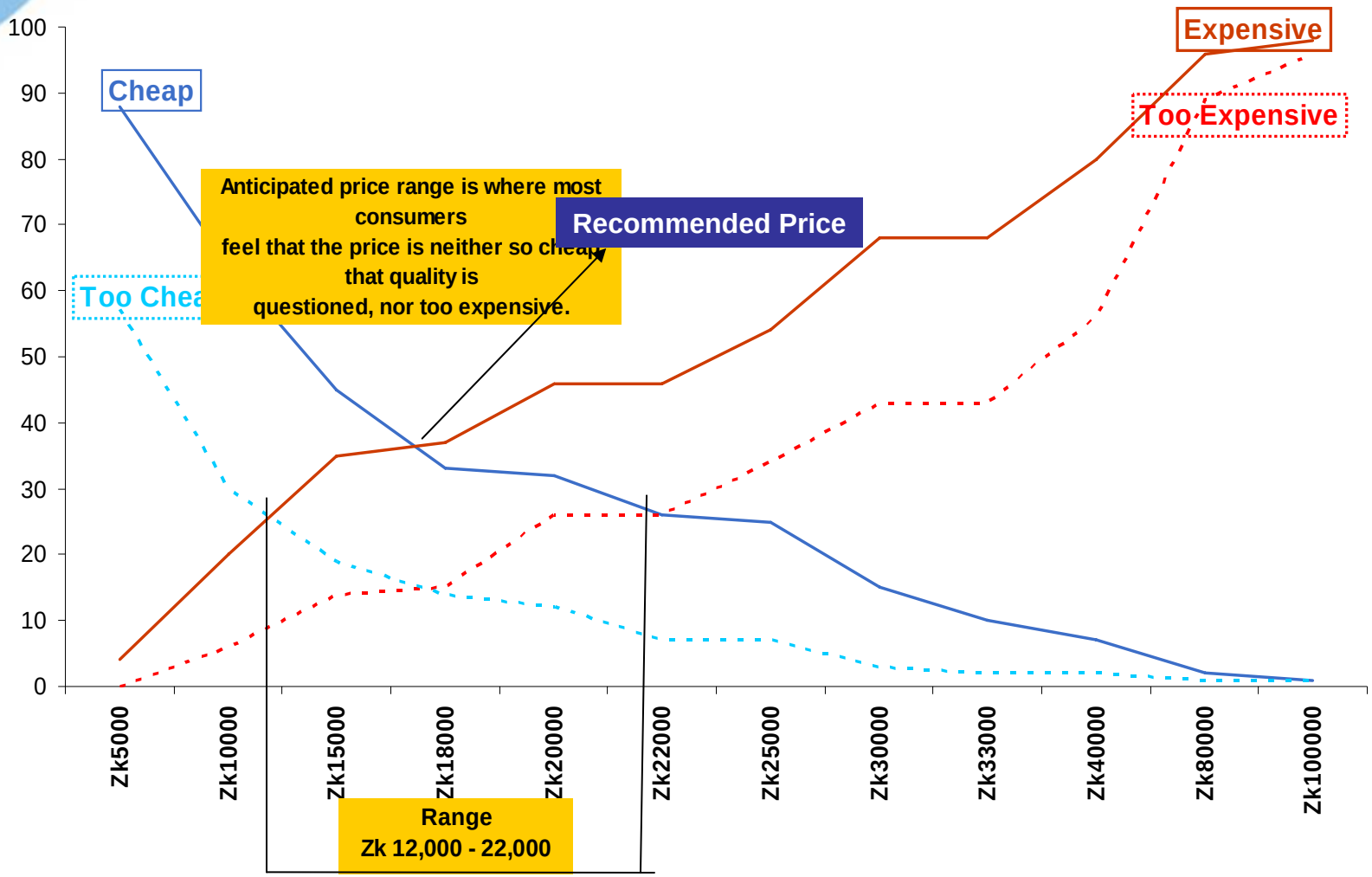
PSM: Rechargeable Task Light

TRADER



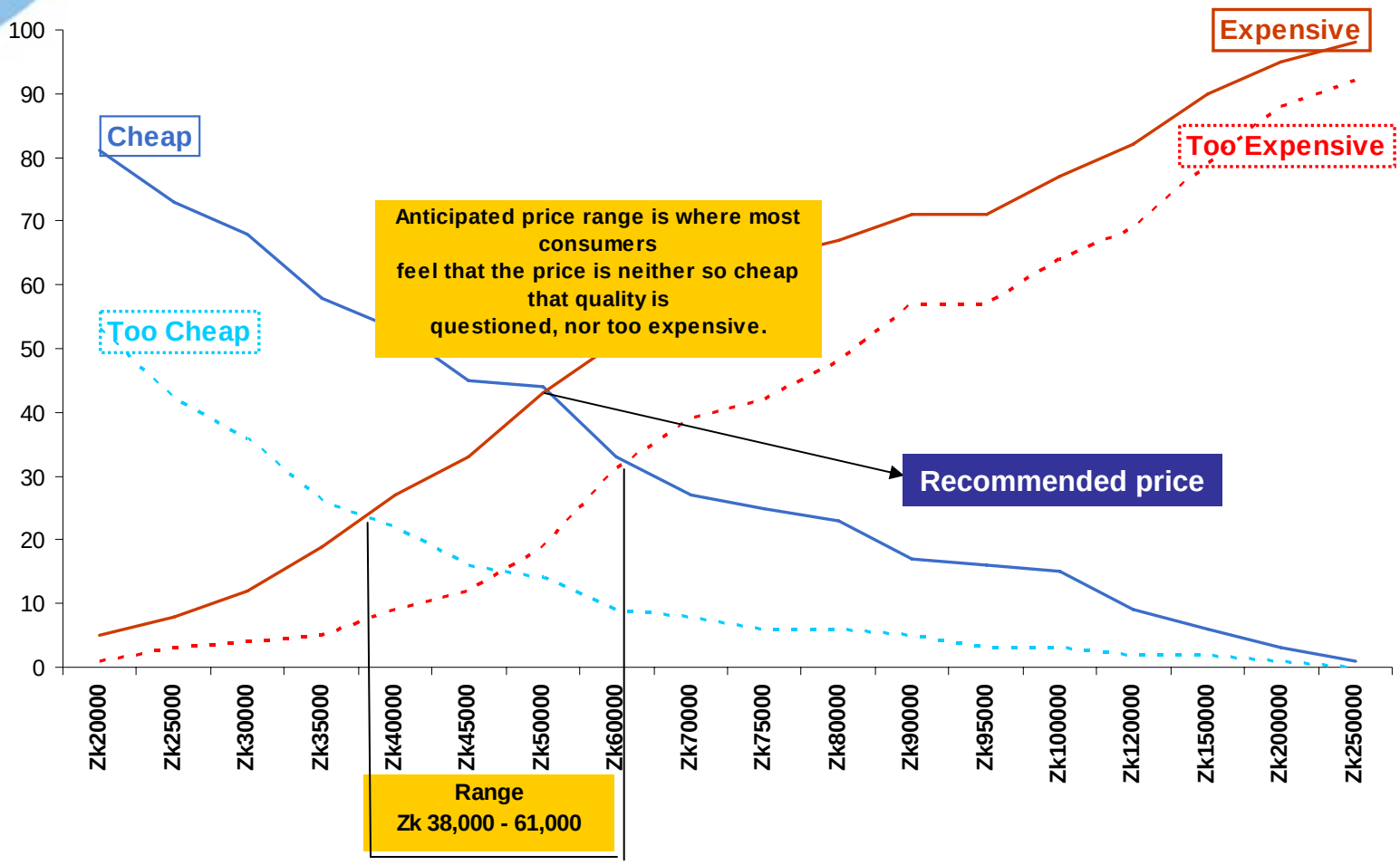
PSM: Rechargeable Torch

TRADER



PSM: Rechargeable Flood Light

TRADER



Summary: Most Acceptable Price Point

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

	Household	Trade
 **Lantern**	**US $11.10** (ZK 37,000)	**US $12.30** (ZK 41,000)
 **Torch**	**US $5.10** (ZK 17,000)	**US $5.10** (ZK 17,000)
 **Task Light**	**US $10.20** (ZK 34,000)	**US $10.50** (ZK 35,000)
 **Flood Light**	N/A	**US $15.00** (ZK 50,000)

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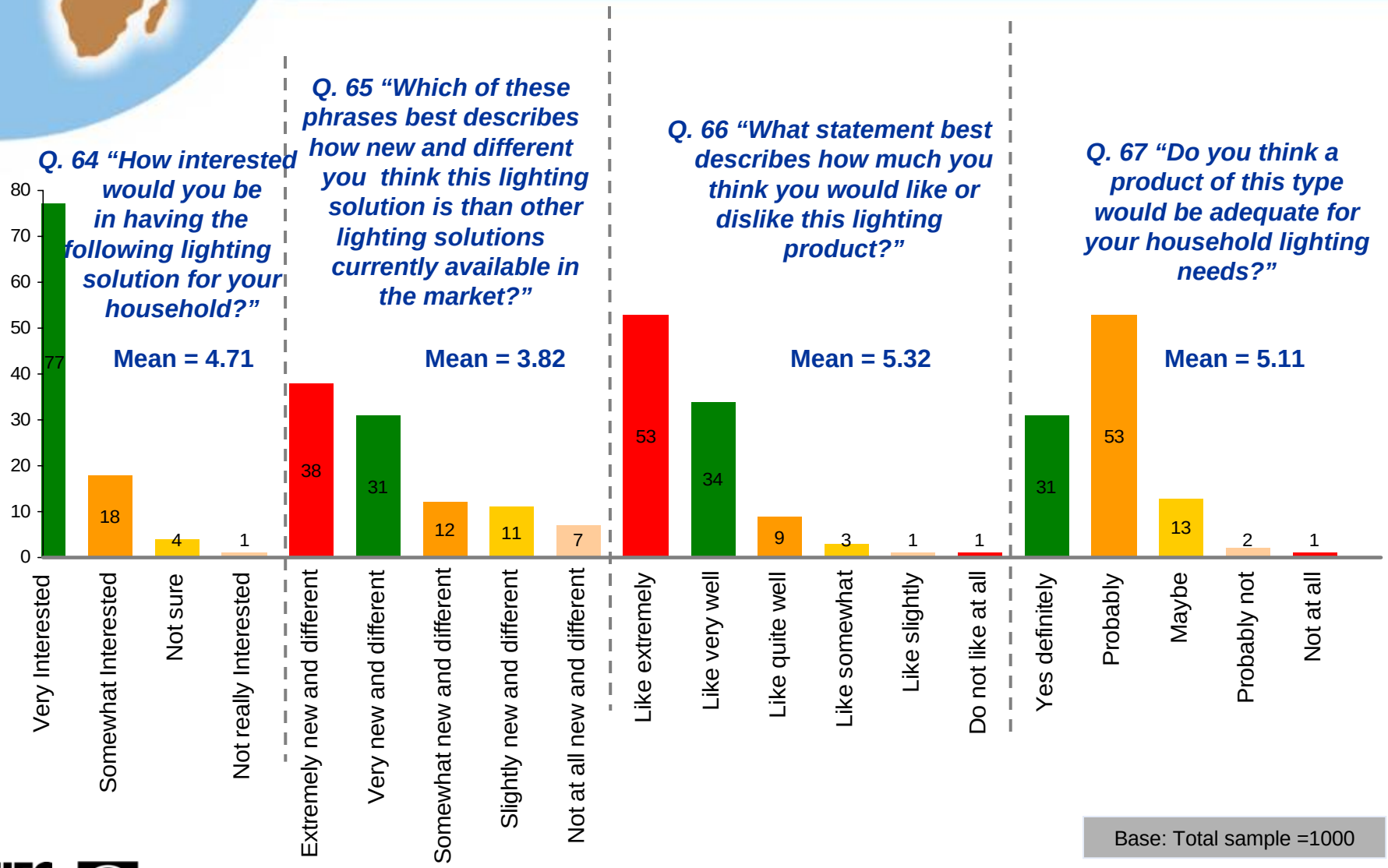
Conversion rate
1US $ = ZK 3,333.33

Home Lighting Concept

CONSUMER

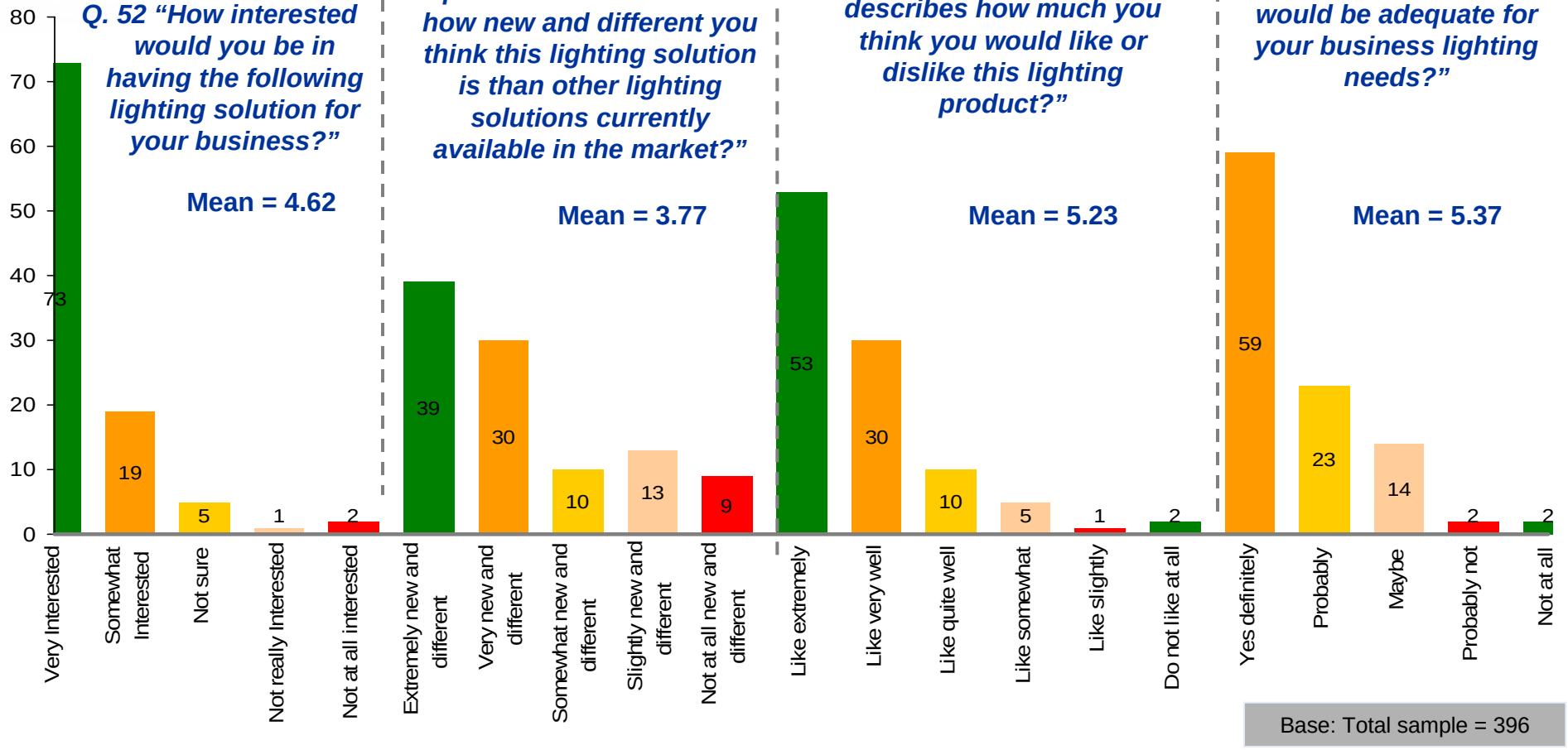
Evaluation Of Lighting Concept



Base: Total sample =1000

Business: Evaluation of Lighting Concept

TRADER



Base: Total sample = 396

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ZAMBIA SUMMARIES

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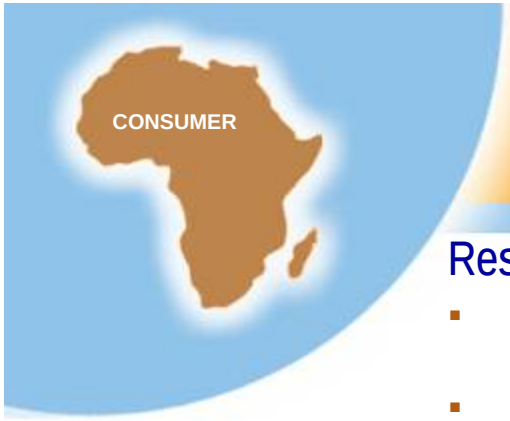


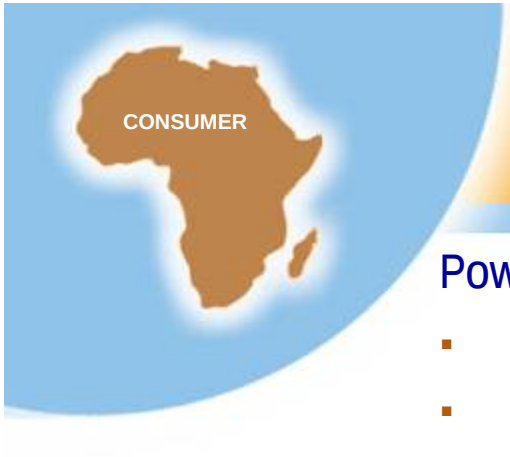
Summary: Consumers

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

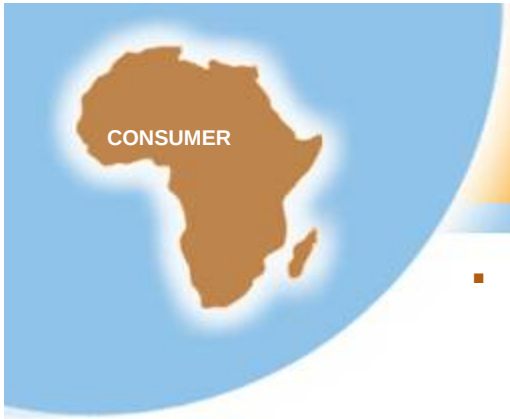
Power and Lighting Habits and Usage

- 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 its 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 night time 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

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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

Salient Thought

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