LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

Lighting Africa Market Assessment Results

Quantitative Assessment - KENYA

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World Bank Group

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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

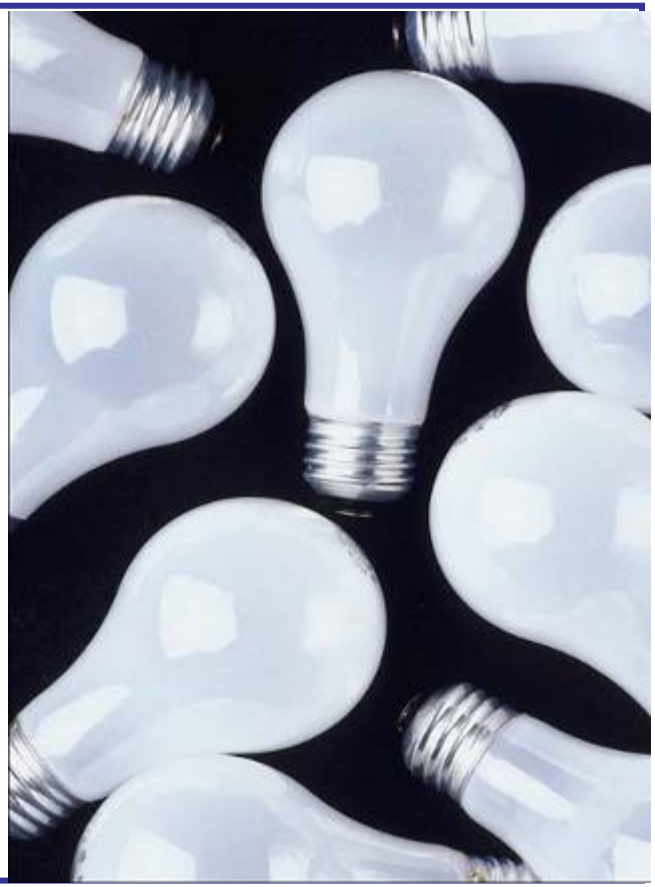
What does the consumer need?

- 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 Nairobi, Eastern, Coast, Western, Nyanza, Central and Rift Valley
- Interviewed main (or joint) decision maker regarding household and purchases – i.e. head of household
- Face to face interview using structured questionnaire

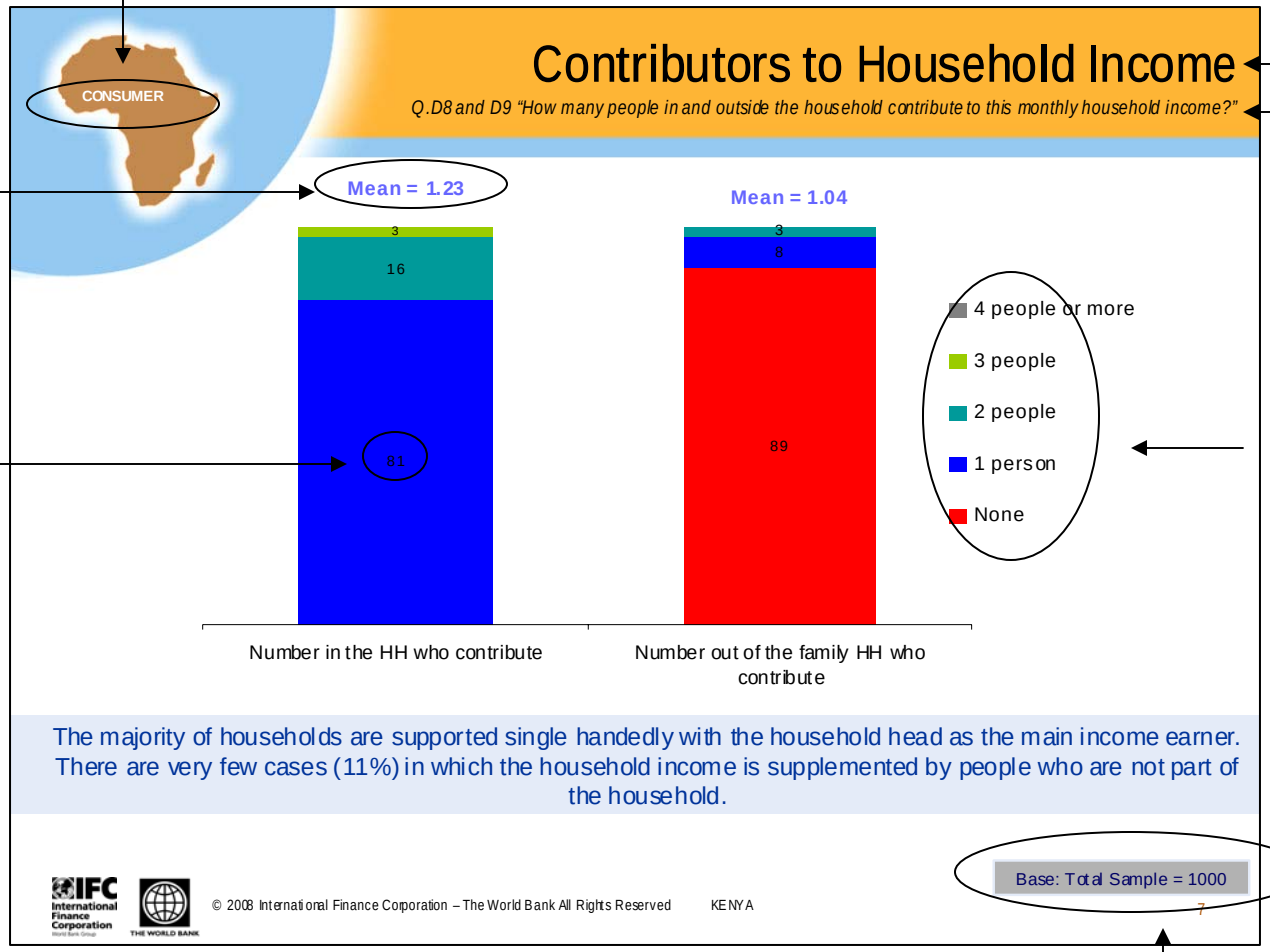
Retail Businesses

- 400 retail businesses, representative sample conducted in Nairobi, Eastern, Coast, Western, Nyanza, Central and Rift Valley
- 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



Slide Title

Question which was asked of the respondent

Mean score or average of a specific measure

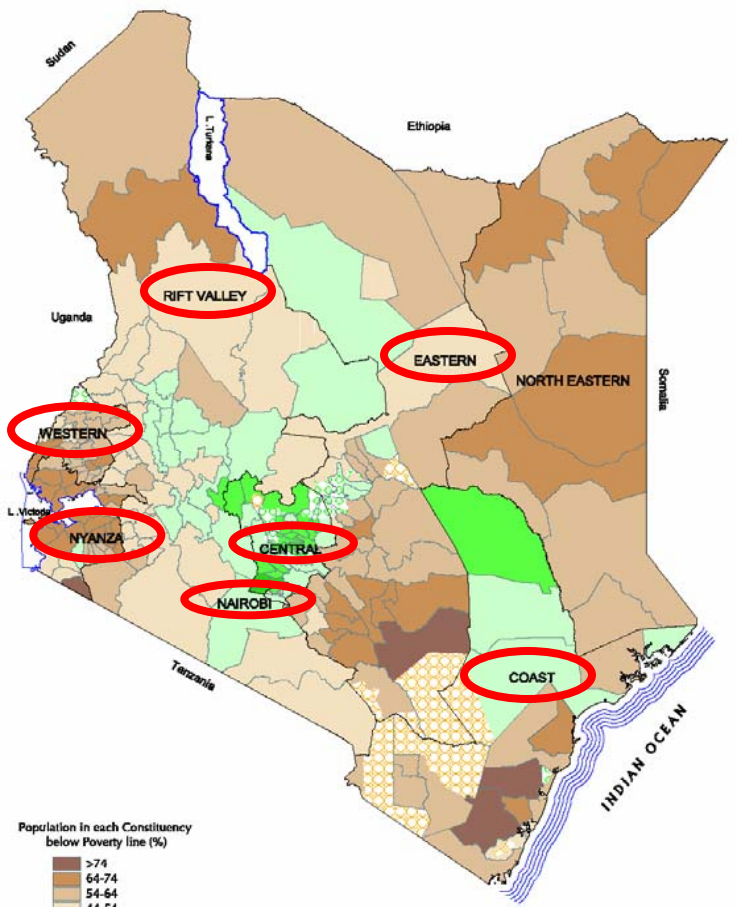
Figures in the graph are percentages of the base indicated

Legend detailing what the different chart colors mean

Comment on slide content

Sample size on which the chart is based

Kenya: Socio-Economic Environment



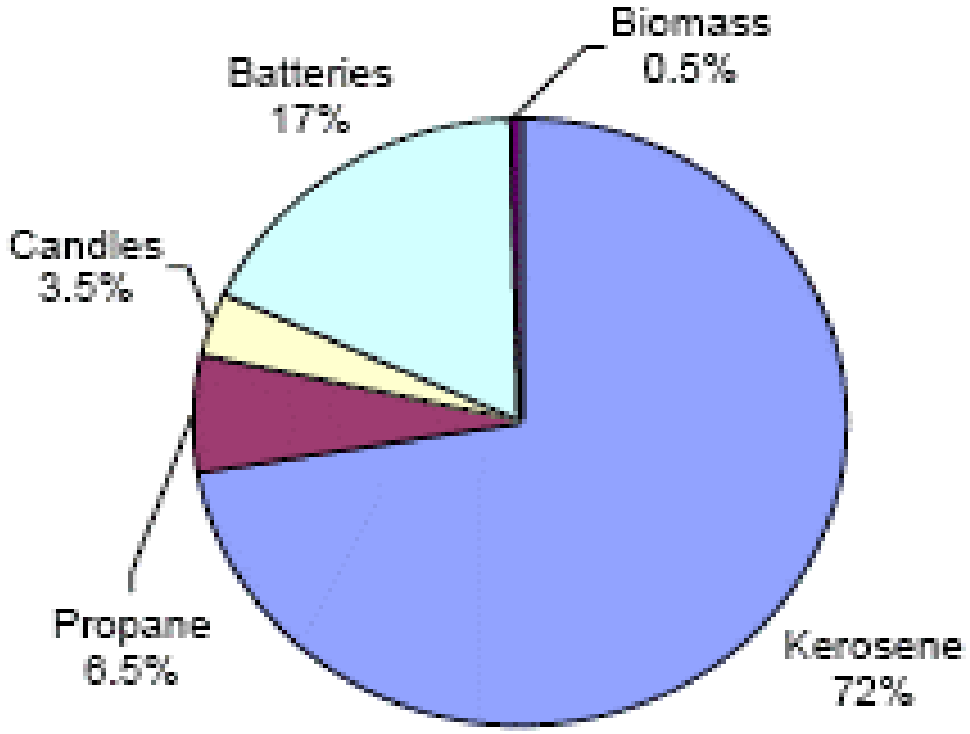
Province	Poverty incidence
Nyanza	65%
Western	61%
Coast	58%
Eastern	58%
Rift Valley	48%
Nairobi	44%
Central	31%

The poverty incidence in Kenya is quite high and spread countrywide with all 7 provinces having over 30% of their population living in poverty.

Majority of Kenyans are living in poverty and are not connected to the electricity grid. It is thus clear that the Lighting Africa products, will have a wide market in which they can be used

Overall Opportunity in Kenya

Figure ICA-2. Off-Grid Lighting by Source
$1.4 billion/year (2005)



With the amount spent on Bio-mass lighting fuels close to 1.4 billion USD a year, the opportunity for modern and environmentally friendly lighting devices within Kenya is substantial

Pre- Study Source: Internet

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RESPONDENT PROFILE

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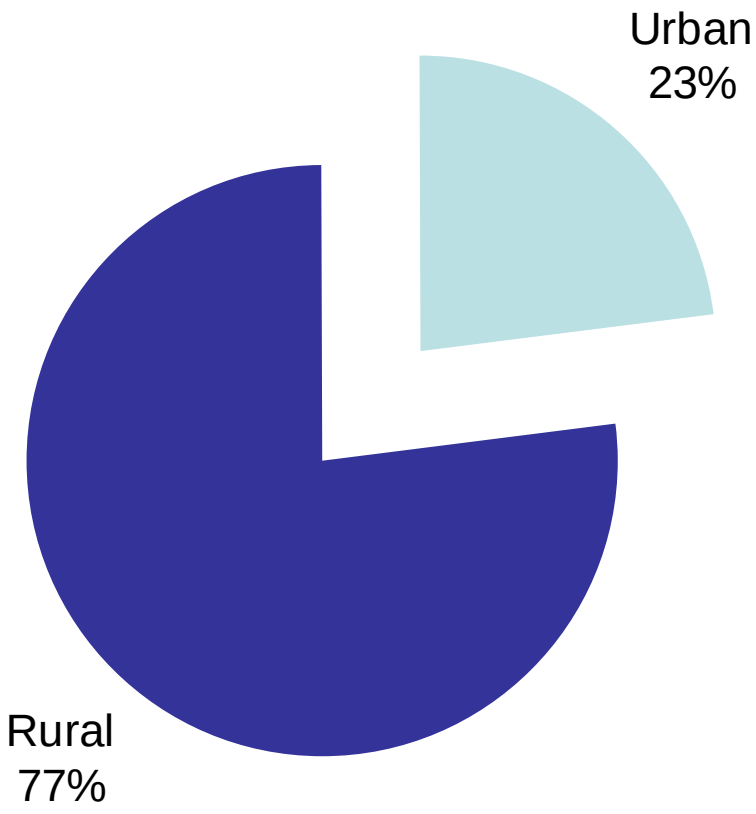
Rural vs. Urban Sample Distribution

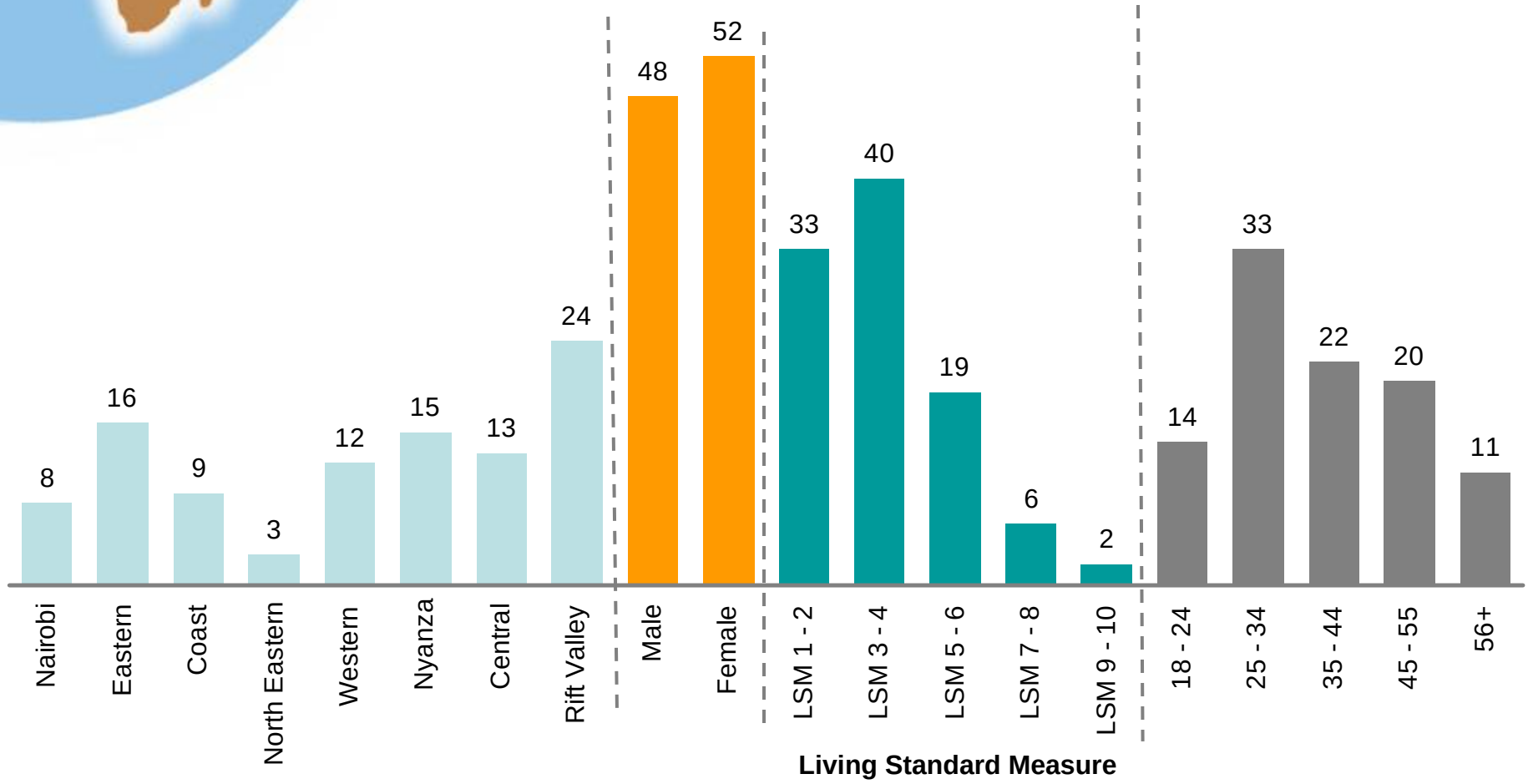
The urban vs. rural sample was split in line with the national distribution of the Kenyan population



Base :Total sample = 1000

CONSUMER

Respondent Demographic Profile



Base: Total Sample = 1000

Observations about Consumer Households

Base: Total Sample = 1000

Colour of the room in the main dwelling	%
White or Bright colour	21
Brown/ natural clay/dark clay	50
Other clay	11
Not observed	19

Dwelling environment	%
Planned urban centre	5
Unplanned/informal settlement	18
Rural –planned settlement	9
Rural - other	68

Wall Material of Dwelling	%
Mud/mud bricks	46
Wood planks	19
Bricks or stone	24
Corrugated Iron	11

Size of the main room	%
3 Square meters or less	41
3.1 – 8 Square meters	40
More than 8 Square meters	19

Roof Material of the dwelling	%
Grass or other thatch	11
Corrugated iron	88
Tiles	1

Type of road near dwelling	%
Tarmac	13
Murram or rough road	61
Pathway (no vehicle access)	26

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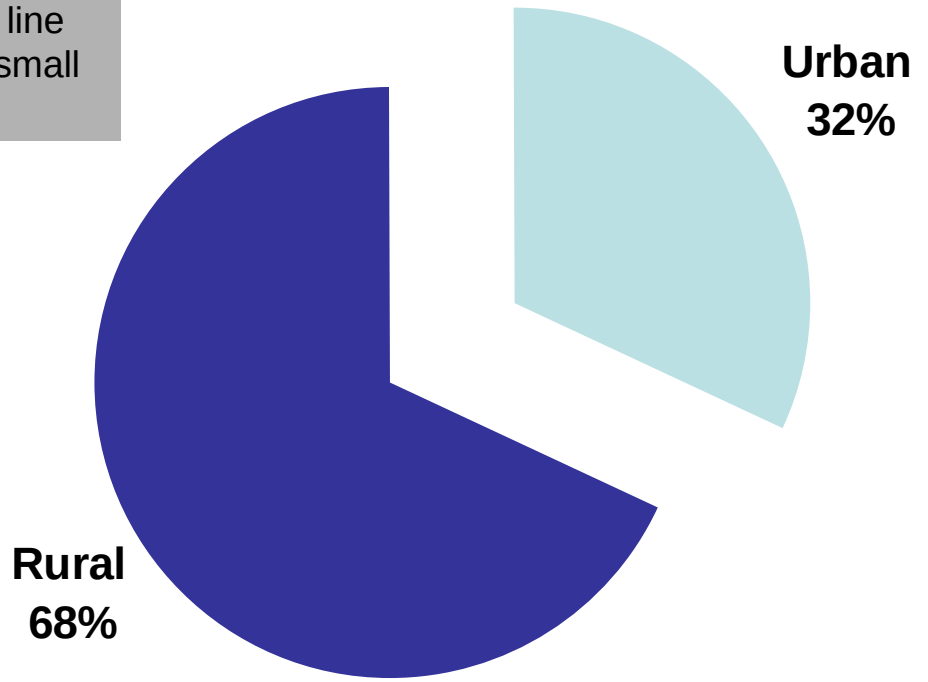
Rural vs. Urban Sample Distribution

TRADER

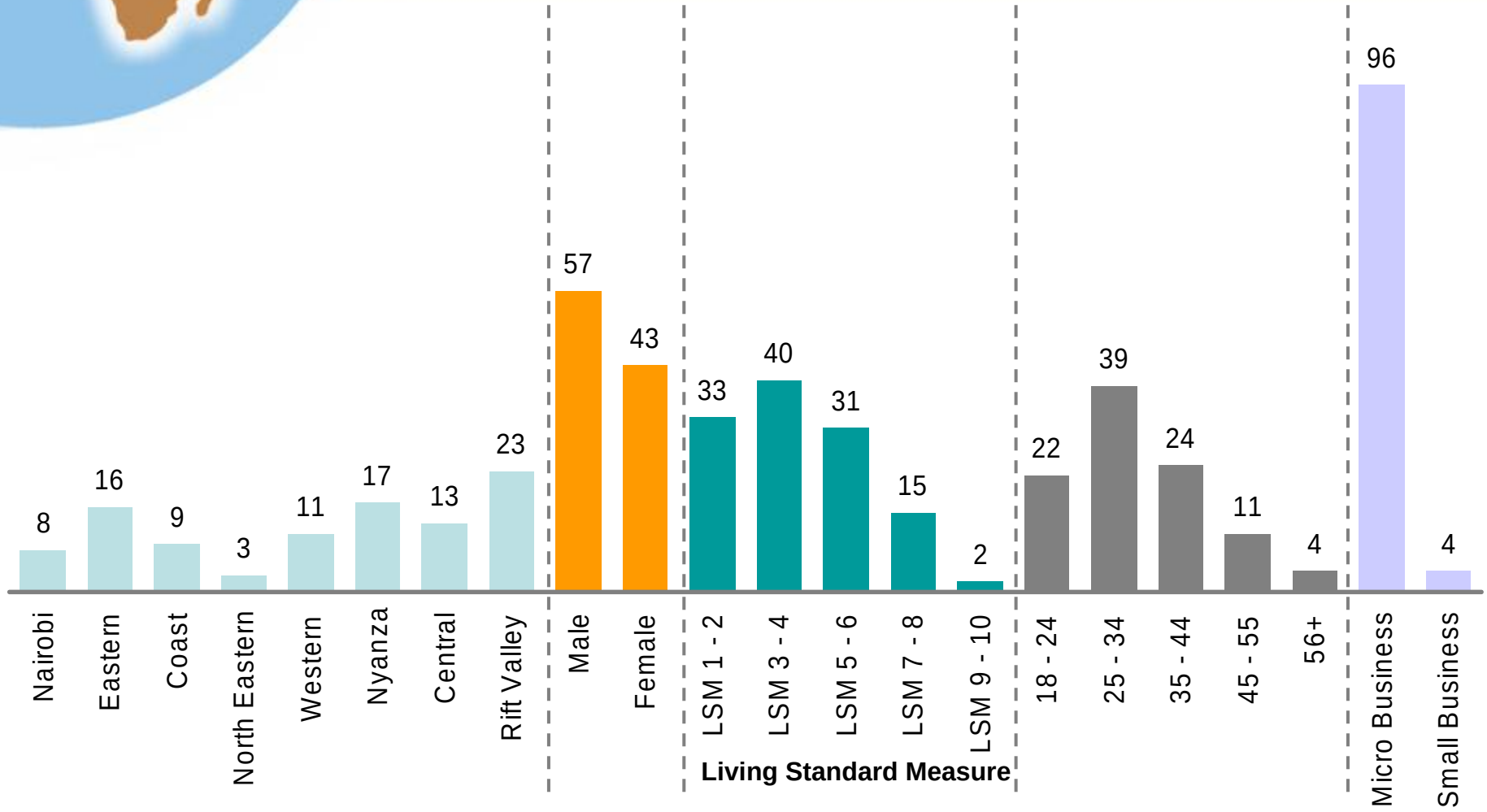
The urban vs. rural sample was split in line with the national distribution of Kenyan small business'



Base :Total sample = 400

TRADER

Respondent Demographic Profile: Traders



Base: Total Sample = 400

Observations about Business Premises

Base: Total Sample = 400

Colour of the walls room in the main business room	%
White or Bright colour	38
Brown/ natural clay/dark clay	28
Other colour	16
Not observed	18

Business environment	%
Planned urban centre	16
Unplanned/informal settlement	16
Rural –planned settlement	45
Rural - other	23

Wall Material of Business Structure	%
Mud/mud bricks	16
Wood planks	27
Bricks or stone	36
Corrugated Iron	21

Size of the business structure	%
3 Square meters or less	48
3.1 – 8 Square meters	38
More than 8 Square meters	14

Roof Material of the business structure	%
Grass or other thatch	5
Corrugated iron	93
Tiles	2

Type of road near business	%
Tarmac	39
Murram or rough road	55
Pathway (no vehicle access)	6

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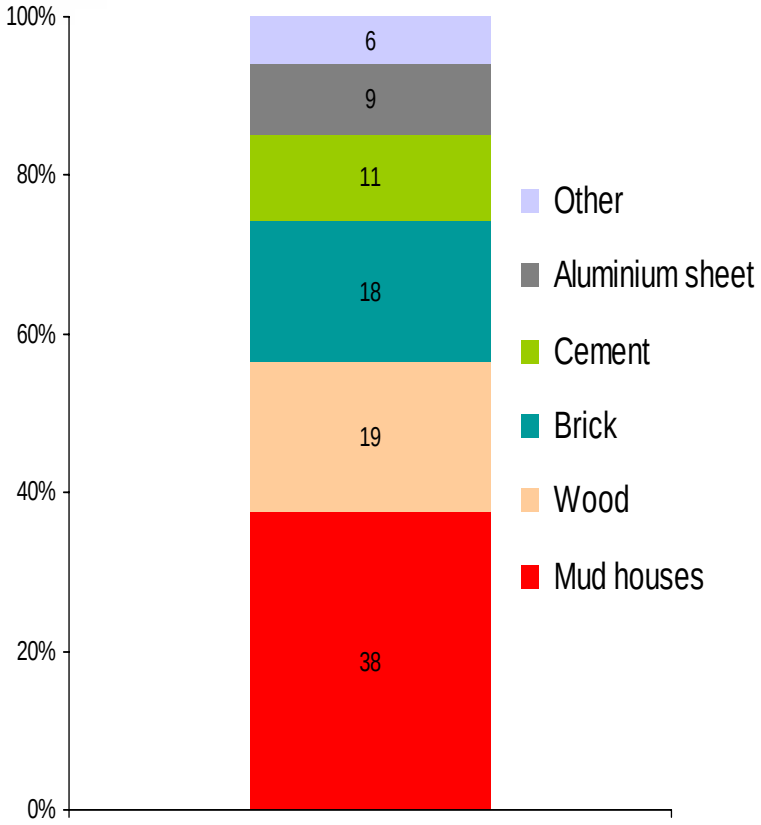
Dwellings



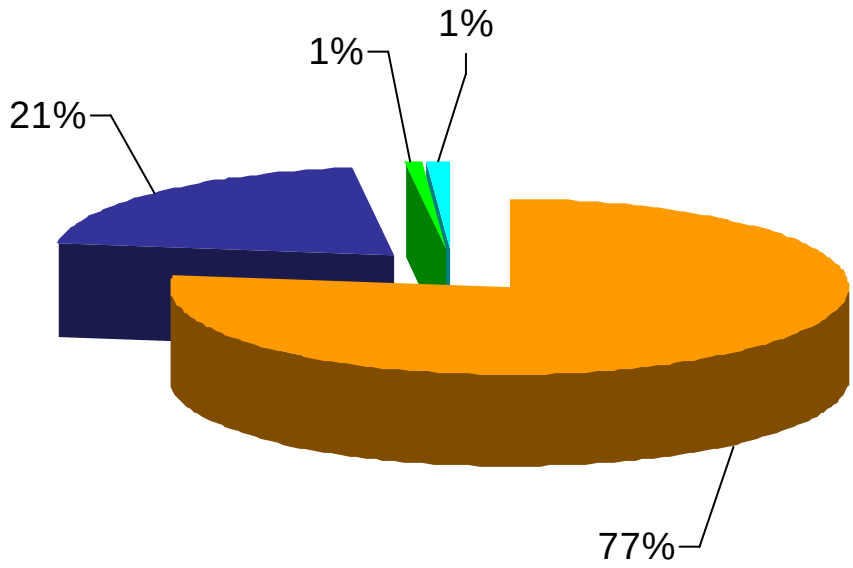
Consumer dwelling units in Kenya are predominantly structures which are built from mud, wood and aluminum. More permanent housing made out of brick only constitutes 18% of all housing types within the interviewed LSM bands.

Base: Total Sample = 1000

CONSUMER

Home Ownership

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



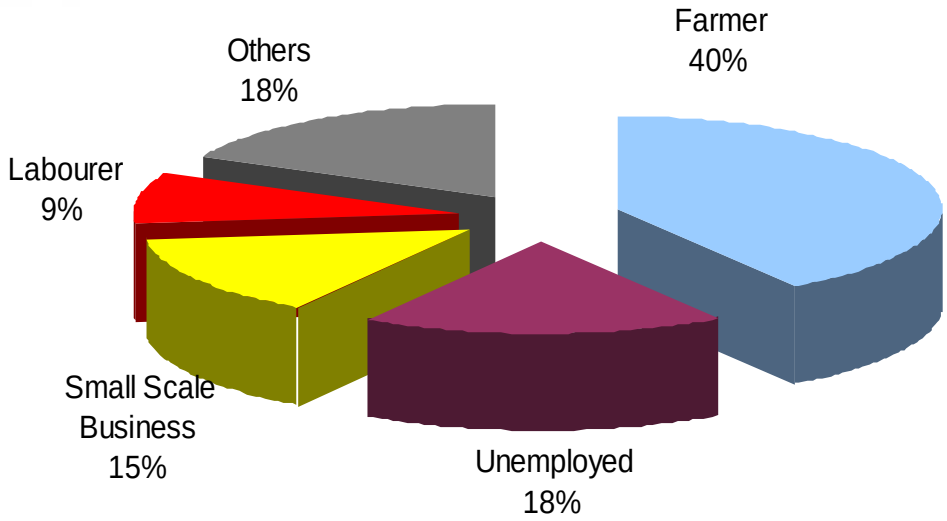
Of the structures in which people live 78% are owned, 21% are rented and 1% of respondents live in their parents' house – home ownership thus being relatively high.

Base: Total Sample = 1000

CONSUMER

Occupations

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



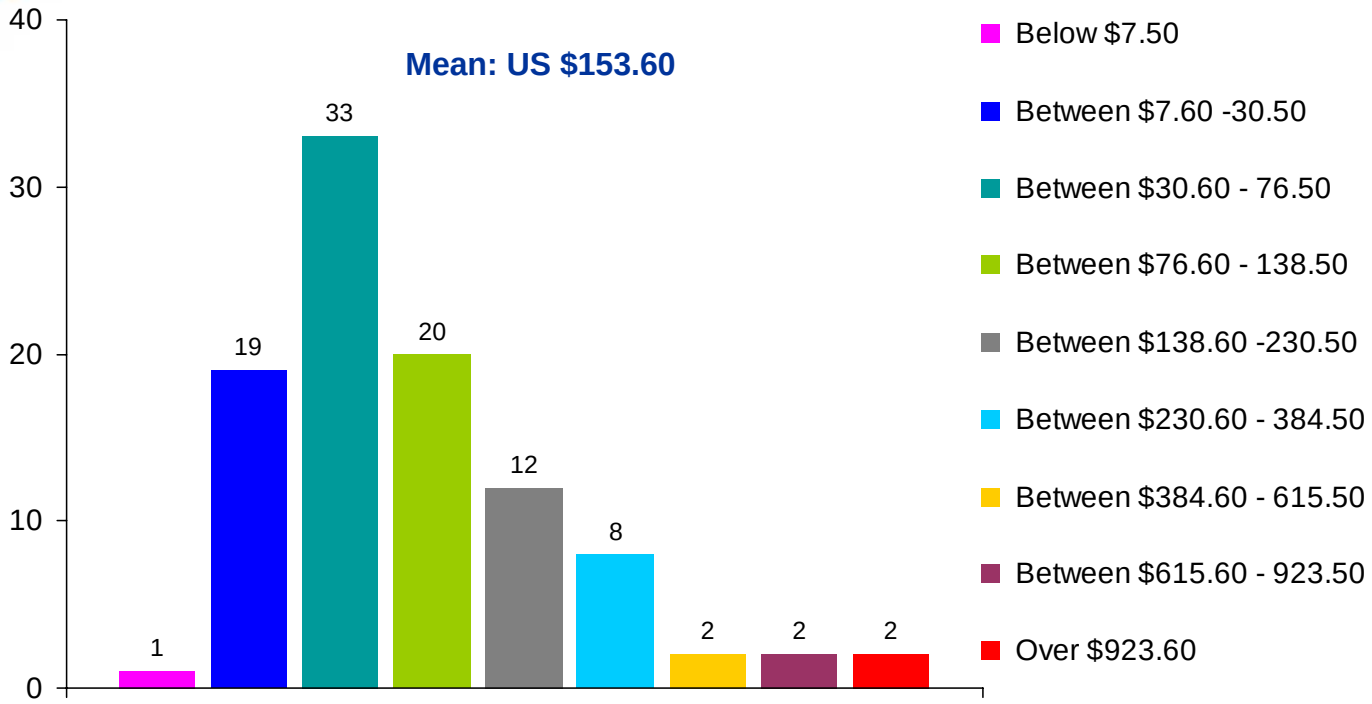
The claimed average monthly income is US $153.60. Farming is the most common occupation followed by blue collar jobs, such as teaching, security guard, etc.

Base: Total Sample = 1000

CONSUMER

Average Kenyan Household Income

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



Kenyan average monthly income: ***US $153.60*** (majority of people with this income fall within the LSM groups 2 and 3).

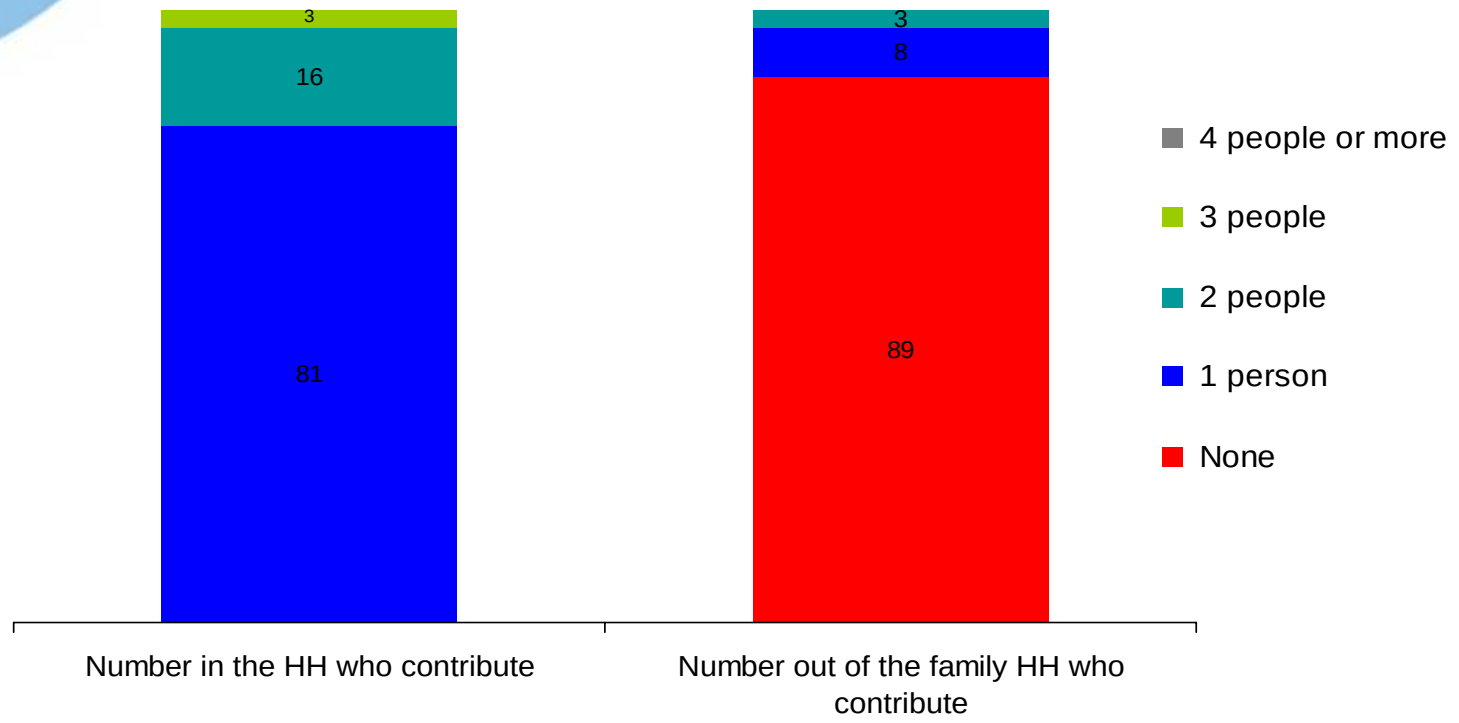
Base: Total Sample = 1000

CONSUMER

Contributors to Household Income

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

Mean = 1.23



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.

Base: Total Sample = 1000

Number of People in the Household

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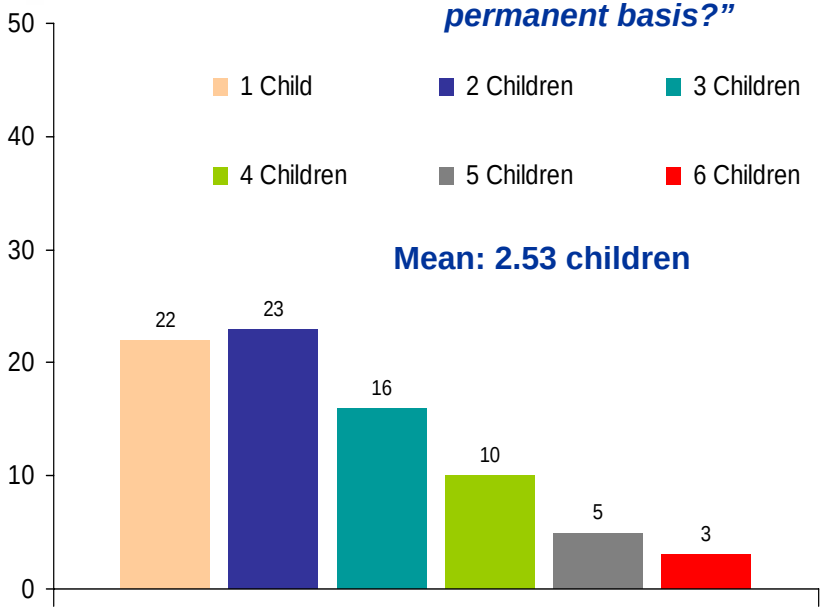
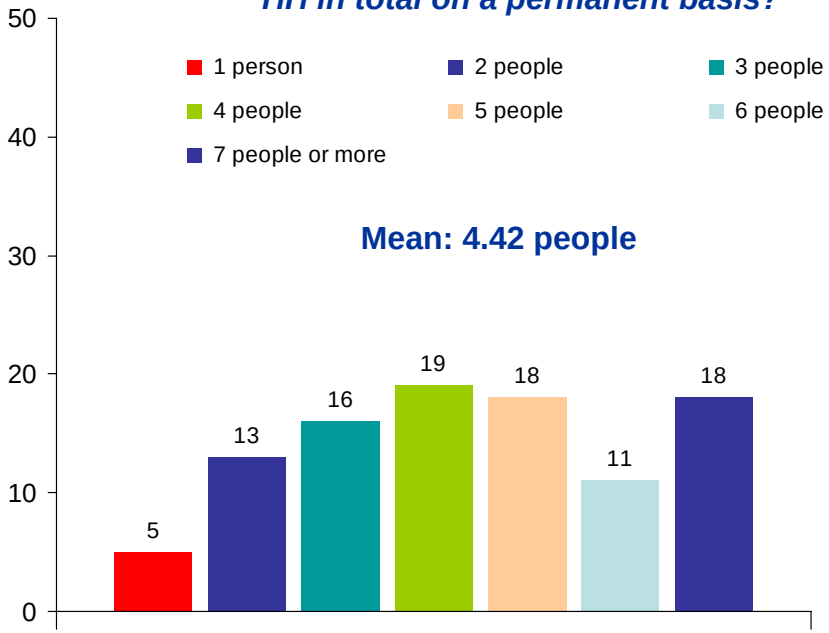
Q.1b "How many children (under 16 years) live in your HH in total on a permanent basis?"



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



In Kenya on average between 4 to 5 people reside in one household permanently, of which there are 2 to 3 children

Base: Total Sample = 1000

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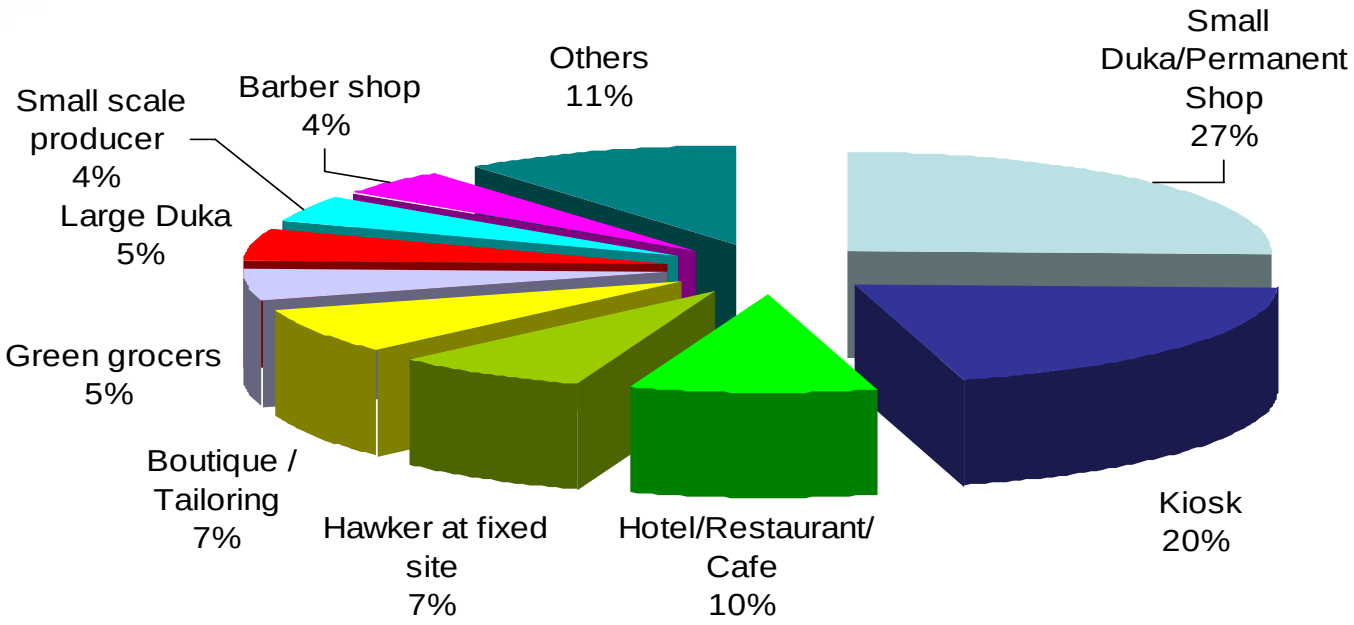
Types of Shop

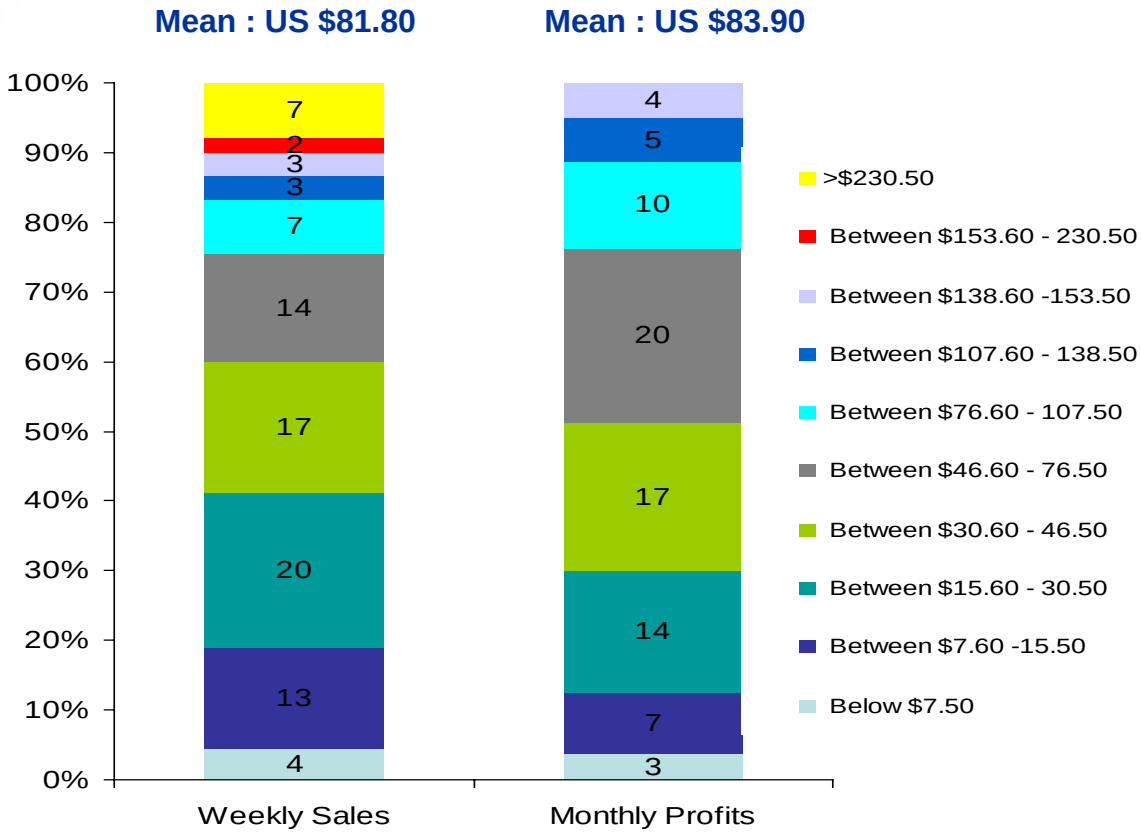


Many of the retail businesses in Kenya are small Permanent shops and Kiosks mostly selling household commodities, food stuffs, fruits and vegetables.

Base: Total Sample = 400

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?"



Small scale businesses in Kenya are struggling to survive with about 20% of them making weekly sales of between US $15.60 and US $46.50. An average business sells US $81.80 in a week, making profit of almost US$22 (83.90/4) weekly

Base: Total Sample = 400

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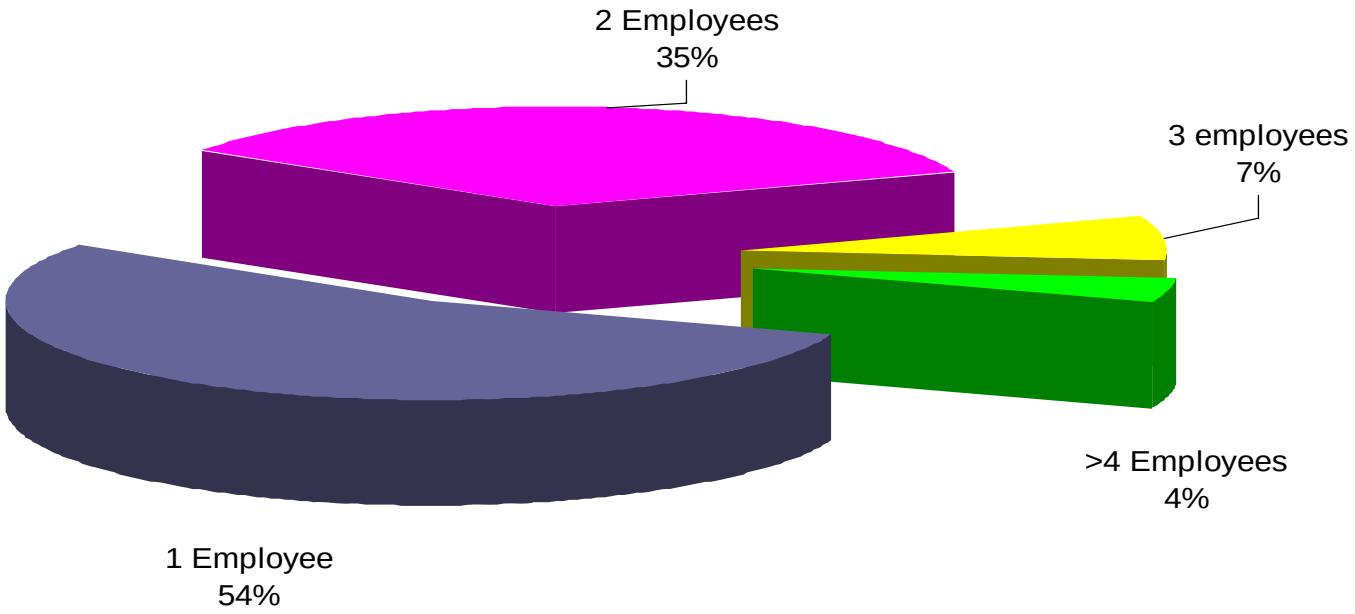
Number of Employees who Work in the Business

Q. 1 "How many people work here either on casual or permanent basis?"



54% of businesses are sole proprietorships. These are usually run by the shop owners with family members stepping in to help when the owner is away. Only about 1 in every 3 businesses has more than 1 employee.

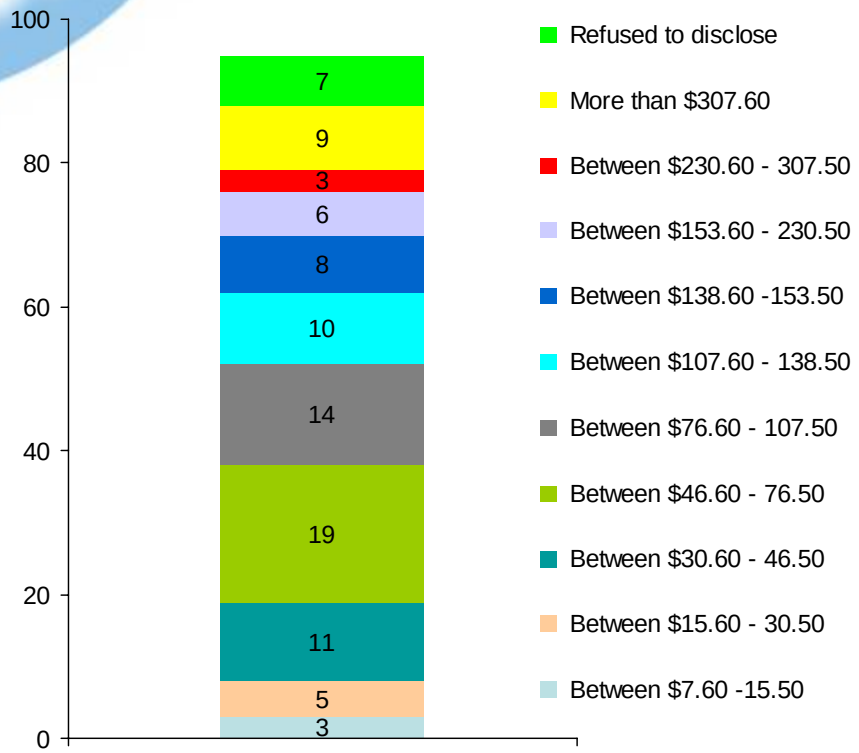
Base: Total Sample = 400

TRADER

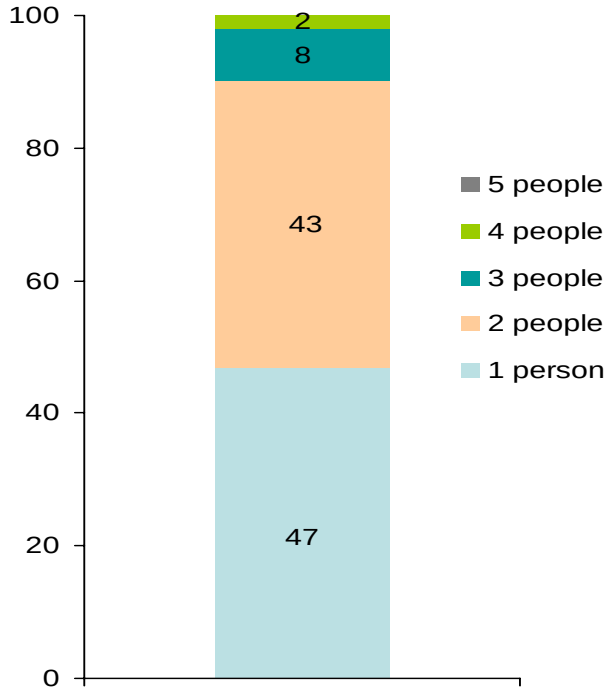
Monthly Income

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 $146.50



Mean : 2 people



These small scale business people earn a mean income of US $146.50 a month. With the business owner making a profit of on average US $ 83,90 it is clear that in many cases the spouse or another member of the family supplements the household's income

Base: Total Sample = 400

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ELECTRICITY CONSUMPTION HABITS

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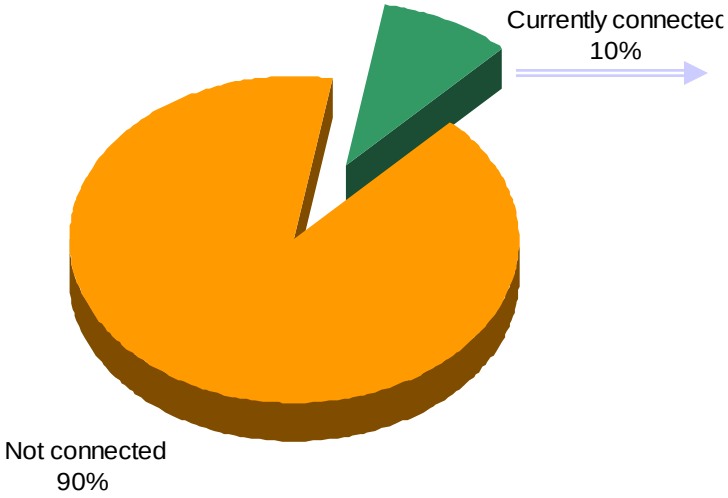
Connection to Main Power Grid

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



Q. 7 "Is the electricity currently working?"	Base = 100
Yes	96
No	4

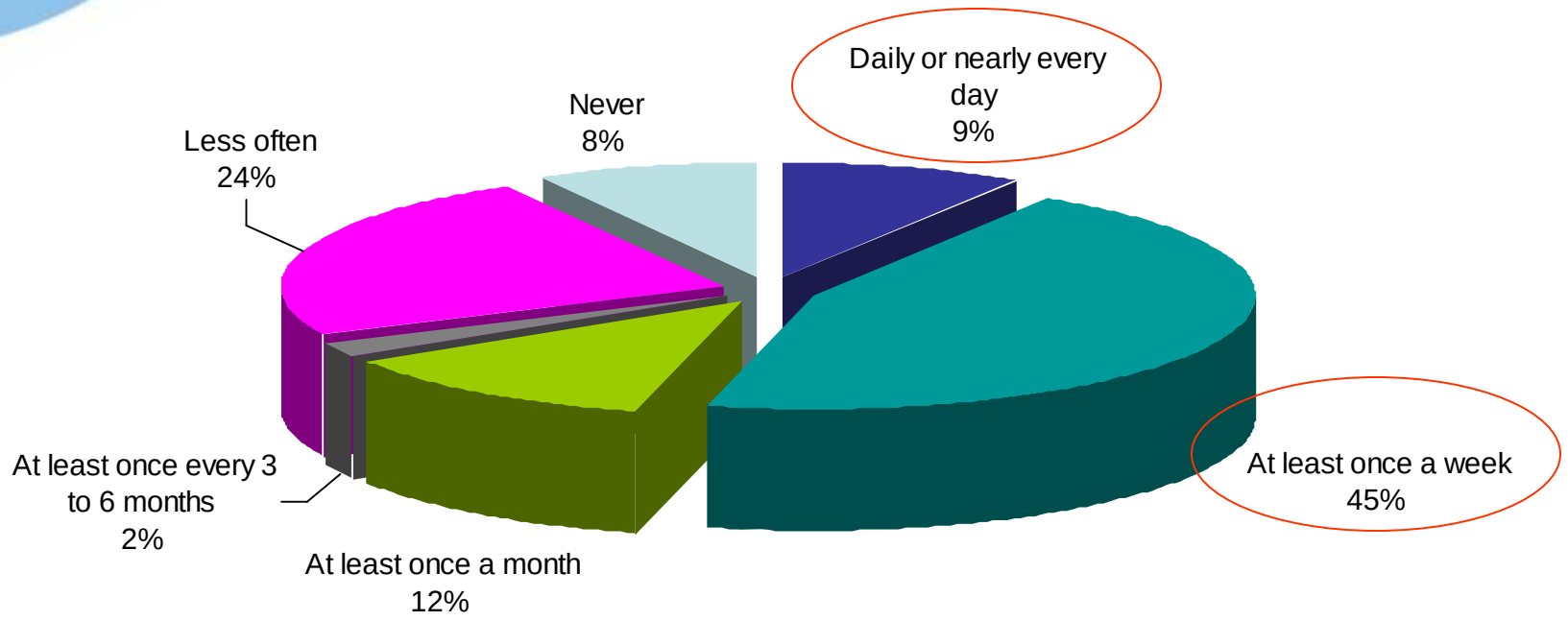
Base: Total Sample = 1000

Of the 10% connected to the main power grid (this is not the national penetration figure of electricity connectivity – this percentage was quota'd for the purposes of the research), in 96% of cases the electricity is functional

CONSUMER

Power Cut Frequency

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



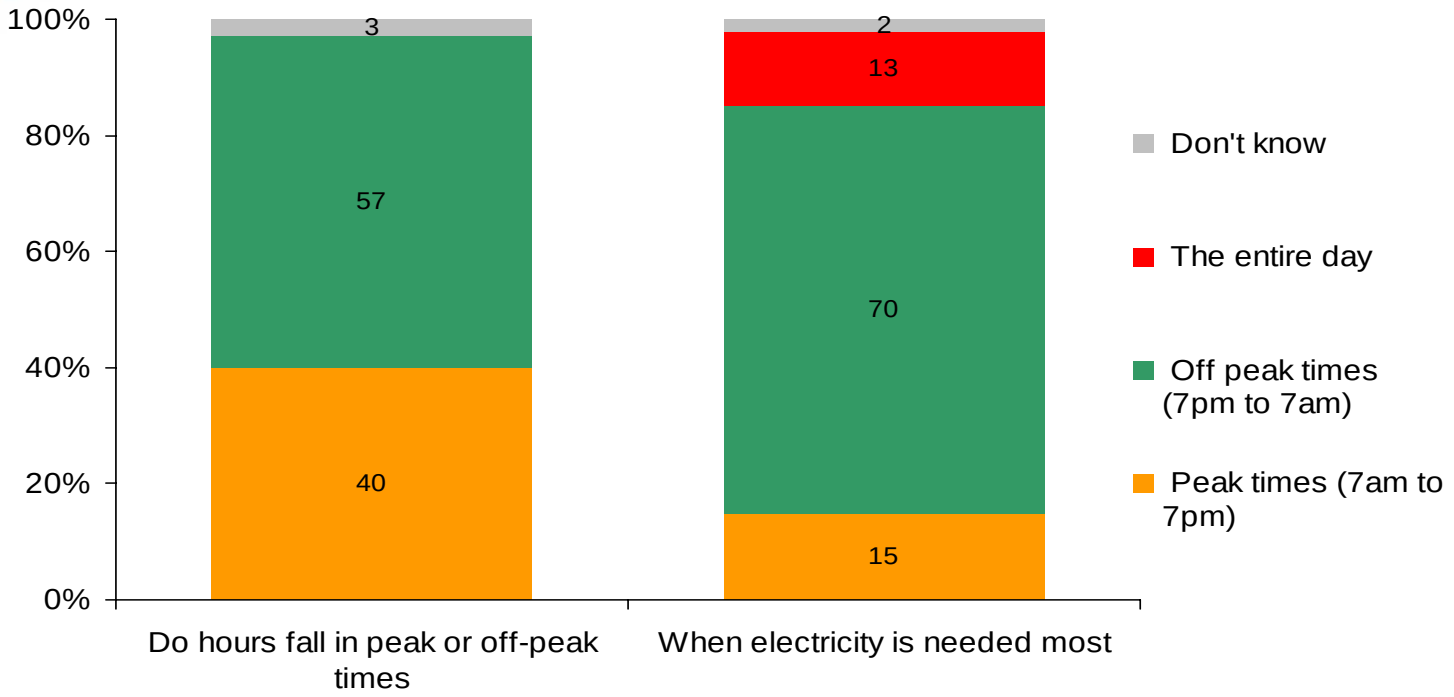
54% of those households connected to electricity experience power cuts at least once a week, thus making it necessary to have an alternative lighting source available

Base: Currently connected to main power grid and have electricity = 95

CONSUMER

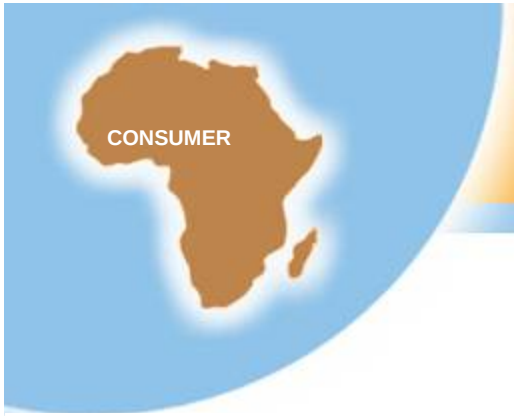
Time Power Cuts Occur

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?"



57% power cuts occur at off peak hours. During these hours electricity is needed by 70% of households as these are the hours when the household is back home from their day time activities and require light to prepare dinner and for the children to be able to do their homework.

Base: Currently connected to main power grid and have electricity = 95



Monthly Expenditure on Electricity

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

Conversion rate
1US $ = Ksh. 66

Median on total= Ksh 670($10)

min on total = Ksh 160($2.4)

Max on total= Ksh 3000($45.5)

	Total n=95	Nairobi n=8**	Eastern n=14	Western n=12	Nyanza n=18	Central n=17	Rift valley n=20
Below US $3(Kshs 200)	14	13	8	-	12	19	26
US $4 – 8 (Ksh 250- 500)	44	39	24	27	53	63	43
US $9 – 12 (Ksh 600-800)	8	-	8	18	12	-	10
US $15– 23 (Ksh 1000 1500)	12	-	24	36	12	-	11
US $35 – 46 (Ksh 2300 - 3000)	5	13	8	-	-	-	**5**
Mean	US $10 Ksh. 647.4	US $11 Ksh. 740	US $14 Ksh. 924.4	US $12 Ksh. 785.6	US $7 Ksh. 460	US $5 Ksh. 319.2	US $9 Ksh. 605.6

On average US $ 5 to 10 is paid for electricity on a monthly basis. Those consumers who are connected to the grid generally fall between LSM 6 – 10 and therefore have a higher level of disposable income which allows them to supplement their electricity lighting with other devices is necessary

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KENYA

****Caution – Coast and Eastern not charted due to small base sizes**

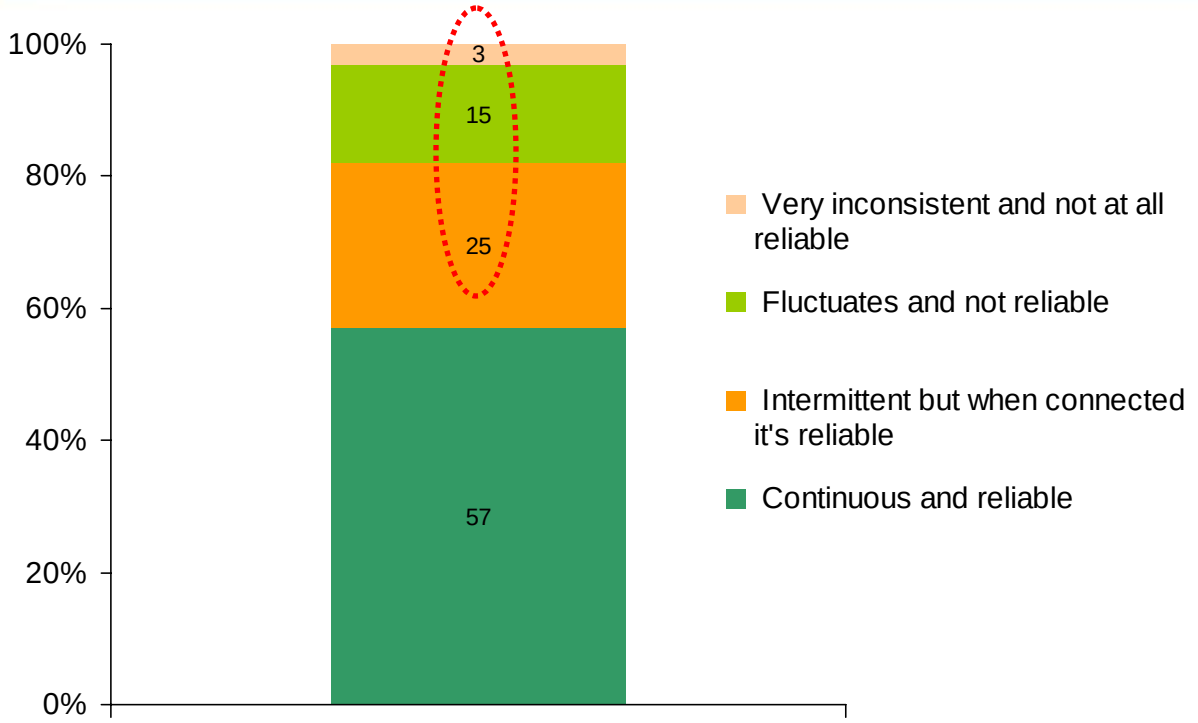
CONSUMER

Quality of Electricity

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

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

***Q. 14b Not analysed due to small base sizes**



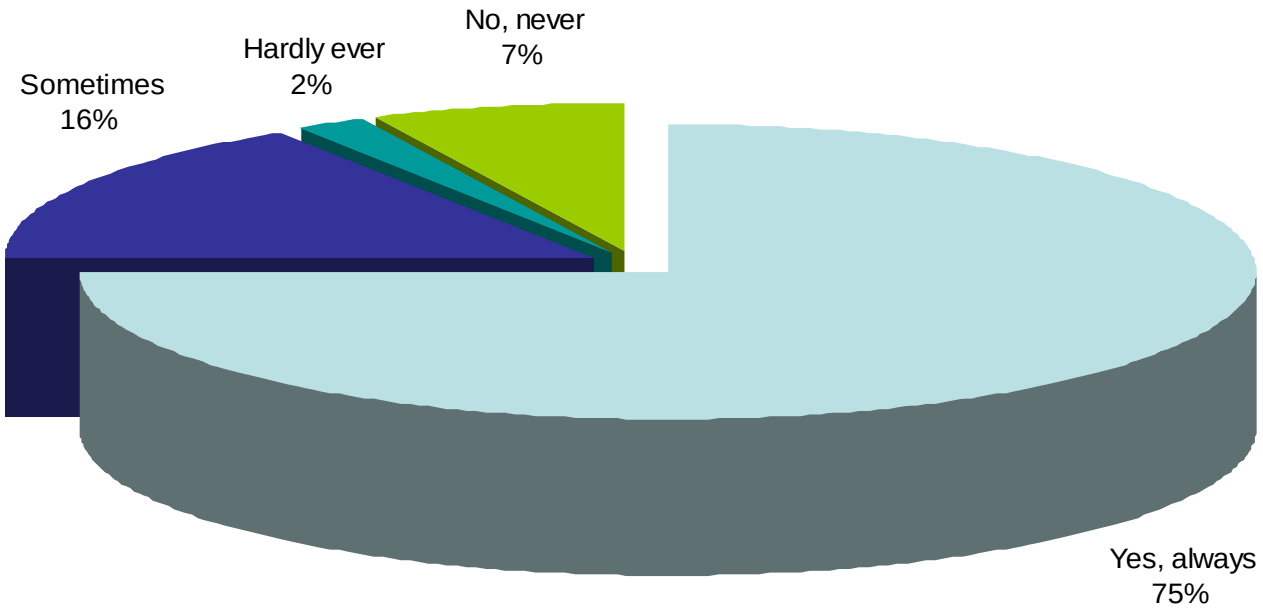
Households connected to electricity receive bills monthly and on average Kenyans pay US $10 per month for the bills. 57% of households state their electricity is continuous and reliable, while 43% of consumers are not satisfied with the quality of their electricity. This creates a need for alternative lighting devices to be used when electricity is not satisfactory

Base: Currently connected to main power grid and have electricity = 95

CONSUMER

Voltage Sufficiency for Household Appliances

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



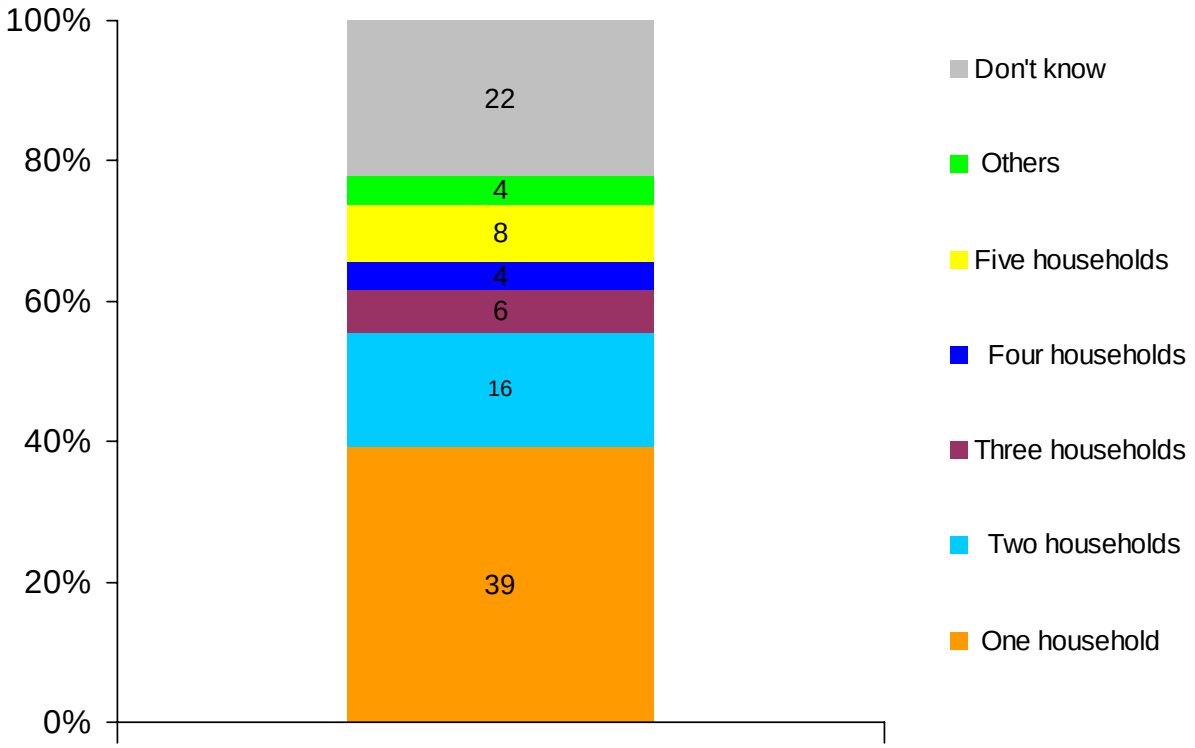
Base: All currently connected to main power grid

CONSUMER

No. of Households Sharing Electricity

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

Mean = 3 households



On average 3 households share from the same power source, however majority of respondents, 39%, do not share. 22% of households do not know whether they share their electricity source or not indicating low levels of knowledge about how the grid operates and how electricity is received in the household.

Base: Currently connected to main power grid and have electricity = 95

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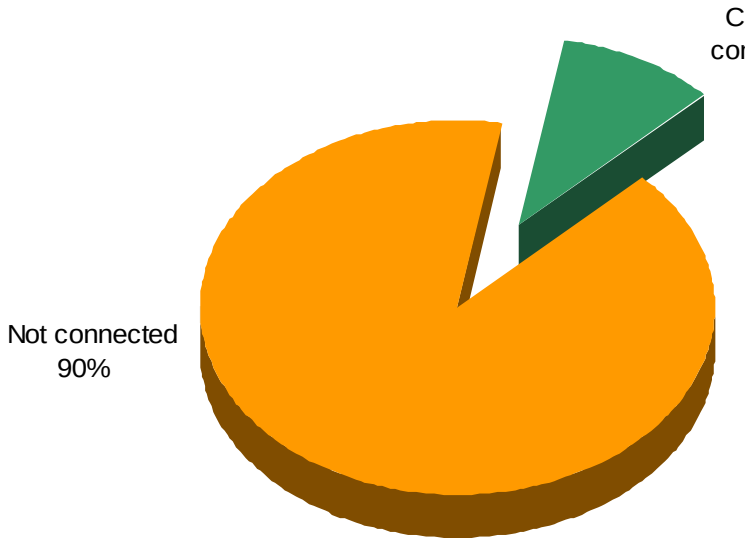
Connection to Main Power Grid

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



Base = 400: Total Sample

Q. 7 "Is the electricity currently working?"	Base = All Currently connected to main power grid = 41
Yes	100%

The same quota's were used to sample traders which were connected to the grid: 10% of the total trader sample. Of those traders connected all of them has electricity which worked at the time of the interview

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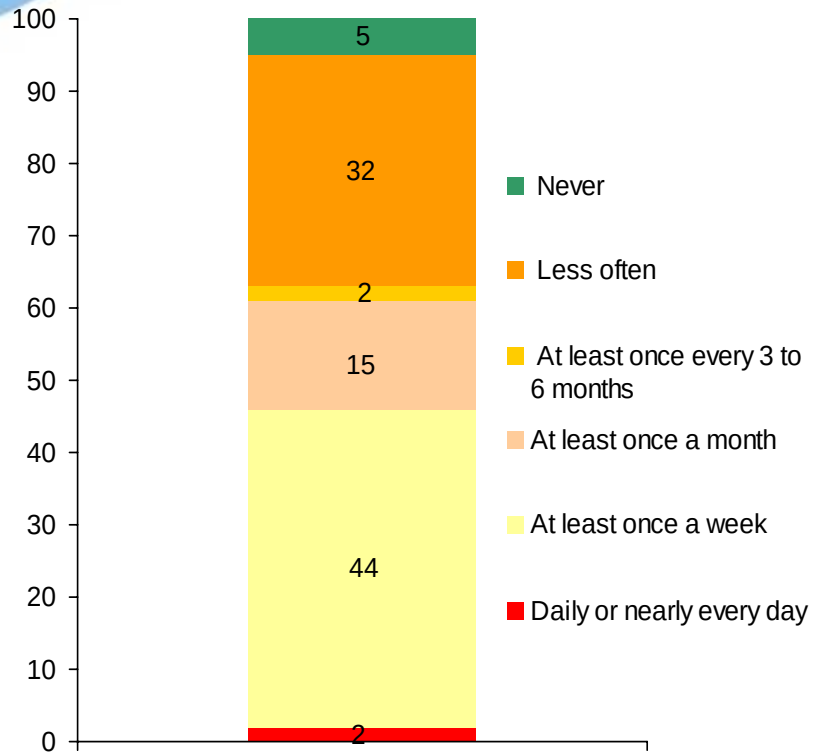
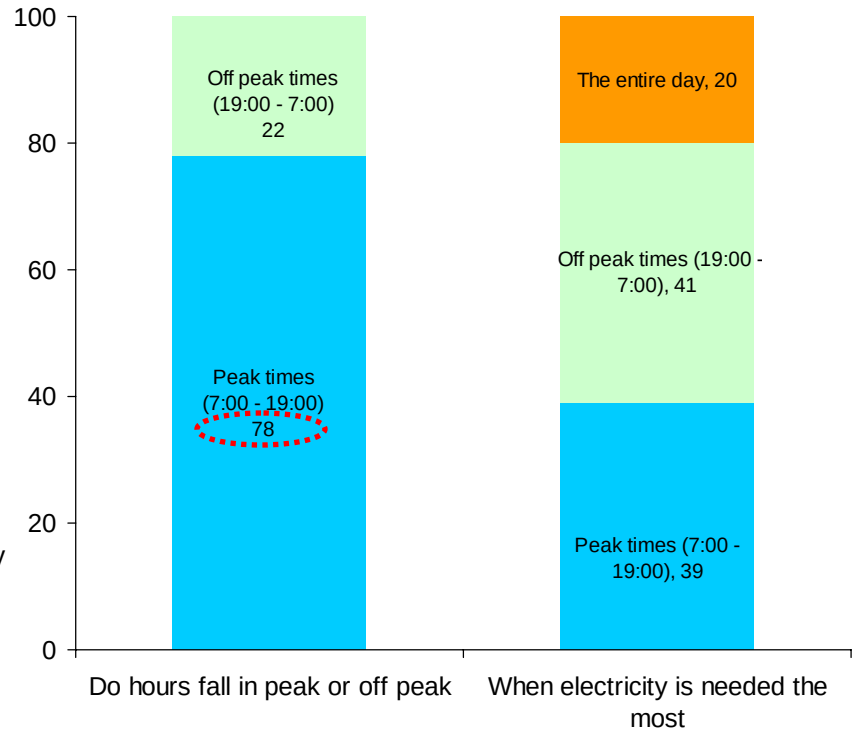
Power Cut Frequency

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



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



Electricity is not a stable source of power for traders. 78% of power cuts occur during peak hours (07.00-19.00), a time when 4 in every 10 traders need electricity

Base: Currently connected to main power grid = 41

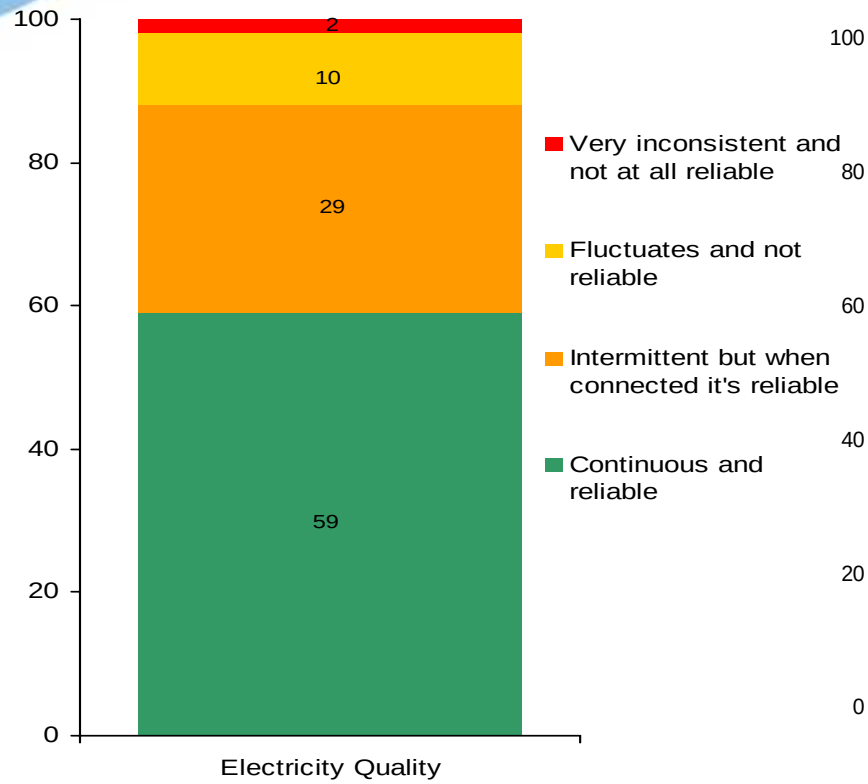
***Q. 10 could not be analysed due to small base sizes**

TRADER

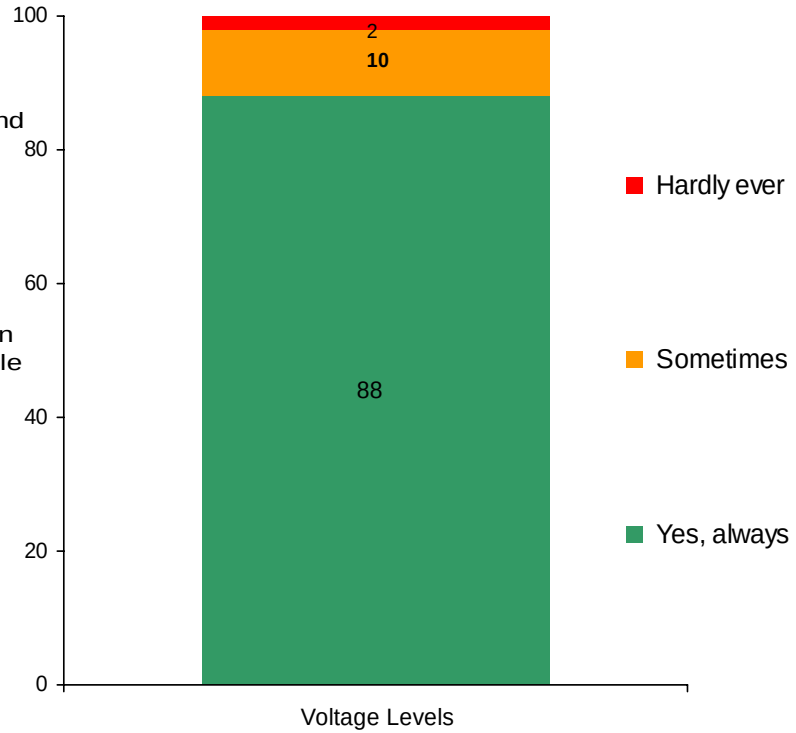
Quality of Electricity

Q14a not charted

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



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



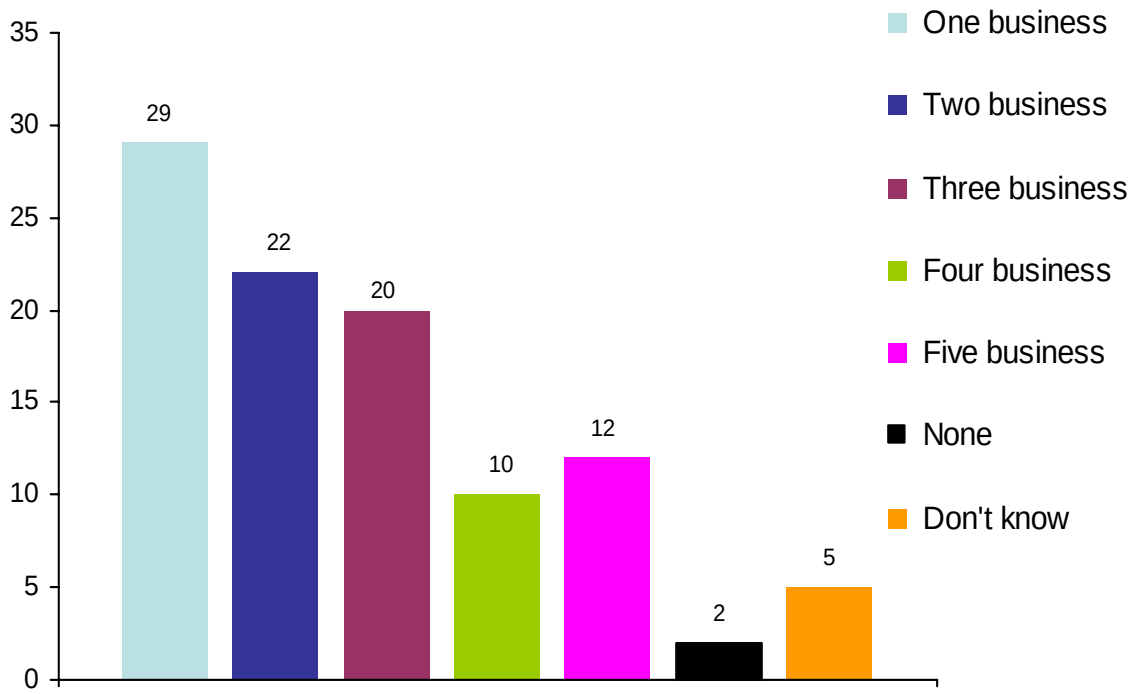
Majority of traders receive their electricity bills on a monthly basis. Unlike consumers, many businesses say that when the electricity is working it is continuous and reliable and even the voltage is to expectation.

Base (41) = All currently connected

TRADER

Sharing Electricity from Same Source

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



About 9% of businesses were connected to the main power grid, of these 2-3 businesses share from the same power source. However, 29% do not share and 5% of the businesses do not know how many there are on the source – thus the level of knowledge about where the electricity comes from is much greater amongst traders than amongst households.

Base: All currently connected to main power grid = 41

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POWER & LIGHTING HABITS AND USAGE

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CONSUMERS

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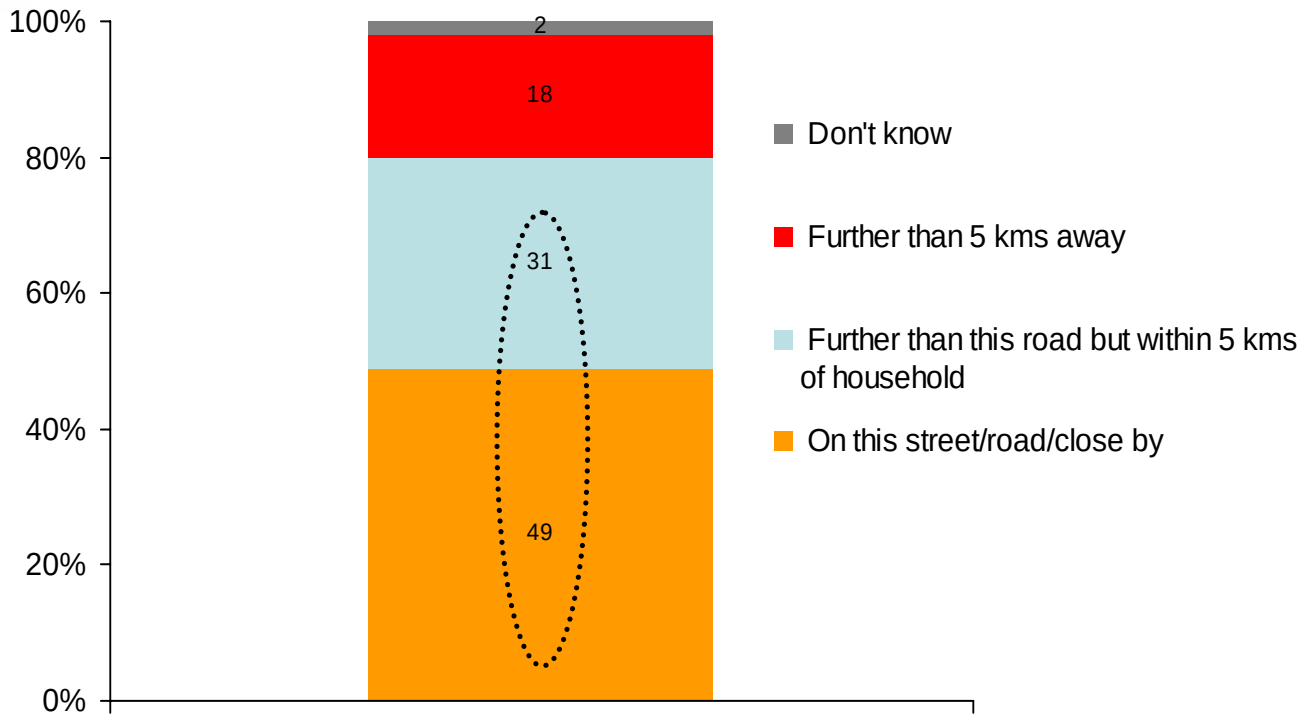
CONSUMER

Proximity to Power Line

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



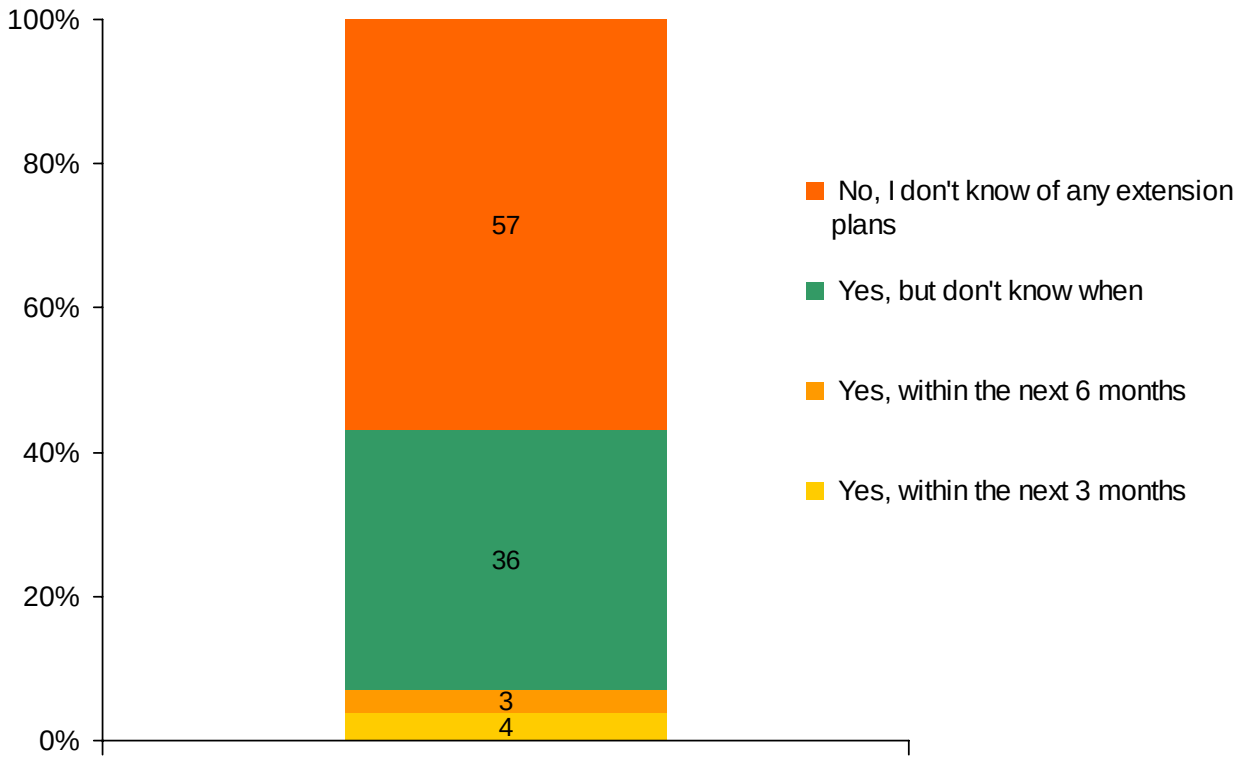
Proximity to the power line is not the main inhibiting factor for those respondents who are not connected to the power grid – it is more likely to be a cost issue.

Base = 905: All not connected to power grid

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?



57% of consumers do not know of any extension plans, those who know that there is an extension plan are not clear on when the extension is to take place.

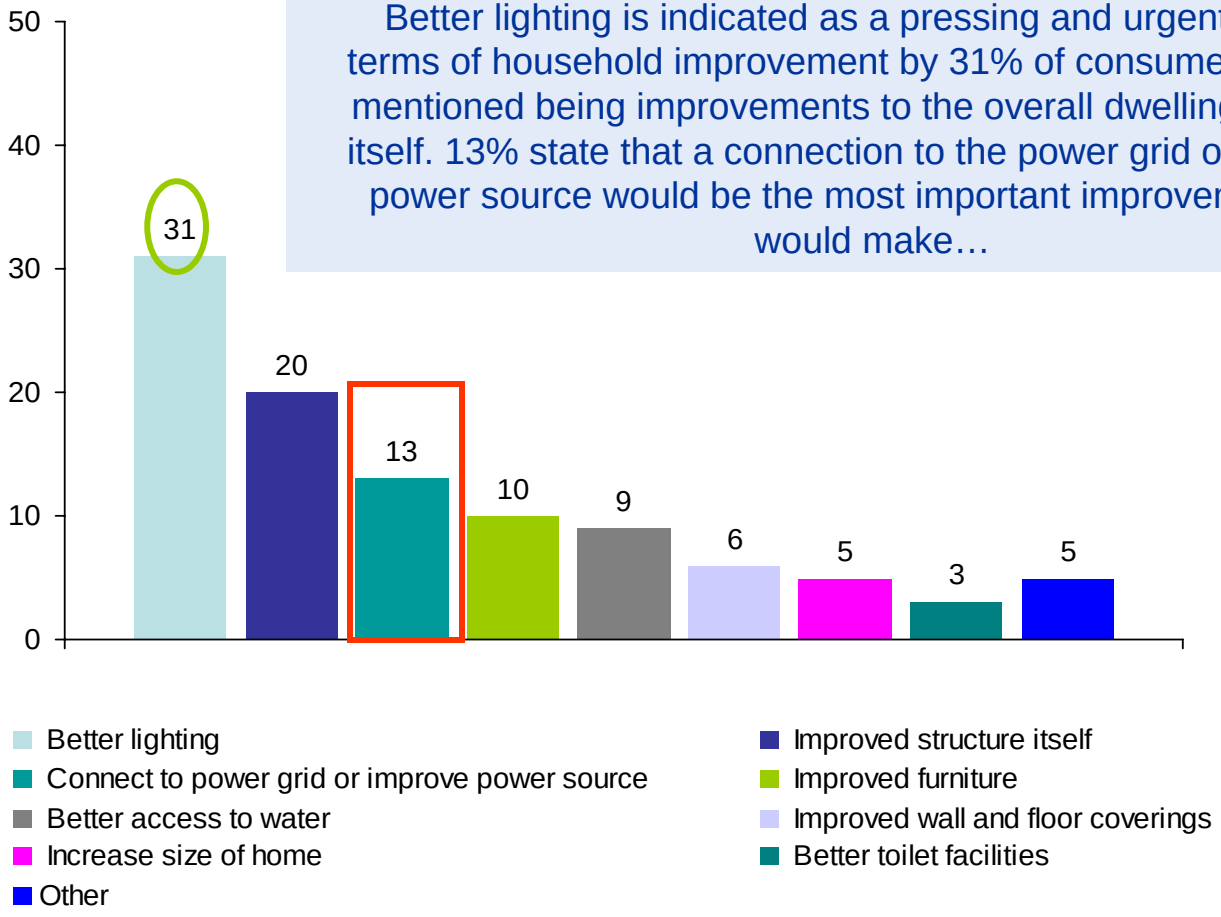
Base: All those close to the main power line= 444

CONSUMER

Improvements to the Household

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

Better lighting is indicated as a pressing and urgent need in terms of household improvement by 31% of consumers, second mentioned being improvements to the overall dwelling structure itself. 13% state that a connection to the power grid or improved power source would be the most important improvement they would make…

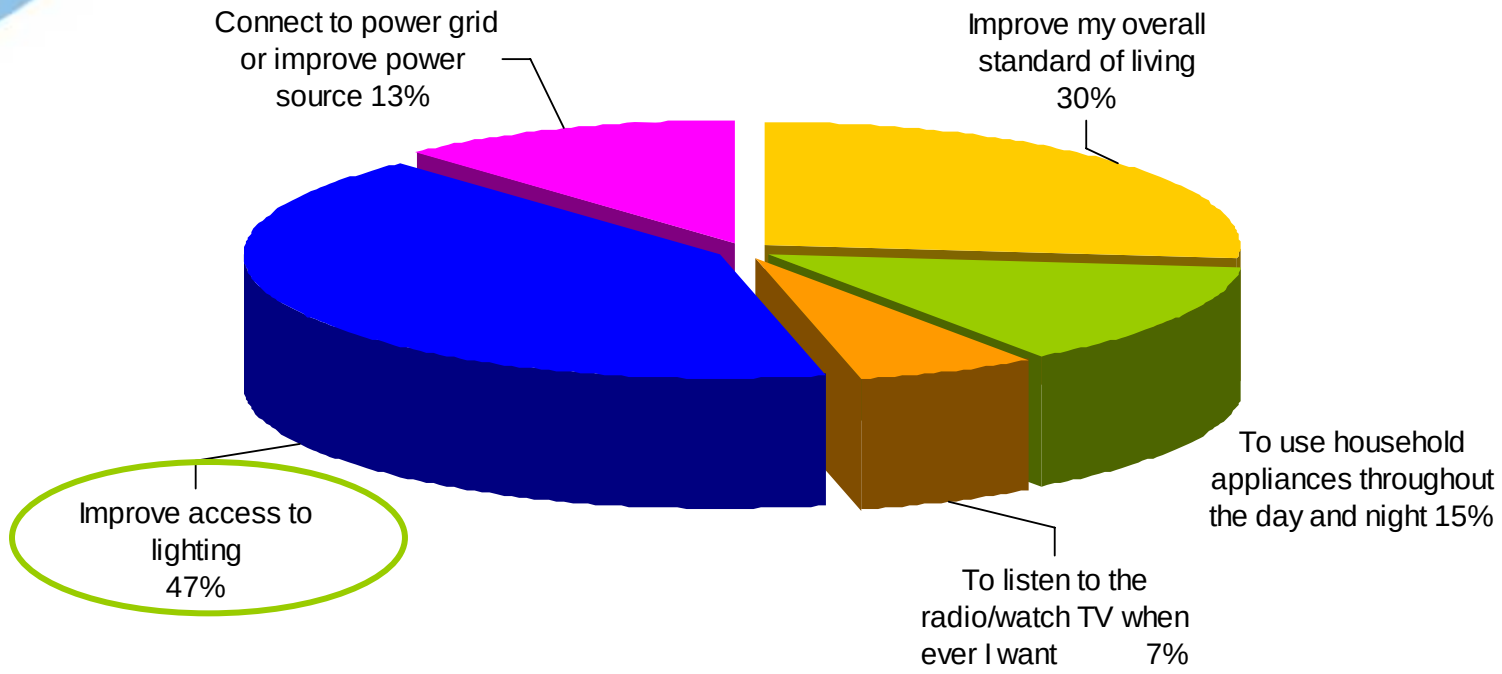


Base: Total Sample = 1000

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?"



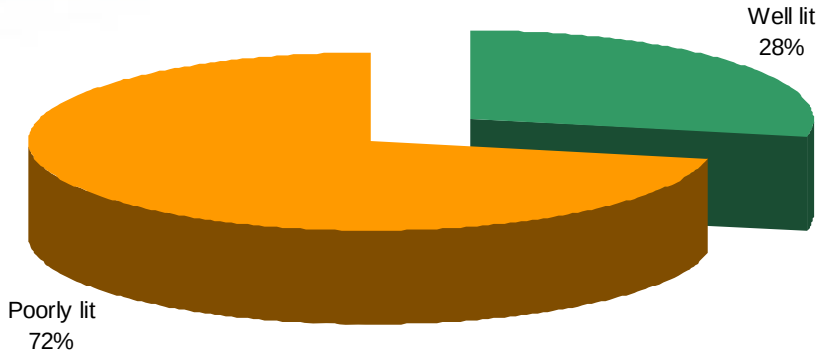
When we look specifically at the 128 people who state they want a better power source, 47% state the main reason would be to improve access to lighting. Thus here very clearly being outlined how important lighting is to consumers everyday well being

Base: All who would improve power source = 128

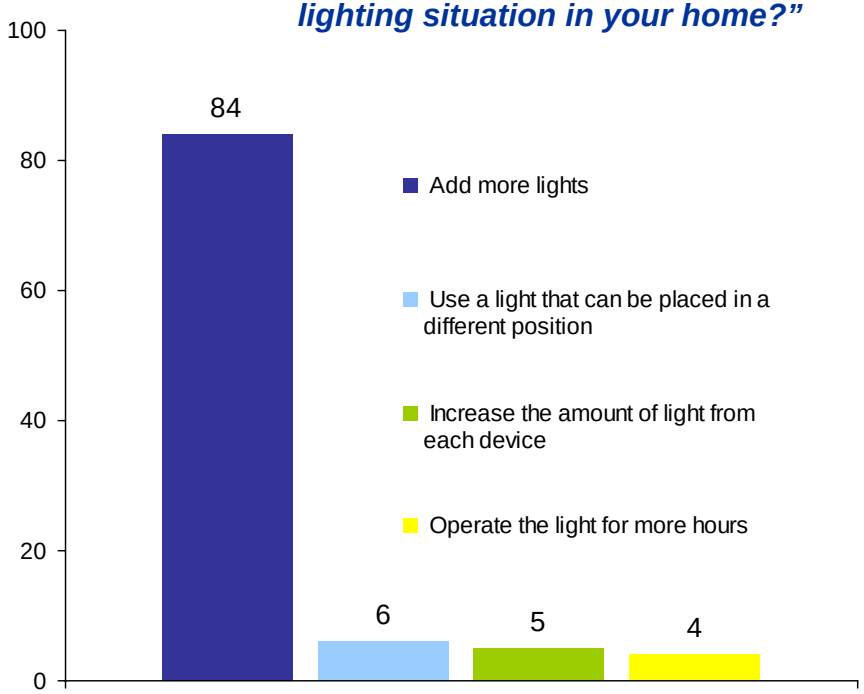
In-home Lighting

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?"



Overall consumer state that their home is poorly lit and the main solution to this problem is adding more lights overall.

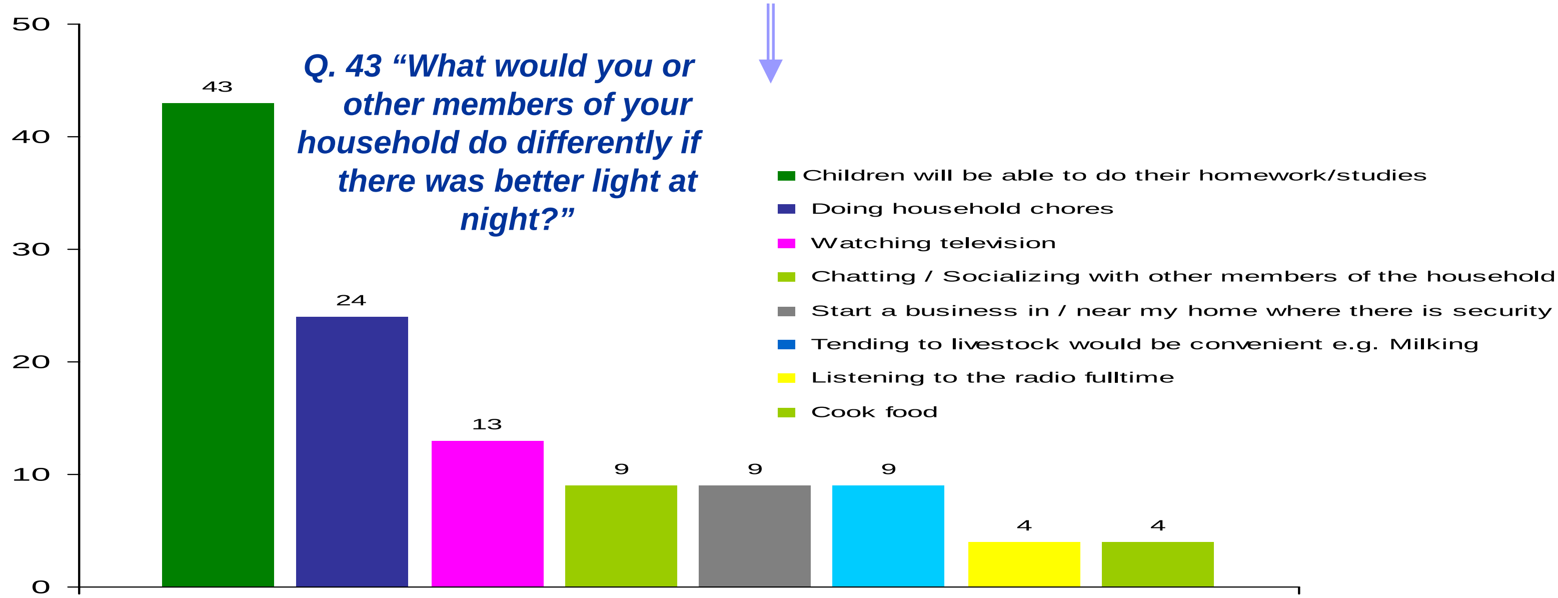
Base: Households whose light can be improved n = 807

Aspirations if there was Better Lighting

CONSUMER

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	59
No	41

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 improved personal development would be the first thing to improve, specifically children being able to do their homework.

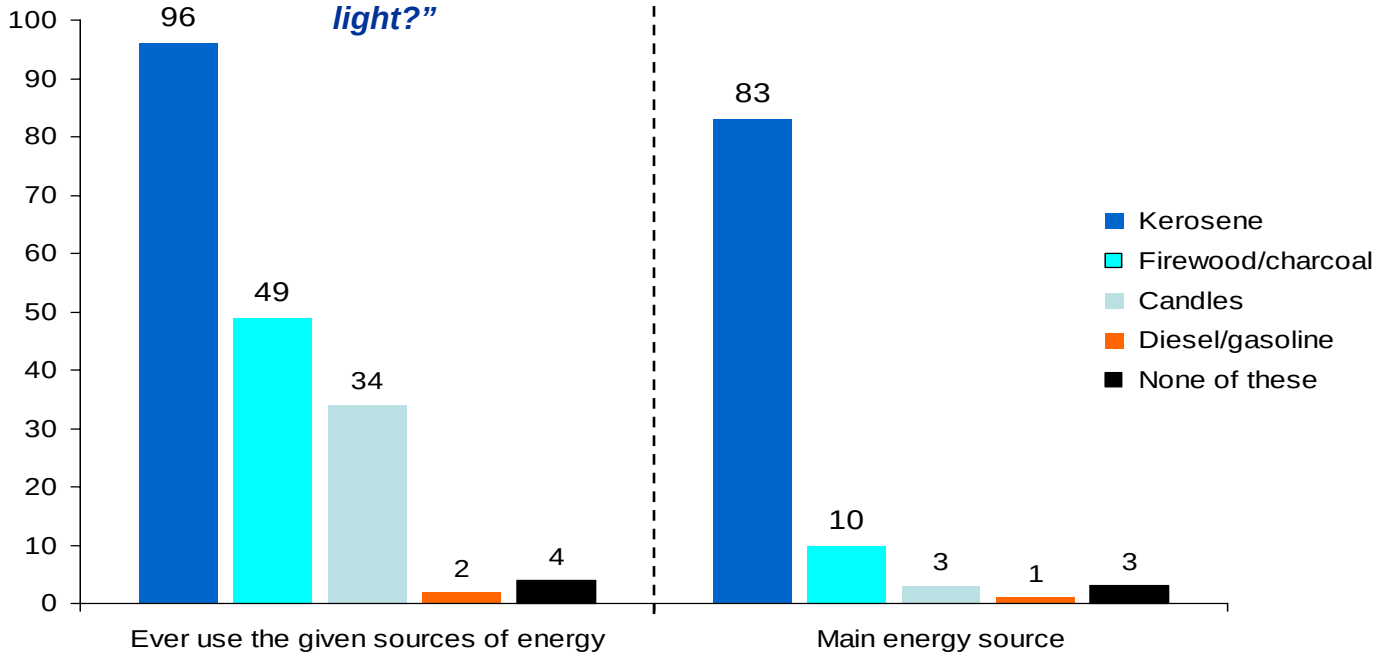
Base: All those who could do things differently = 587

CONSUMER

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 power sources of energy would you say you use as your main energy source?"



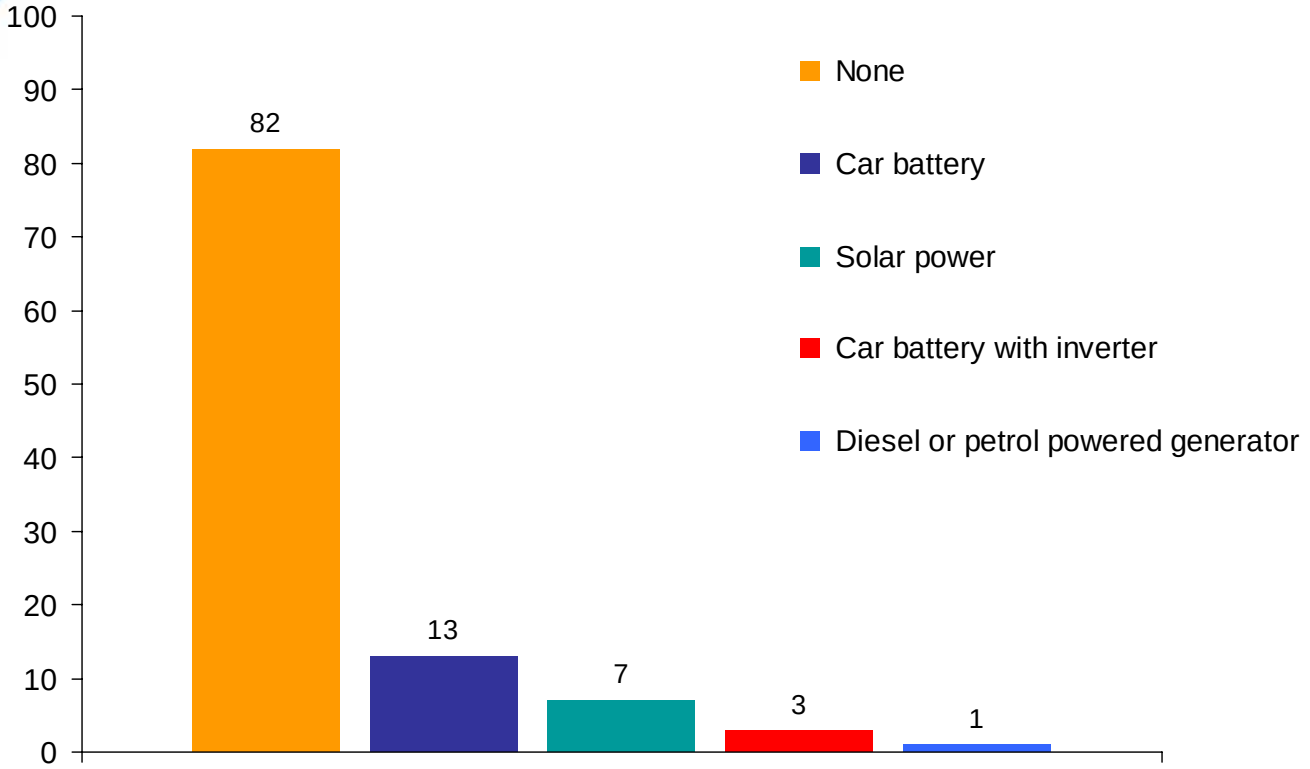
Kerosene is the main energy source used to provide light and power appliances in many households. Firewood and charcoal are another source of energy in many Kenyan households. These sources are popular due to their cost and because of their multi-functionality, i.e. they create light and one can cook with then at the same time

Base: Consumers total households = 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?"*



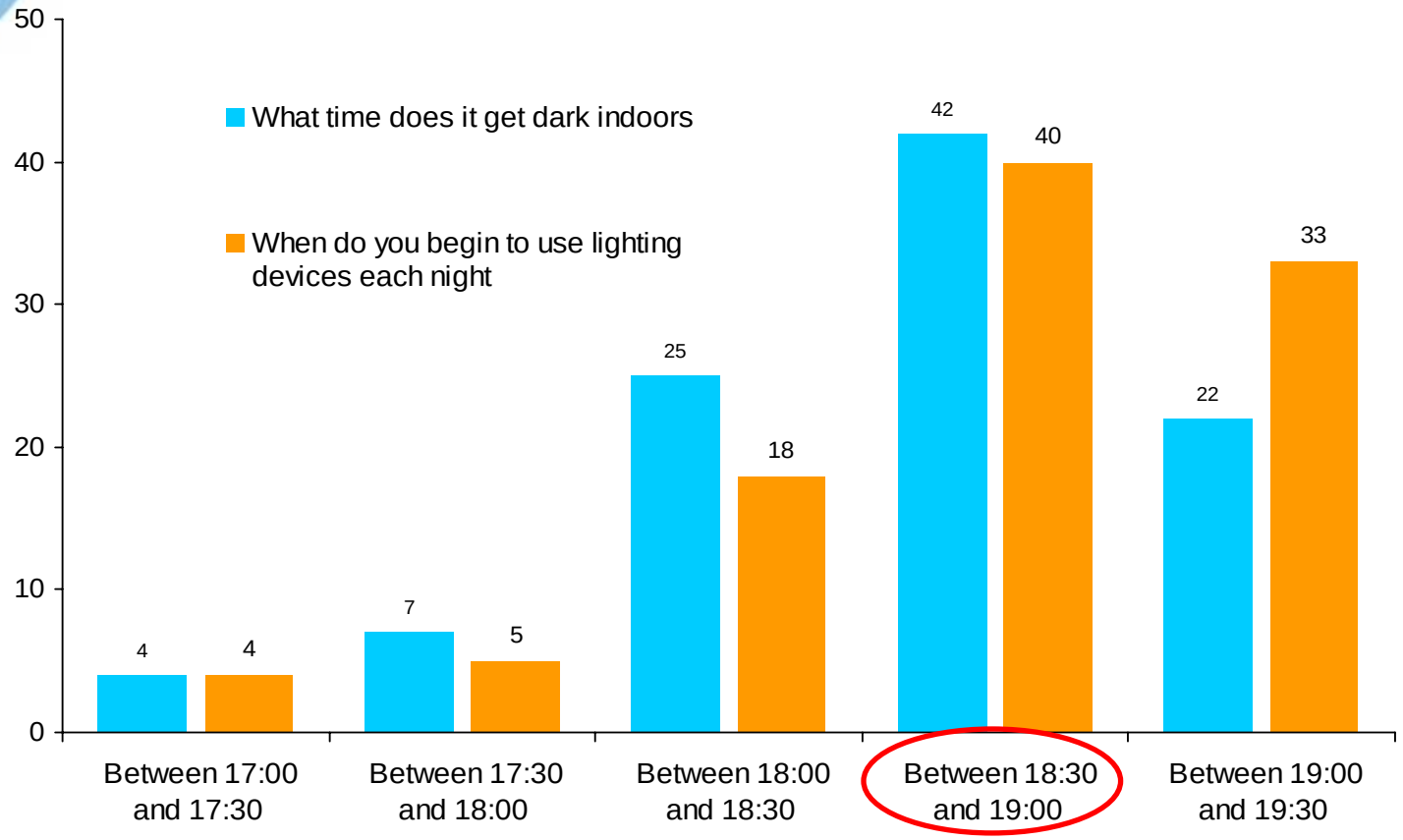
Besides kerosene the majority of households do not have an alternative source of power – small numbers of consumer improvise with power sources such as car batteries and small solar panels.

Base: Consumers total households

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?"



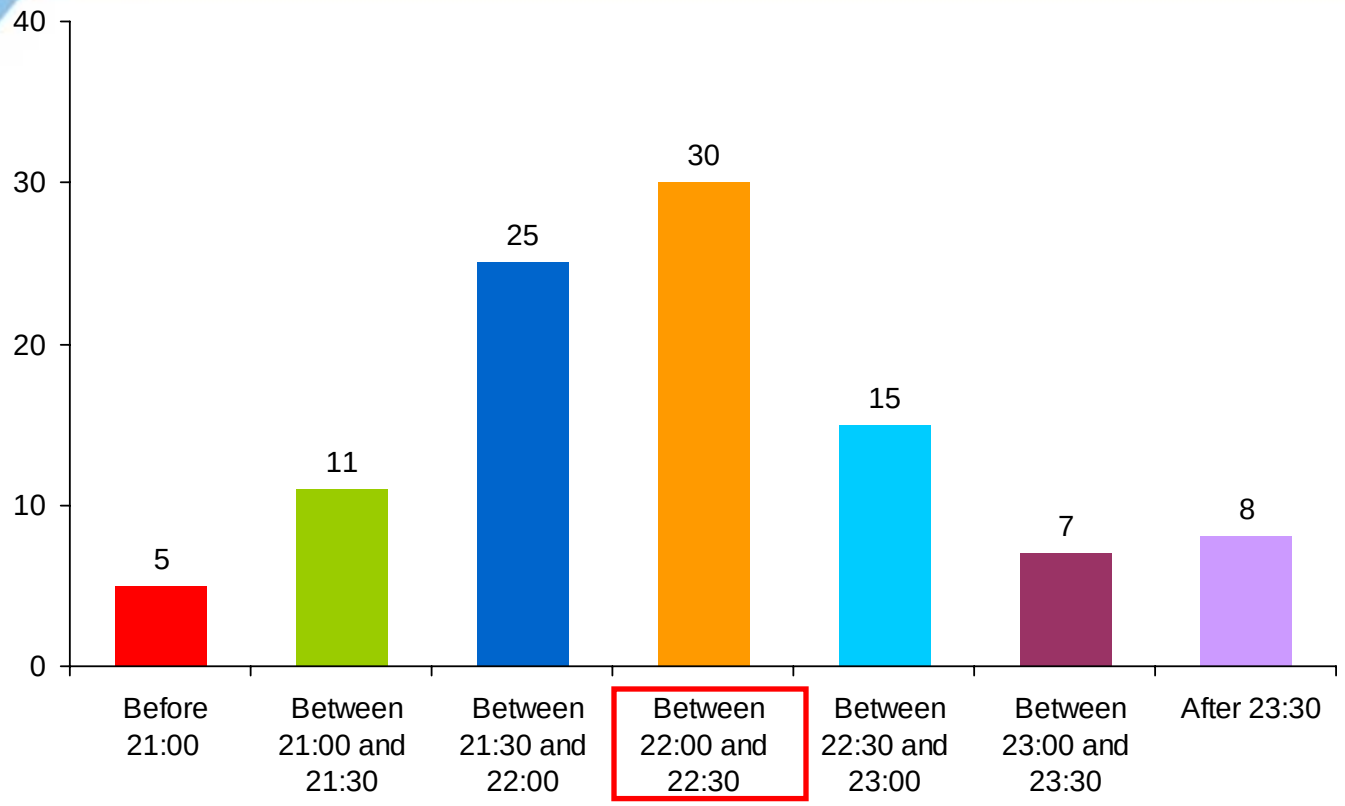
Many households start experiencing darkness inside quite early, but do not necessarily start using lights when darkness sets in. The most likely reason for this is to save on costs by reducing the number of hours that lights are in use – the majority switching on the lights between 18:30 and 19:00 hours.

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 lights are turned off in the night between the hours of 2200 and 2230. Thus we can roughly state that with if on average the lights are used between 18:30 and 22:30 in the evening – lighting devise use at night is approximately 4 hours. However, this calculation does not take into account that many consumers also use lighting devices early in the morning for 1 or 2 hours, meaning that overall a modern lighting device must be able to hold a charge for 6 hours per day minimum.

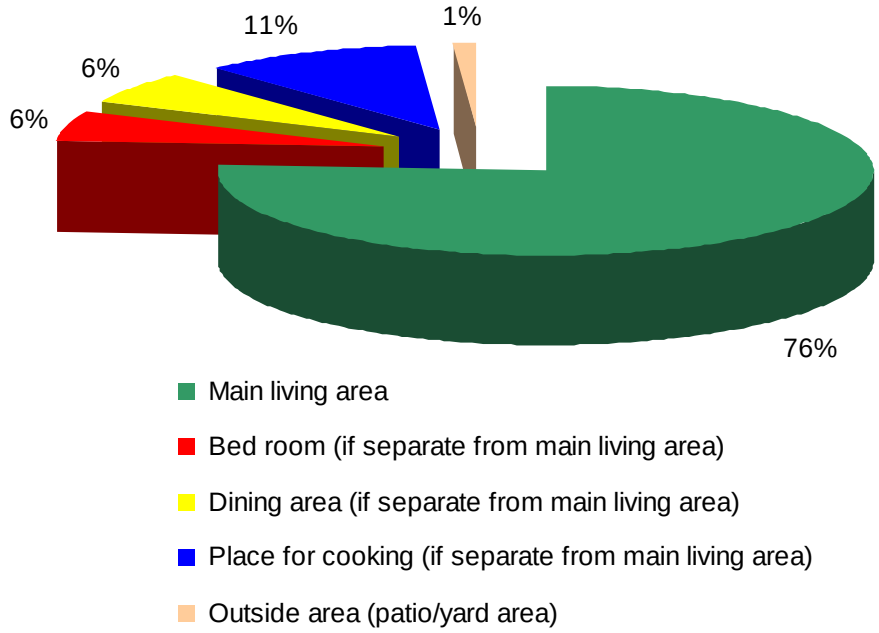
Base: Total sample = 1000

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	22	29
2 rooms	32	35
3 rooms	25	21
4 rooms	12	9
>5 rooms	9	5
Mean	**2.7**	**2.4**

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



Many Kenyan households averagely light 2 to 3 rooms after dark. More than one lighting device is therefore required. The longest used room is the main living area as this is where most household activities are carried out and is also the longest lit room/area. As many household members congregated together in the main room it is of prime importance that the lighting devise allows for enough light to be used by a number of people conducting different tasks.

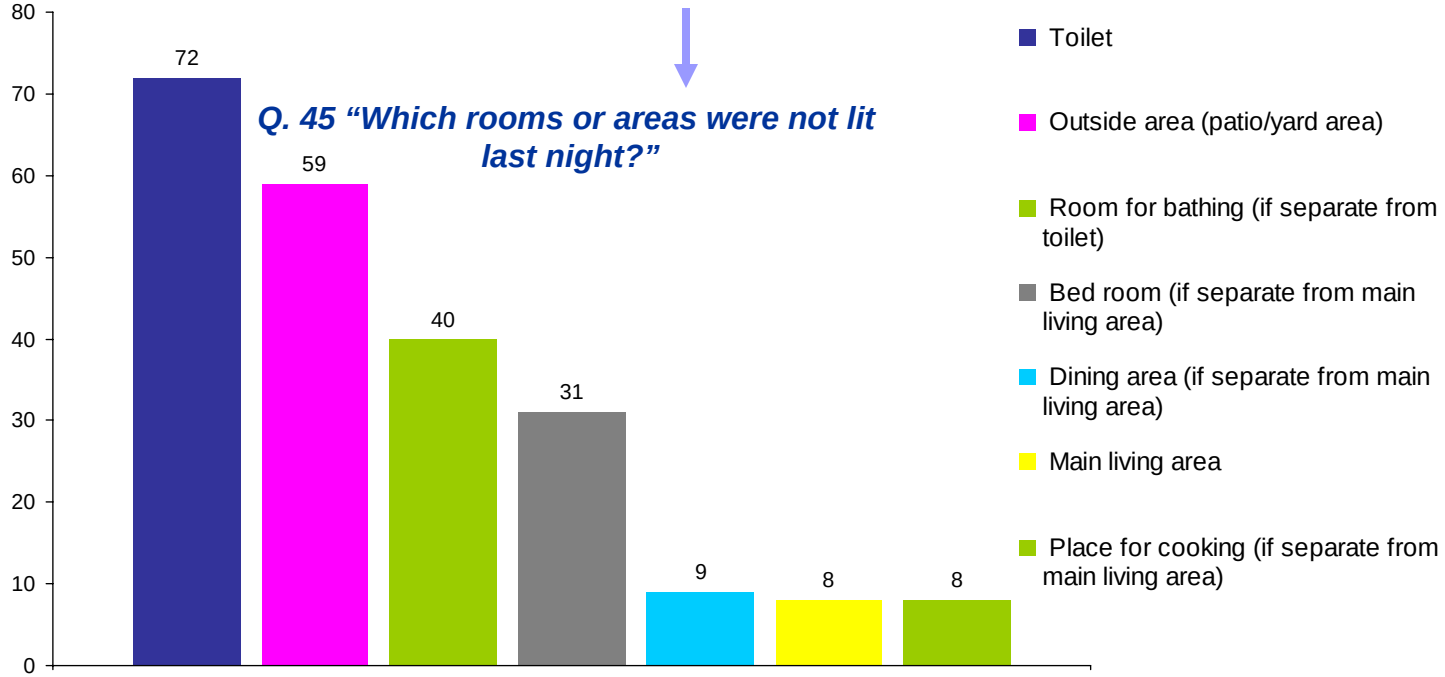
Base: Total sample =1000

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	33
No	67

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



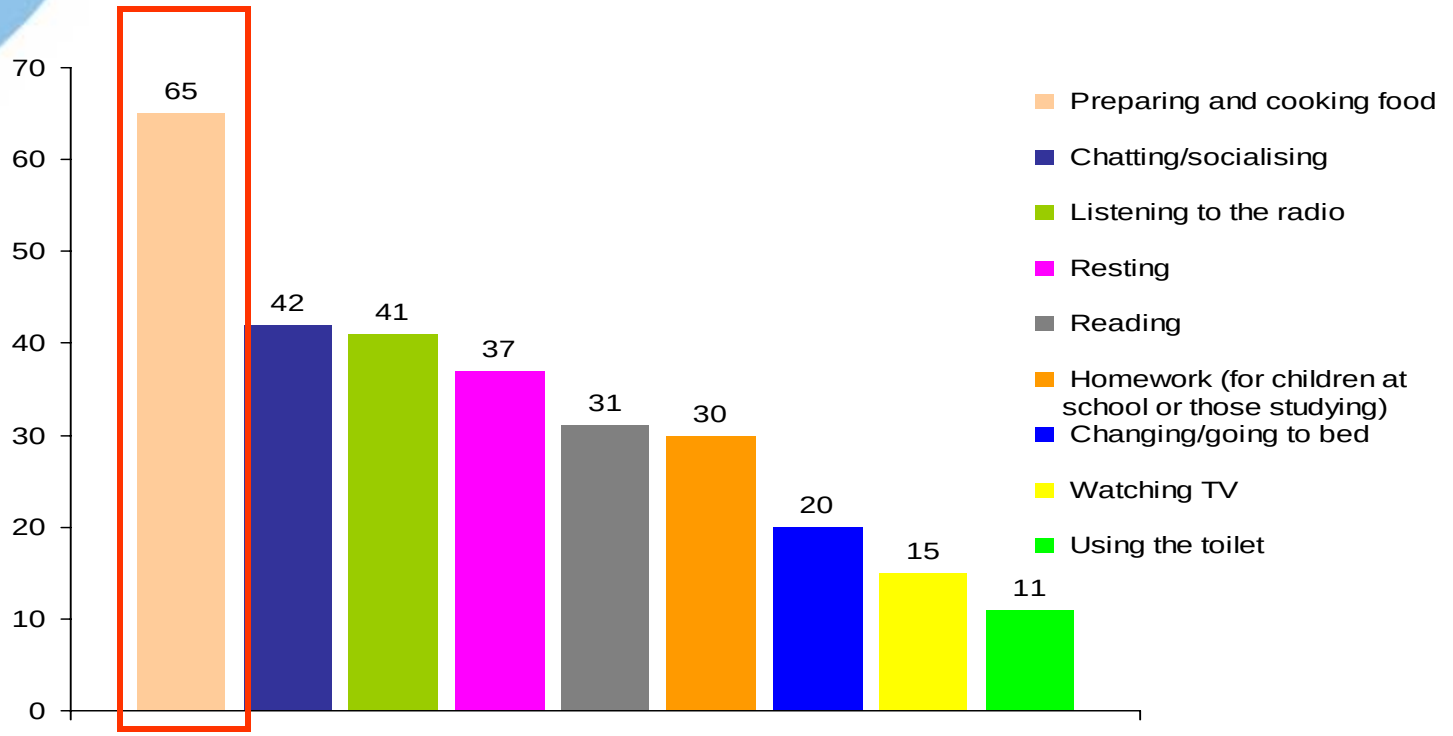
Rooms with the least use such as the toilet, outside areas and bathrooms, are least lit – the most likely type of lighting devise to be used here is a backup such as a torch.

Base: All those with homes not lit in all areas =675

CONSUMER

Night Time Activities

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



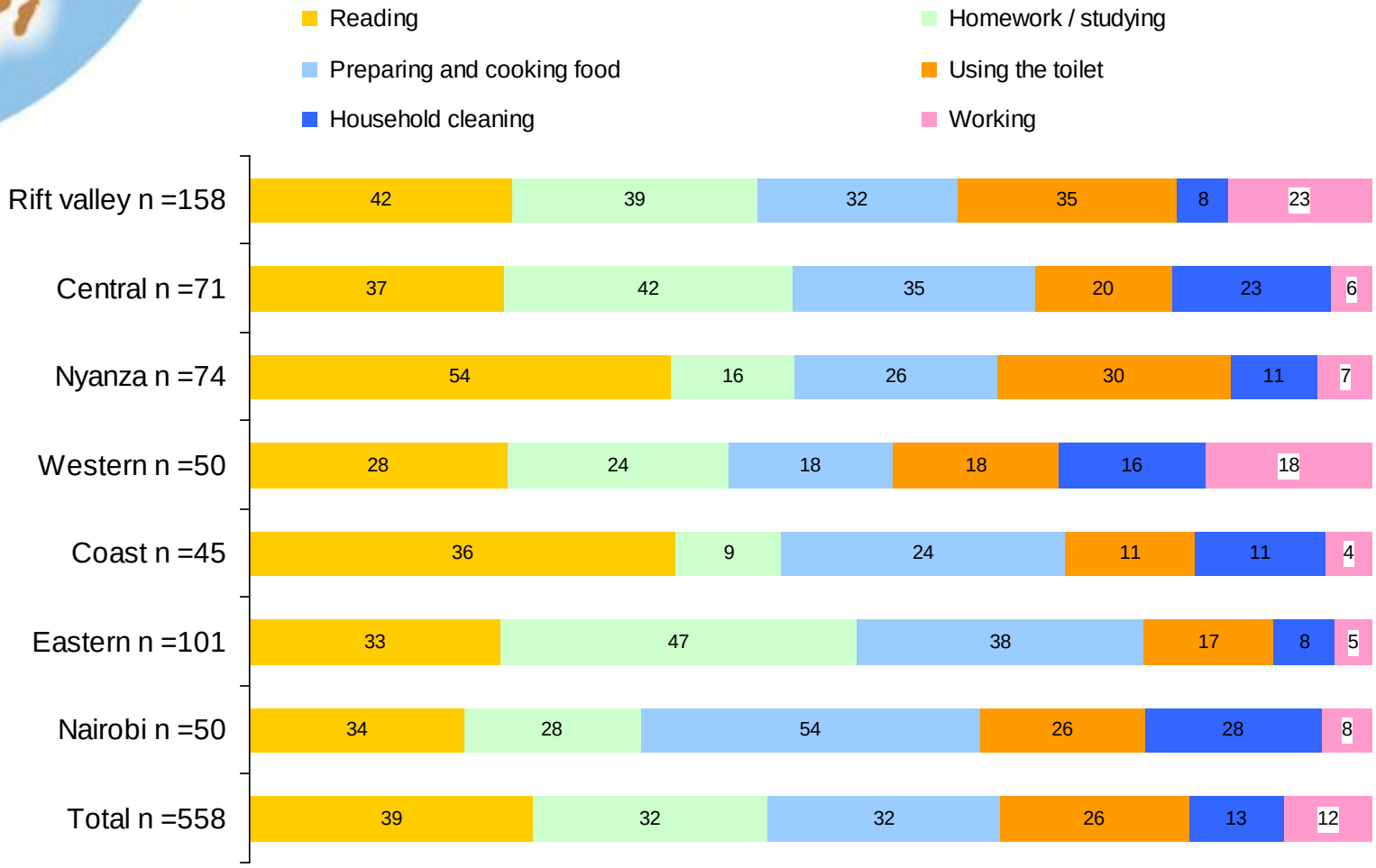
Preparing and cooking food is the most common activity done after dark in 65% of Kenyan households. Entertainment such as chatting, socialising and listening to radio are other activities that many households indulge in after dark. 56% of respondents said the current light in the households was not enough to perform all the activities comfortably

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?"



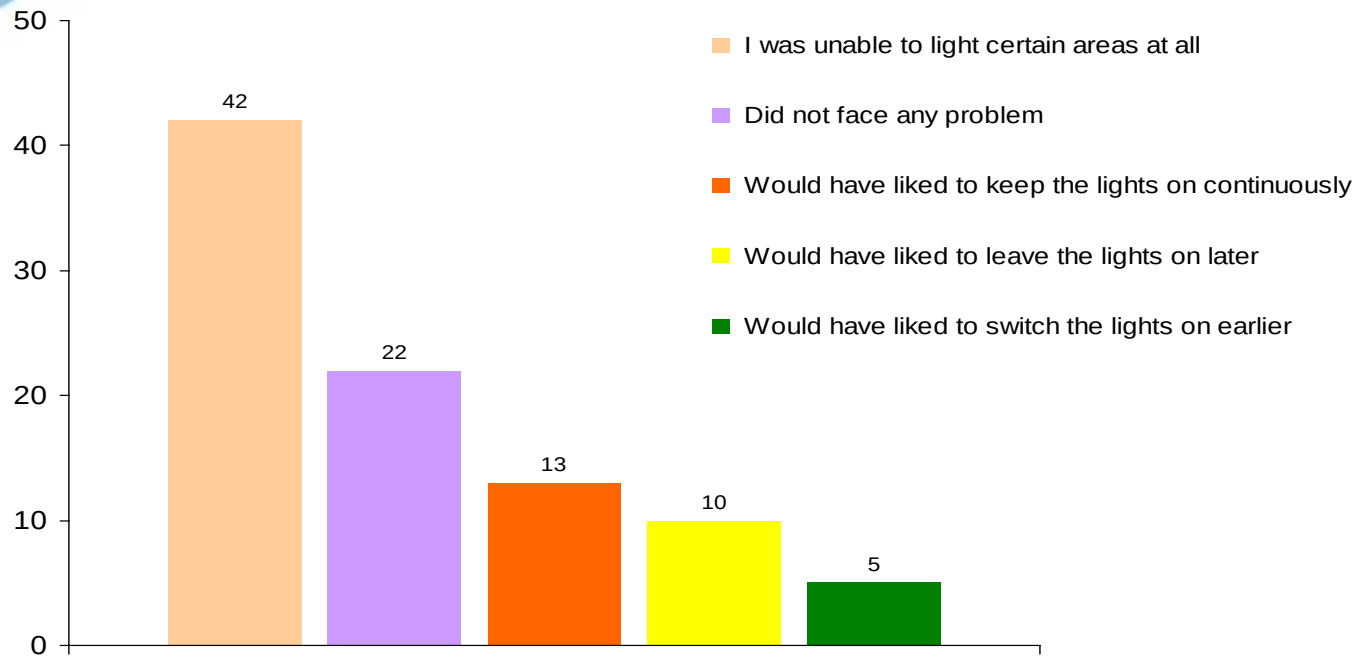
**** N. Eastern not charted due to small base size***

Personal development activities such as reading Children doing their homework, studying and cooking are the activities which suffer the most due to lack of lighting.

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 households were not able to light certain areas of the households, i.e. areas such as the wash room or toilet will not be lit. Lighting currently in use, is not sufficient for the household lighting needs, indicating there is a serious need for better and more affordable lighting products in the Kenyan market

Base: Total Sample is 1000

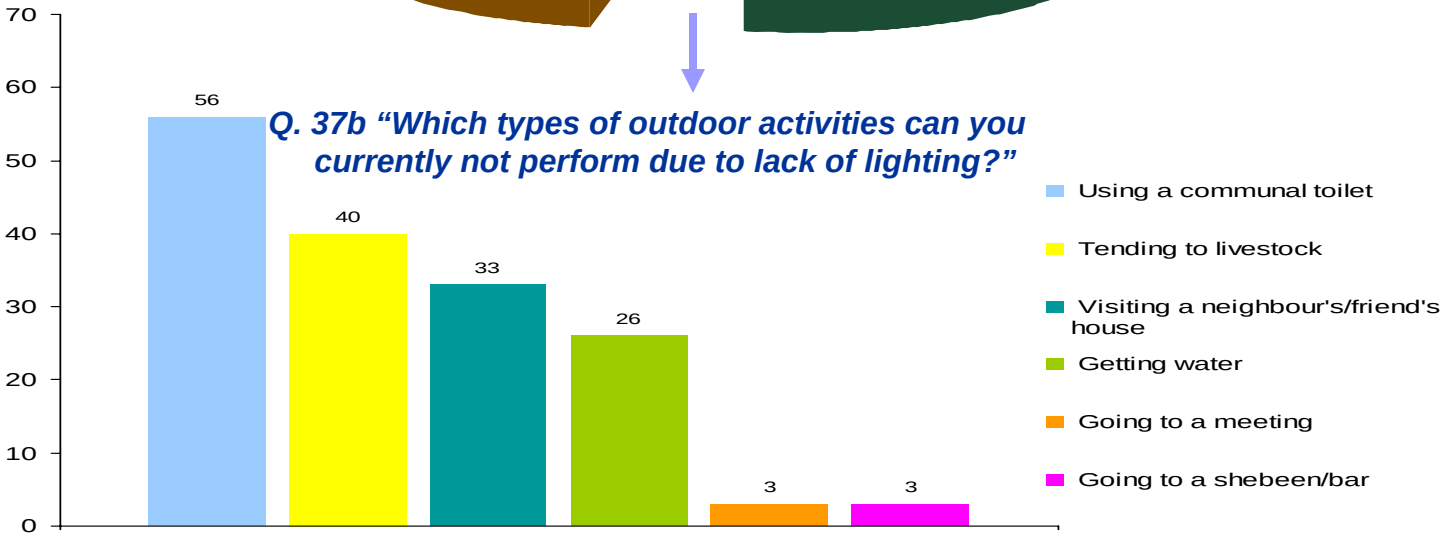
CONSUMER

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?"

Base: Total sample =1000

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



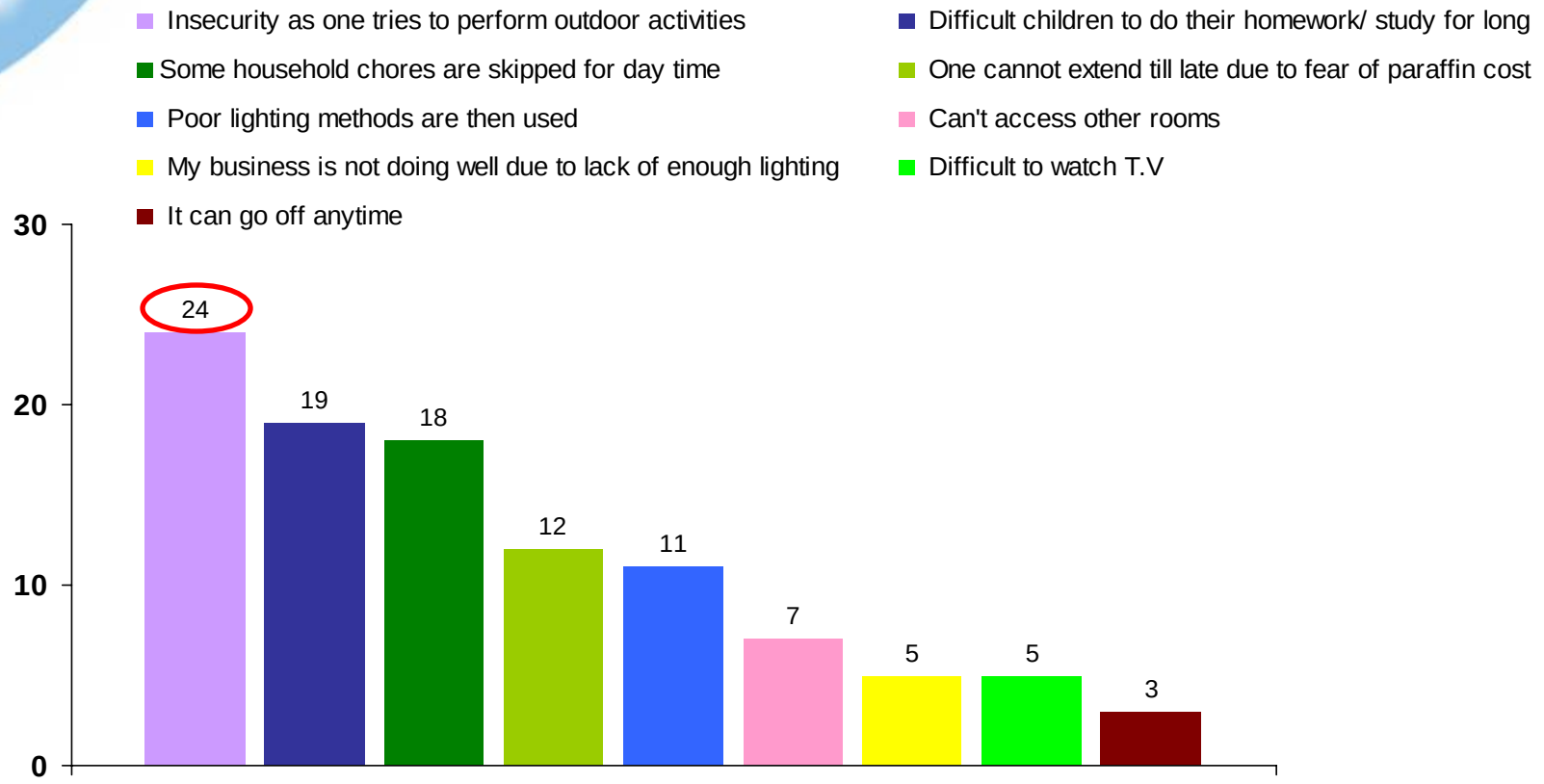
Base: All who could not perform certain types of outdoor activities due to lack of lighting =532

Lack of outdoor lighting hinders certain types of activities: using a communal toilet is the most affected. Strong and portable lighting is necessary for such activities to be carried out

CONSUMER

Problems Experienced Due to Lack of Lighting

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



The most common problem experienced due to lack of lighting is insecurity. Carrying out outdoor activities such as walking outside at night to visit the toilet/bathroom is a challenge for most.

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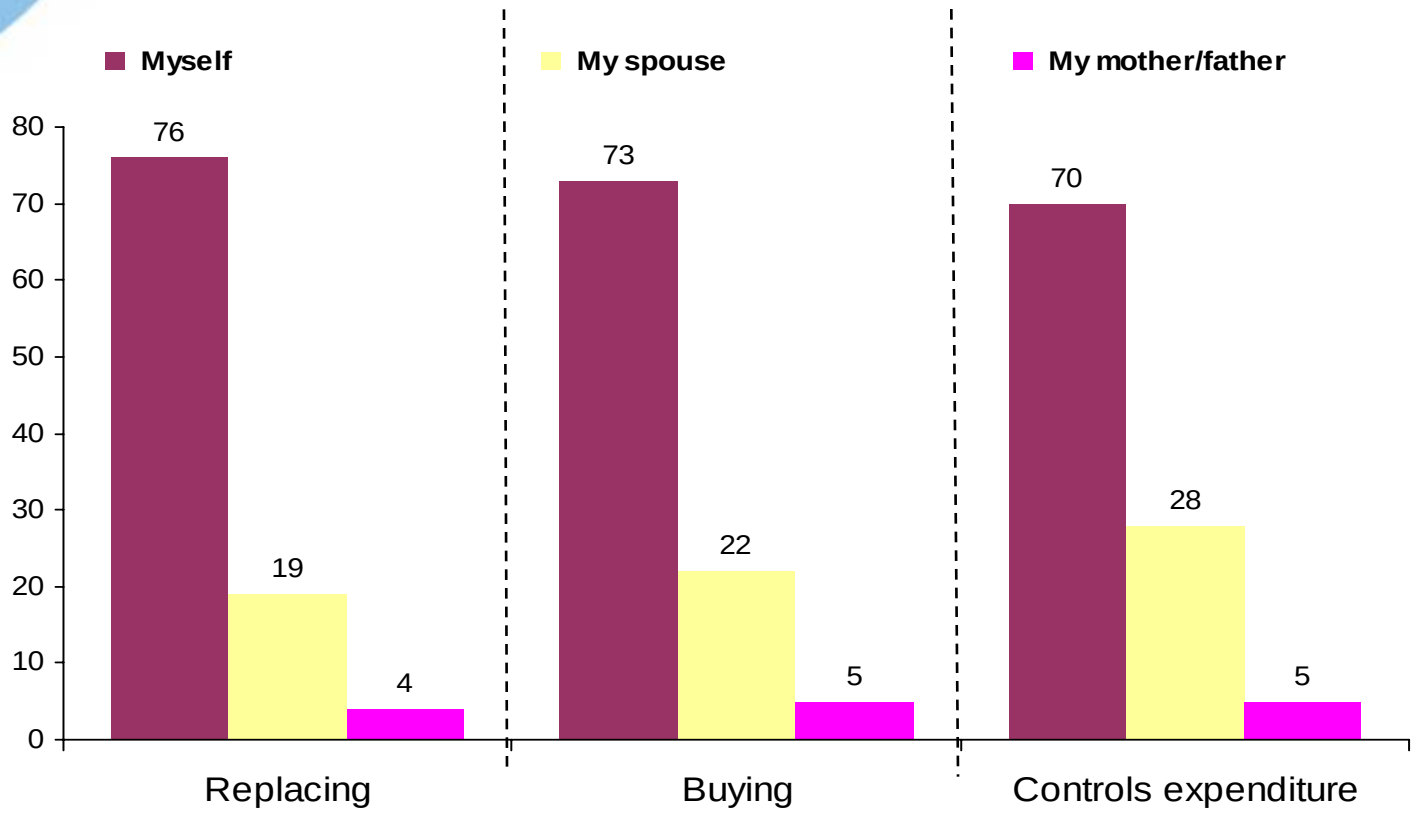
Base: All households whose light can be improved = 807

CONSUMER

Decision and Control in Household

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?"



Since respondents who were selected were the main household decision makers, as expected, decision in replacing lighting systems lies with them and they are the ones whom should be targeted when marketing new lighting products.

Base: Total sample = 1000

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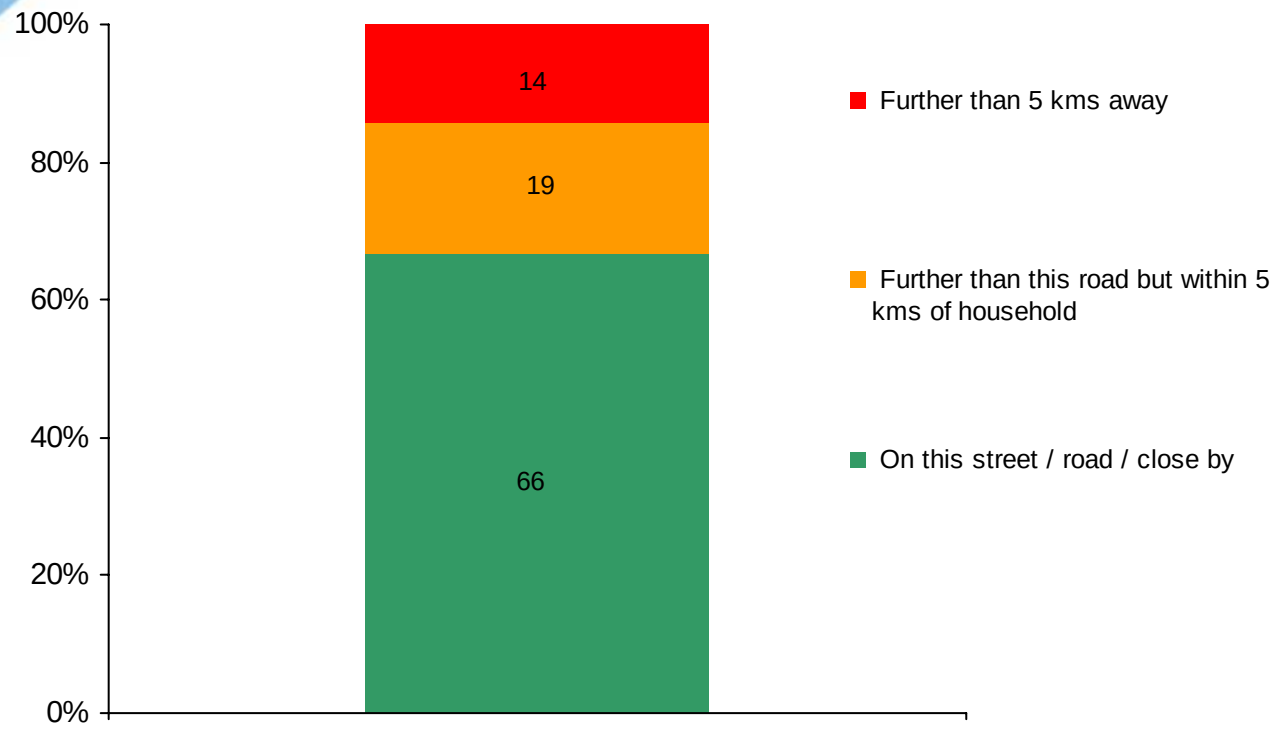
TRADER

Proximity to Power Line

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

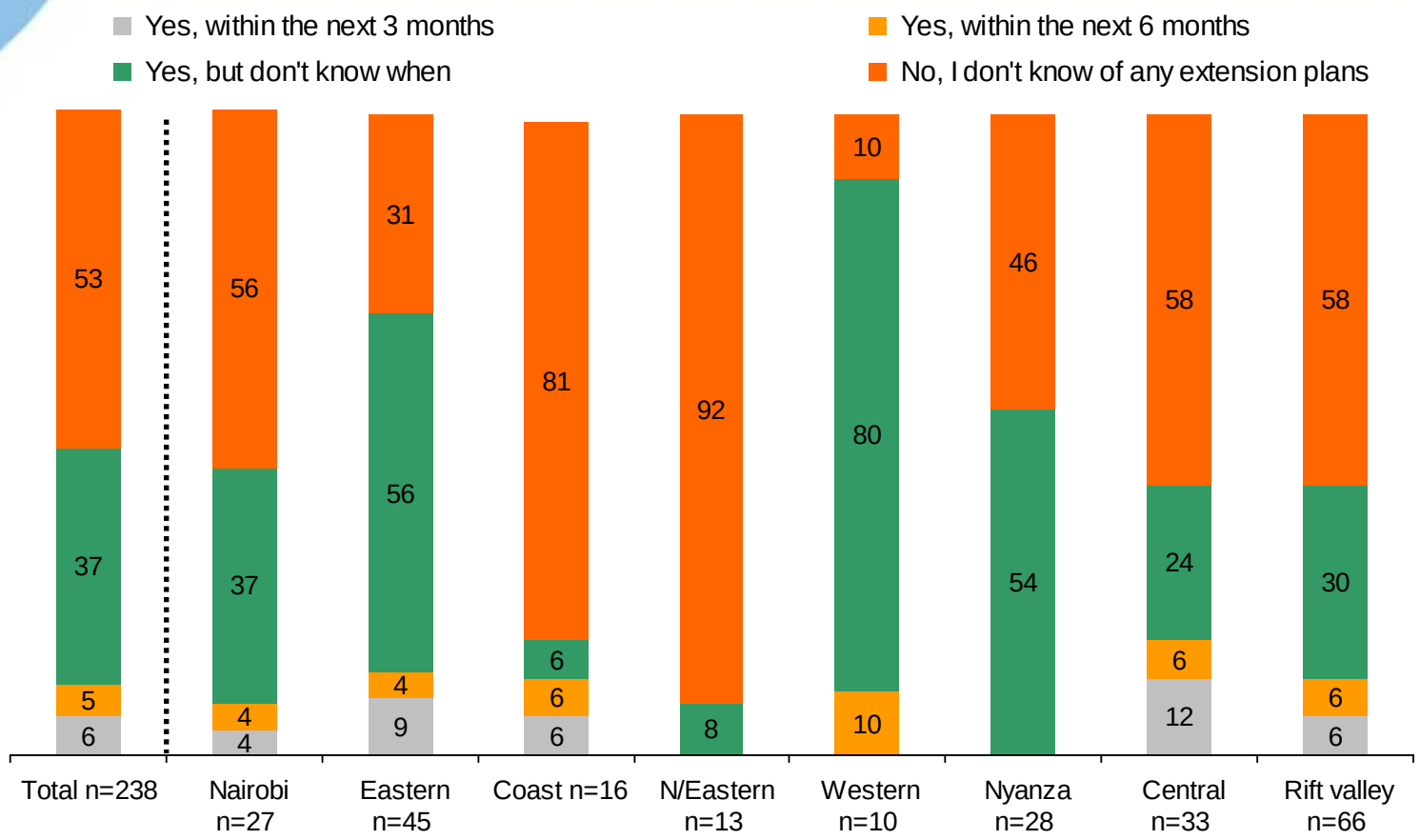


For 66% of traders the mains power line is close to their business premises and therefore proximity is not an inhibitor to installation. The cost is most probably the main reason that causes many traders not to apply for electricity connection.

Base: Not connected to main power grid = 359

Connection Potential

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



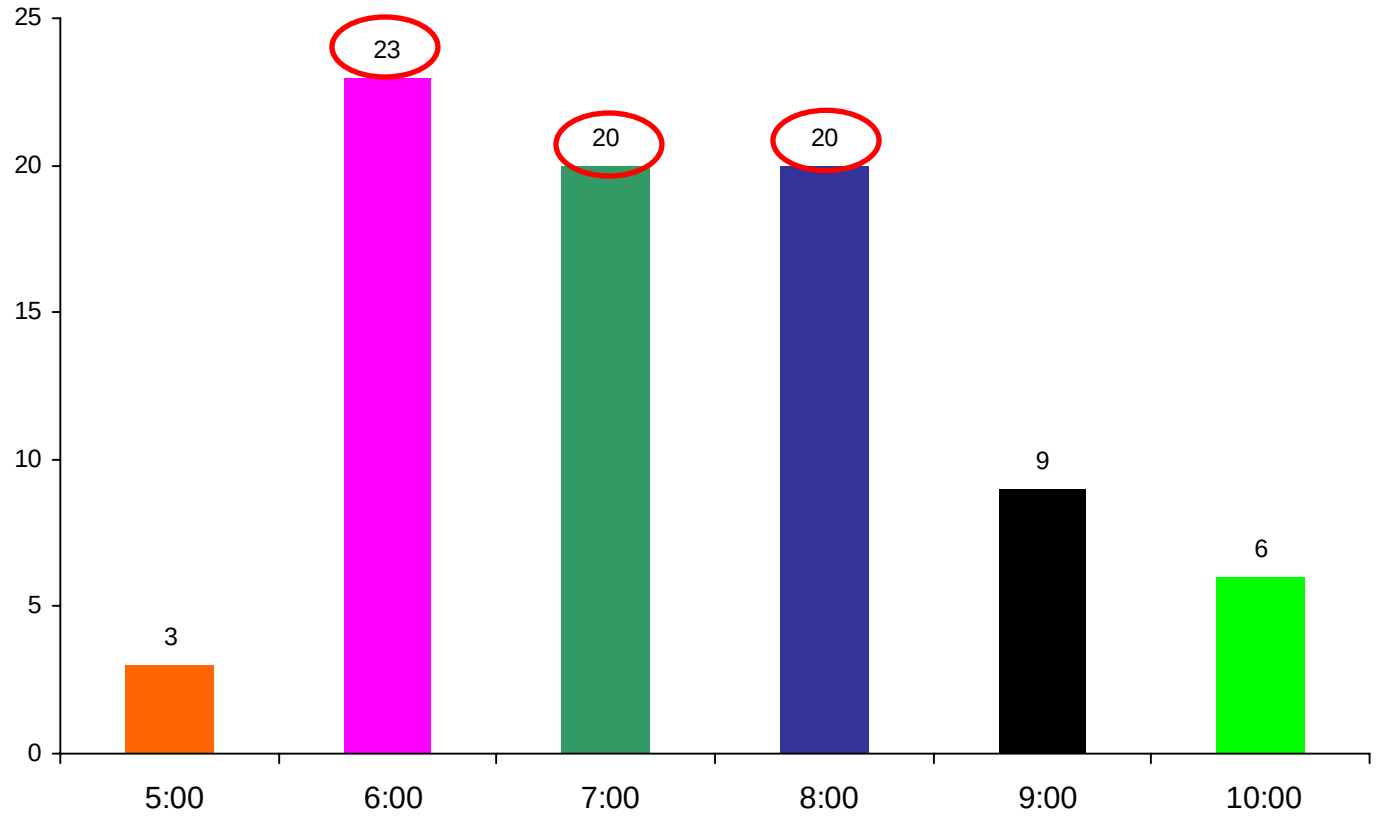
A majority of the traders don't know of any extension plans

Base: All with nearest power line on street/road/close by=238

TRADER

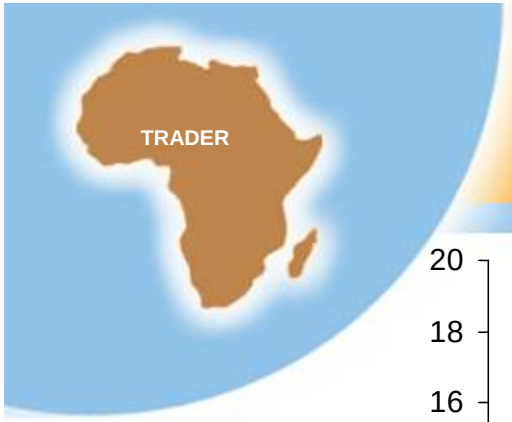
Opening Time

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



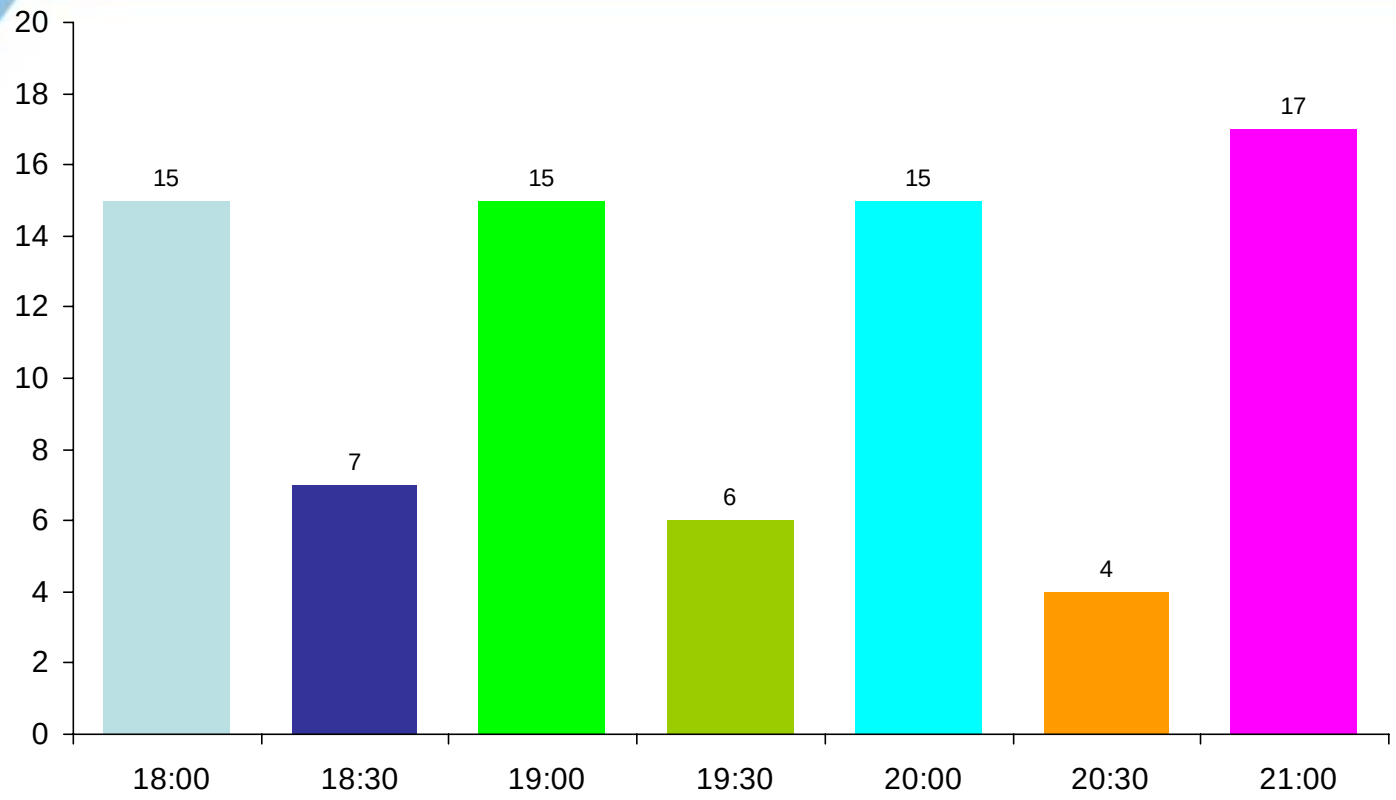
Most traders operate daily throughout the week with 65% opening on Sunday - the majority (63%) opening between 6.00am and 8.00am

Base: Total Sample=400



Closing Time

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



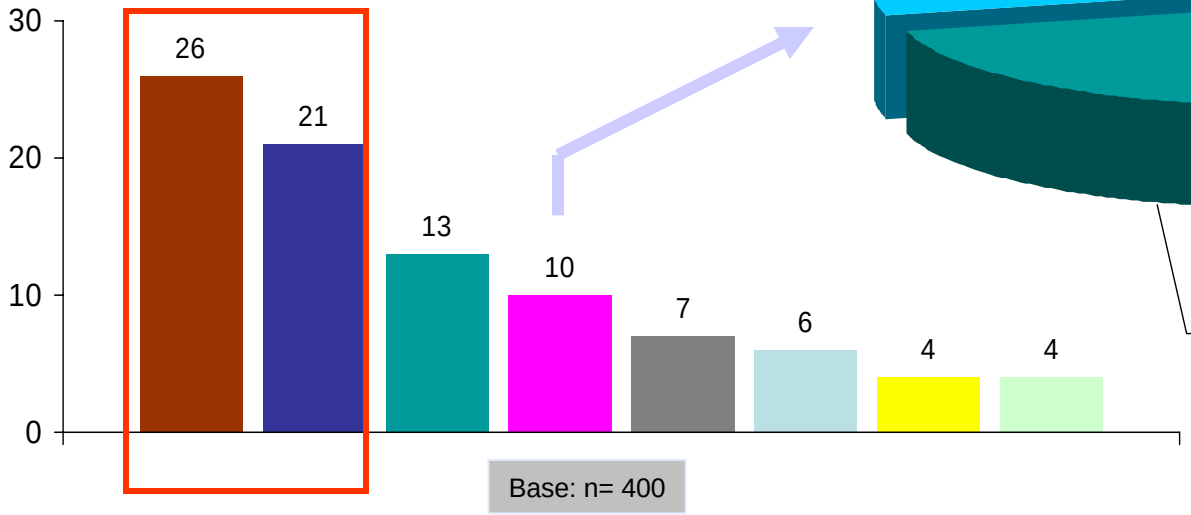
Many businesses close on average at 20:00 which means that they are open roughly between 12 and 14 hours a day. Lighting devices would be needed first thing in the morning before the sun is fully out and as soon as the sun starts to set in order to allow traders to adequately server their customers.

Base: Total Sample=400

Improvements to Business

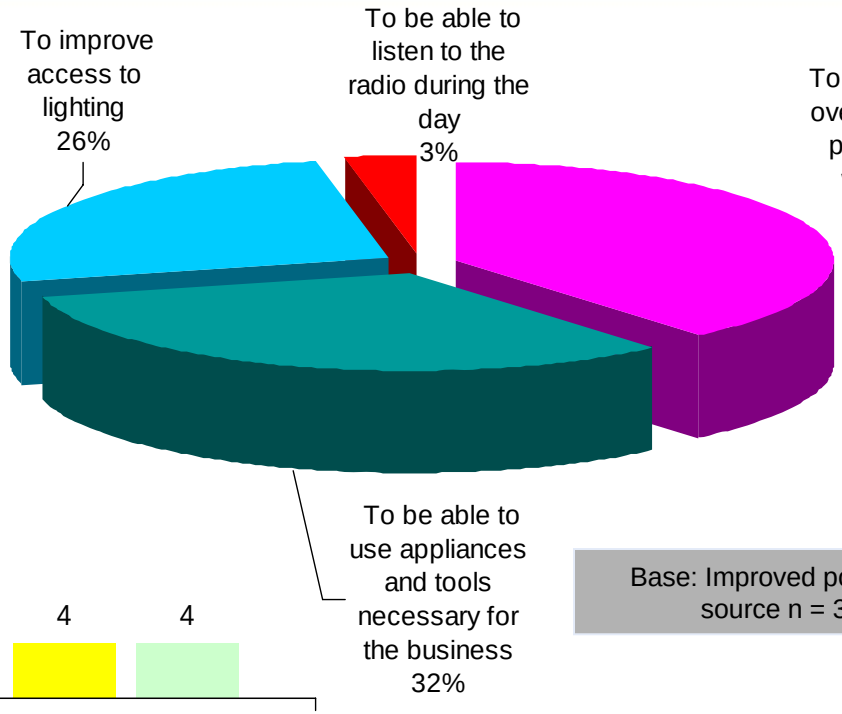
TRADER

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



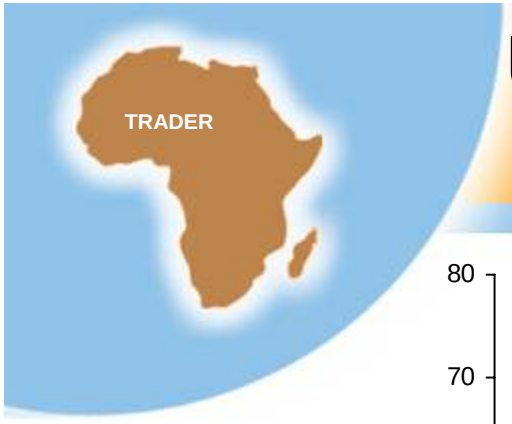
Base: n= 400

- Improved structure itself
- Improved lighting
- Better shelving / display
- Getting a power connection
- Tools and equipment
- Improved furniture
- Better decoration
- Security related items



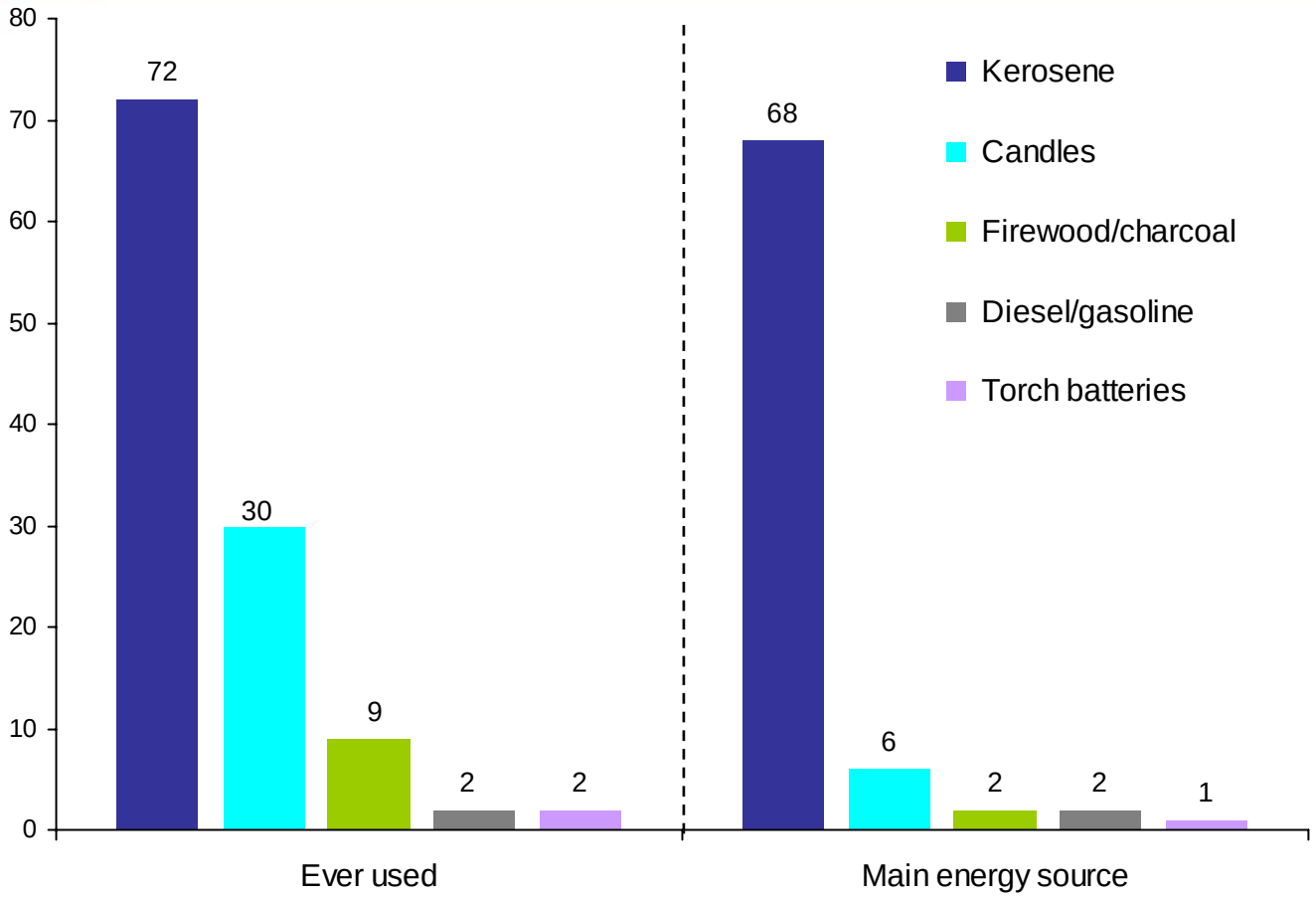
Base: Improved power source n = 38

Traders mostly wish to improve the structure of their premises. As second highest priority, improvement of lighting is also mentioned – those that mention getting a power connection mainly want to do so in order to improve access to lighting



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 following sources of energy would you use as your main energy source?"



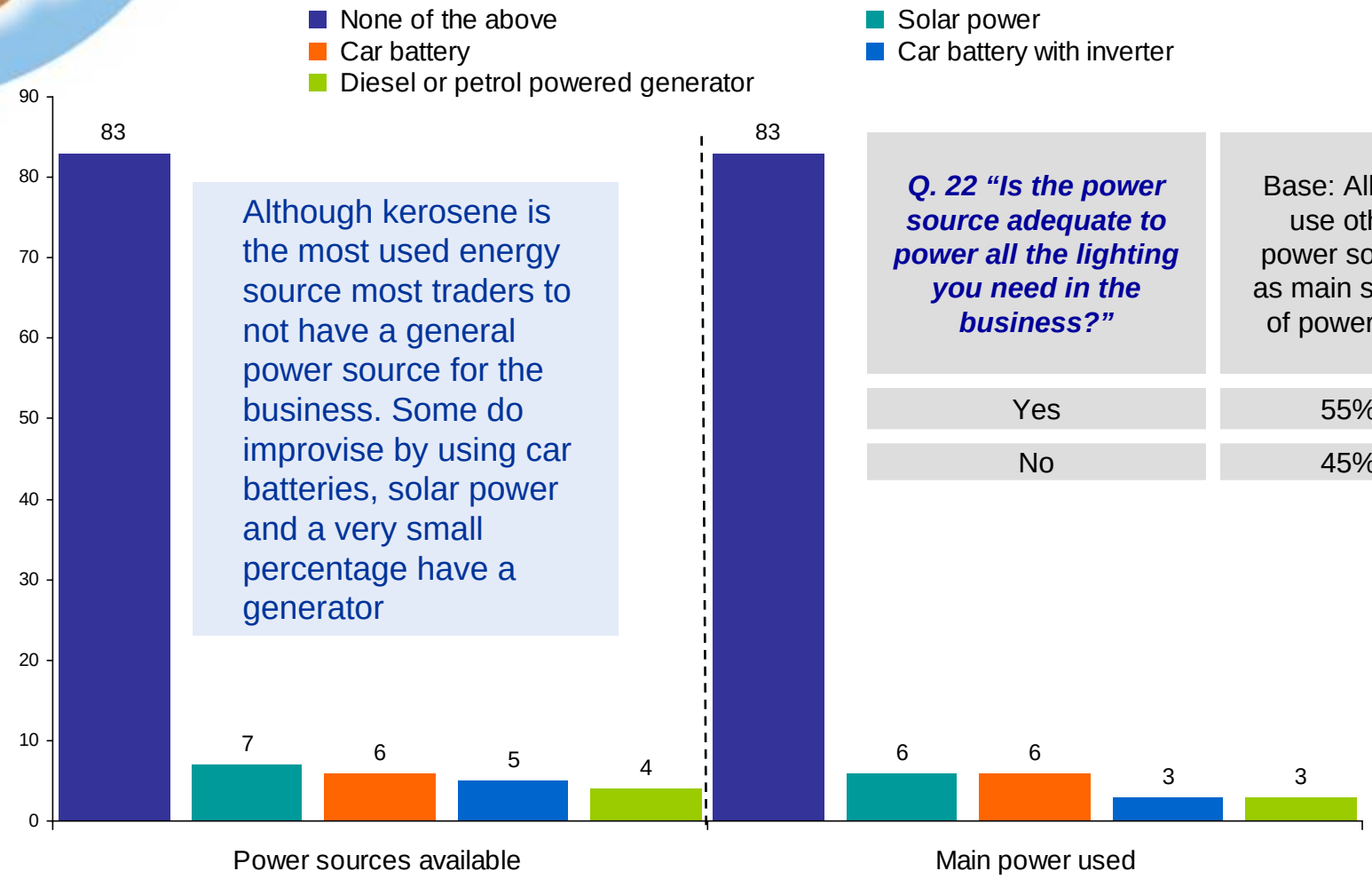
Due to its wide availability kerosene is the most popular source of power in many businesses, just like in many households. Candles are also used, though to a lesser extent

Base: Total sample =400

TRADER

Other Energy Sources

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



Although kerosene is the most used energy source most traders to not have a general power source for the business. Some do improvise by using car batteries, solar power and a very small percentage have a generator

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 =69
Yes	55%
No	45%

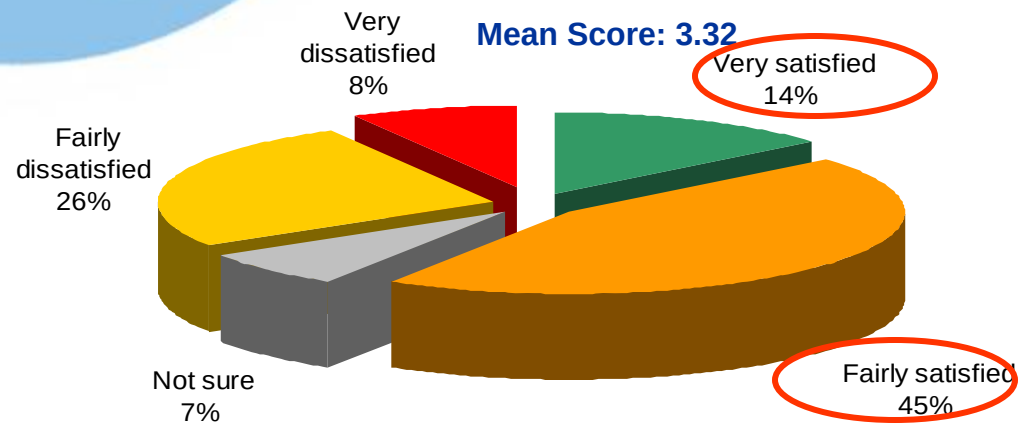
KENYA

Base: Total Sample=400

Satisfaction Level and Limitations with Current Lighting

TRADER

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



Base: n = 400

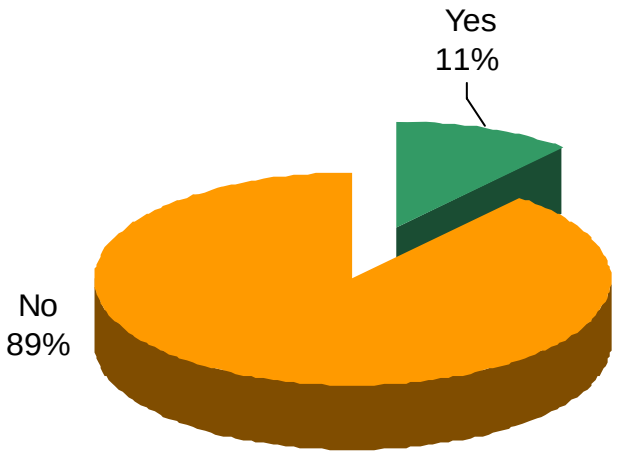
Limitations of current lighting

The brightness is not enough	26%
Poor customer service due to lack of lighting	20%
I am unable to serve customers well	14%
Lighting is not cost effective	11%
Light produced by lamp is not strong enough	11%
I am unable to complete my work at the required time	6%
Poor lighting causes consumers not to Make the right choice	4%
It is risky to operate my business after dark	4%

TRADER

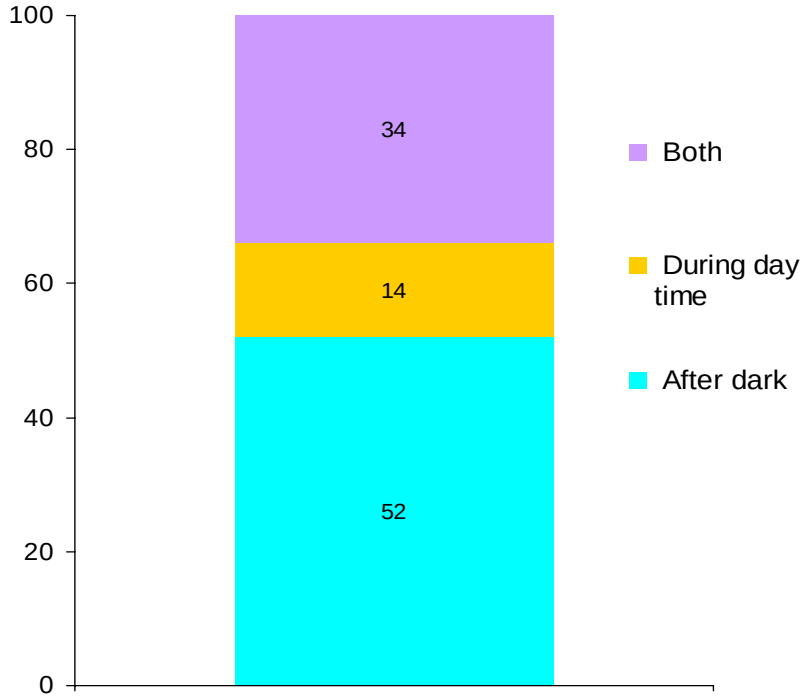
Use of Light

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



Base: Total sample =400

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



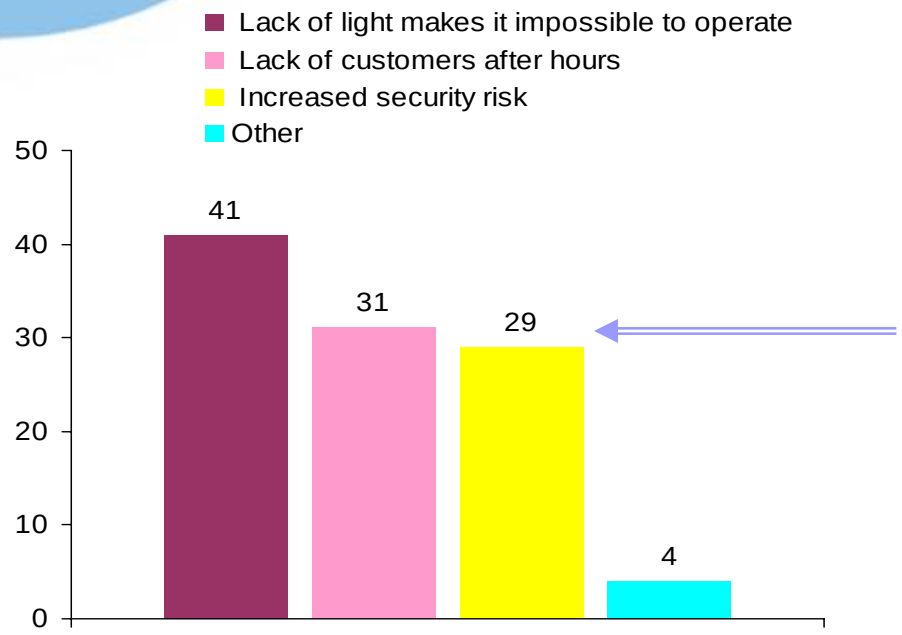
Base: All those who use lights during day and after work

Generally Kenyan traders are more positive about the lighting of their business (59% some degree of satisfaction) than consumers are about their households. This is likely to be due to the fact that most use sunlight to light their work place during the day, which is available in abundance. Only 11% claim to use any lights during day time probably because the structures are small and dark inside. Those that use lights during day time, use the same lights after dark

Operating the Business after Dark

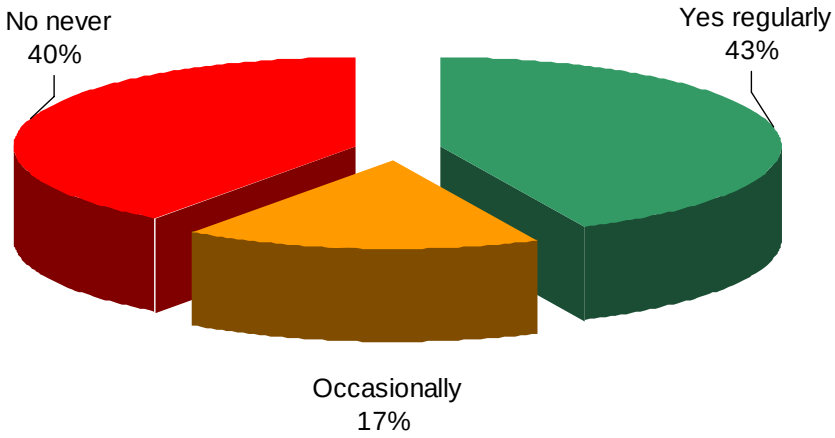
TRADER

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



Base: All who do not open regularly after dark=206

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



Base: Total sample = 400

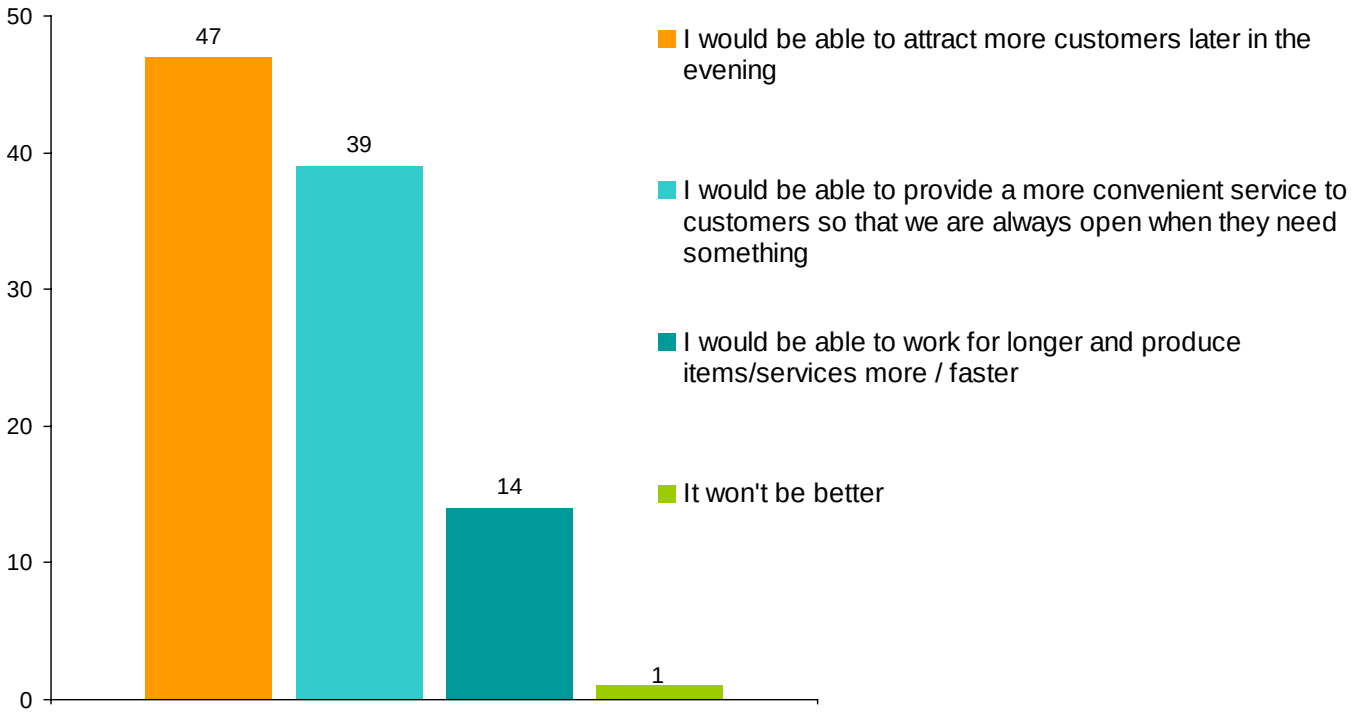
***Q28 not charted**

Lack of light is identified by 41% of traders as the main reason for not operating after dark. 43% of traders would operate regularly after dark if their lighting system improved - most of the traders who state they would open regularly (90%) believe that opening the business after dark would enable them to make more money

TRADER

Opening after Dark

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



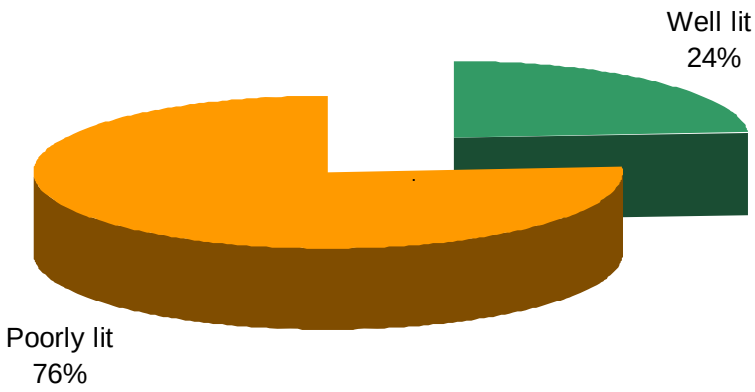
Though lighting is a barrier towards opening after dark, traders are in agreement that opening after dark would be a step in the right direction towards bringing in more customers

Base: All would want to open after dark = 124

Rating for Lighting Outside the Business and its Limitations

TRADER

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



Base (261) = all those who light their business

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

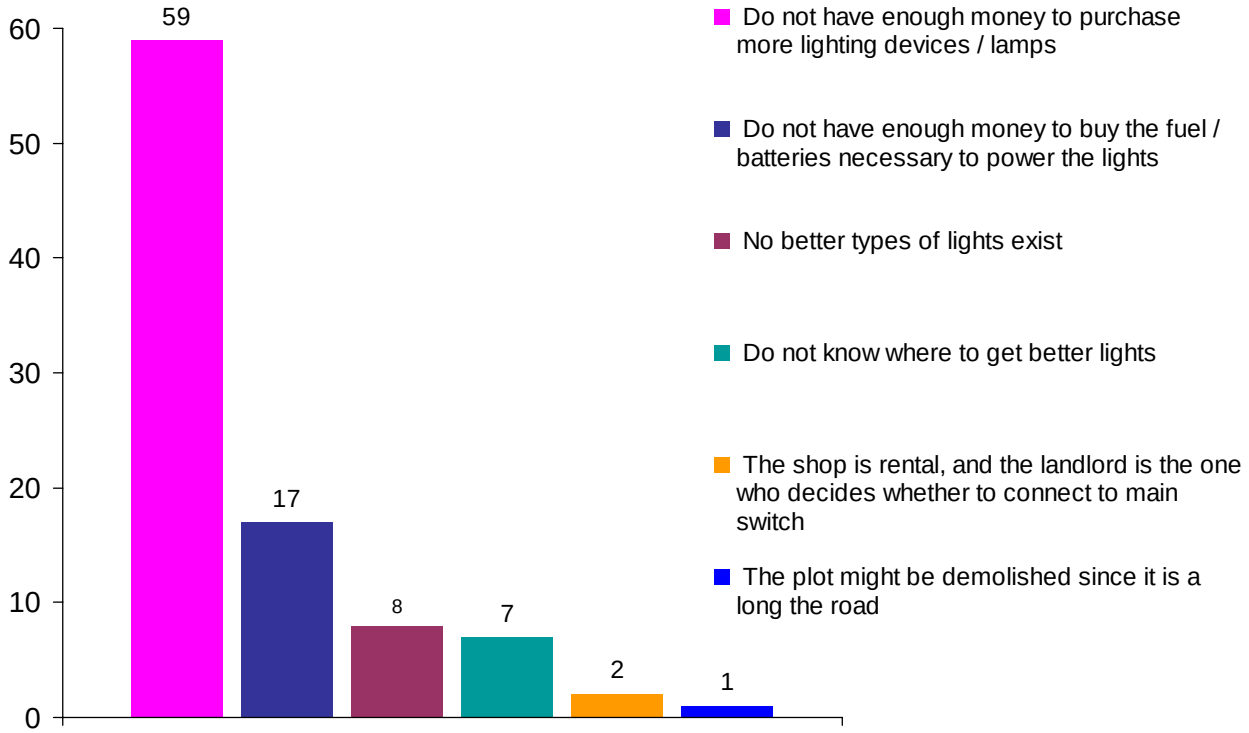
There is no security, hence cannot operate the business after dark	56%
Customers don't see the shop clearly, so they don't shop after dark	19%
I cannot see customers' faces clearly because They buy from outside	15%
Sometimes customers tend to think that the Business has closed down due to lack of enough light	7%
The customers feel insecure	4%

Generally lack of lighting is a security threat to many businesses as they are unable to operate after dark, thus limiting their sales and hence profits

TRADER

Barriers to Improving Lighting

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



The biggest barrier towards improving lighting in businesses is lack of money to purchase more lighting. Modern lighting products will therefore have to be cheap and affordable for small business owners to be encouraged to buy

Base (261) = all those who light their business

LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

CURRENT LIGHTING DEVICES

IFC International Finance Corporation
World Bank Group

THE WORLD BANK

LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

CONSUMERS

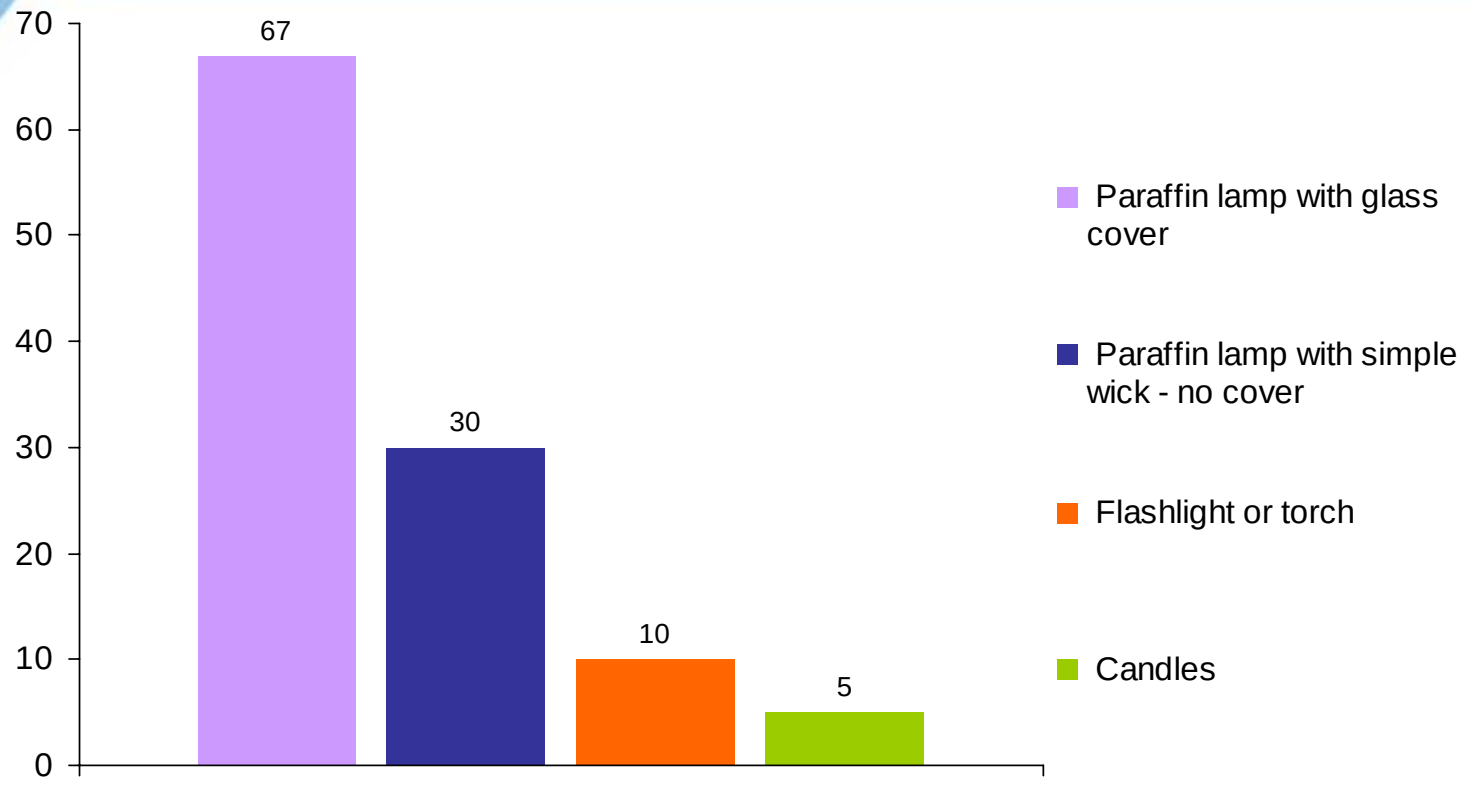
IFC International Finance Corporation
World Bank Group

THE WORLD BANK

CONSUMER

Types of Lighting Devices Used

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



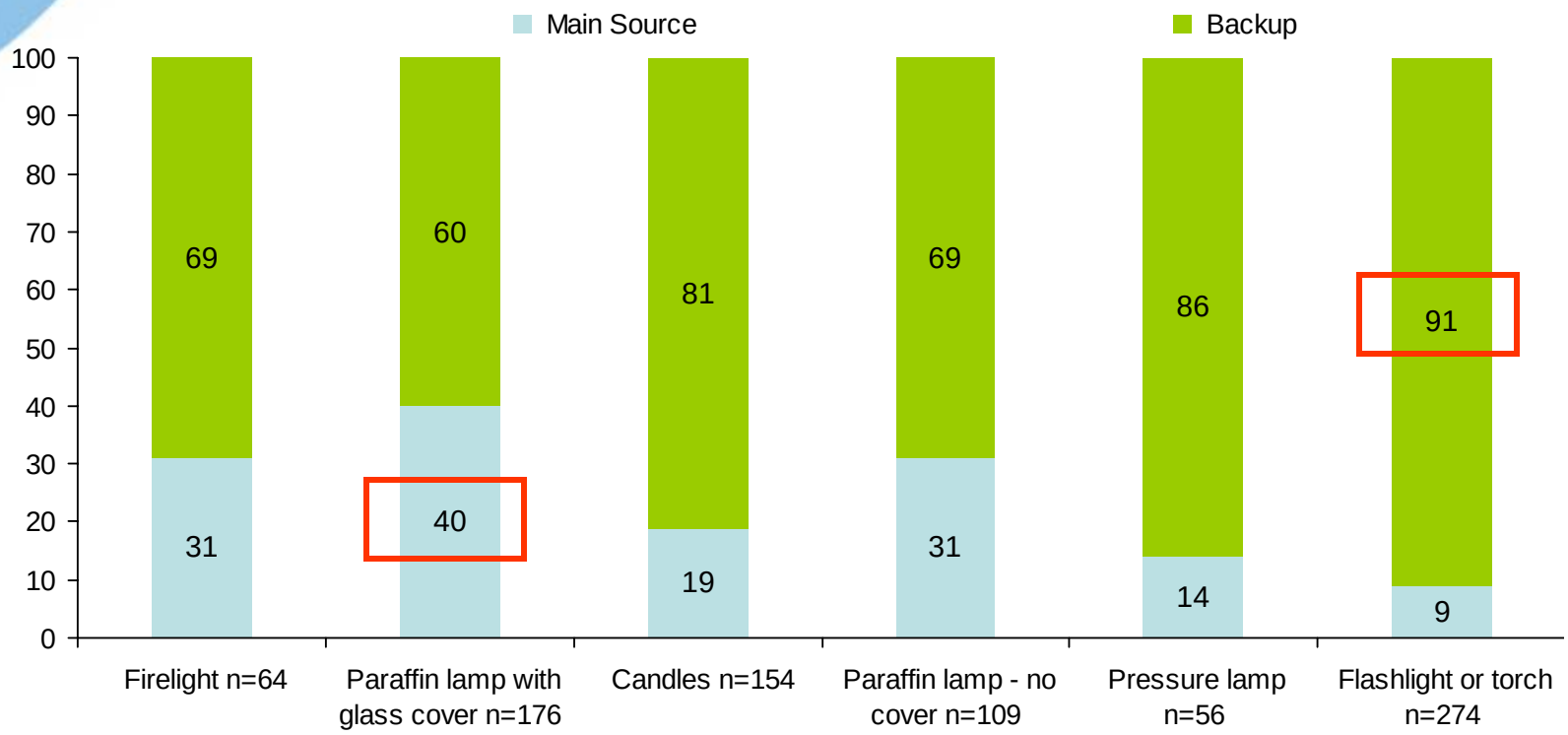
Paraffin devices are the most widely used types of lighting devices. On average 7 in every 10 Kenyan households use a paraffin lamp with glass cover. They are affordable selling at around US $6.06 each and paraffin is widely available

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?"



Paraffin lamp with glass cover is mostly used as main source of lighting, while a flashlight is used as backup lighting device in most households. Very low LSMs (1 and 2) have a higher usage of firewood as a lighting devise due to the fact that the obtain the wood free by chopping and collecting as convenient

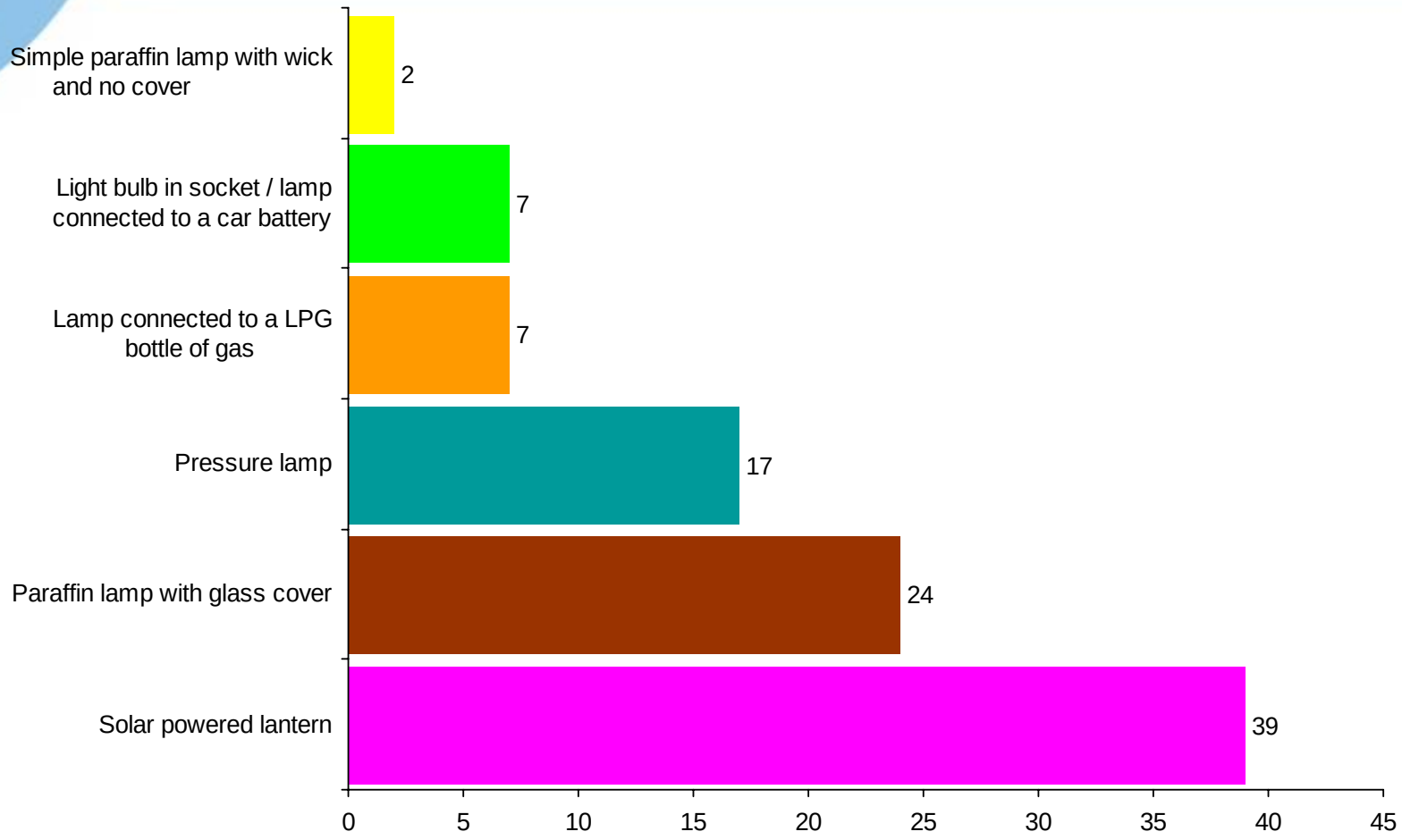
Lamp connected to gas bottle, Light bulb in socket/lamp and Lantern have been removed due to small base sizes

Base: All with .... in working order

CONSUMER

Preferred Type of Lighting Device

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

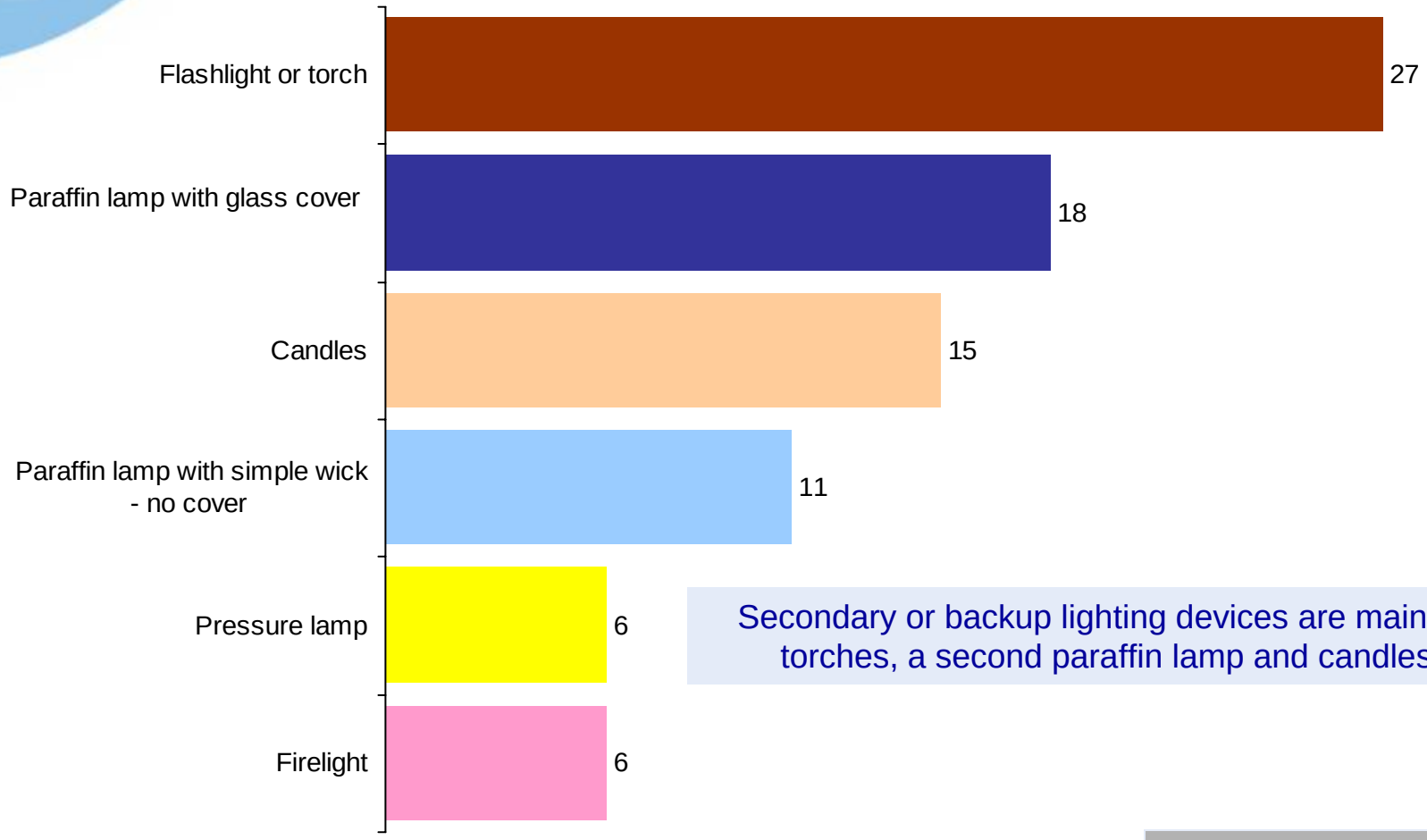


Solar powered lanterns are the most preferred type of lights due to the fact that they are seen to be up market and sophisticated thus aspirational. Additionally consumer like the fact there is not refueling necessary and that they are safe.

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?"



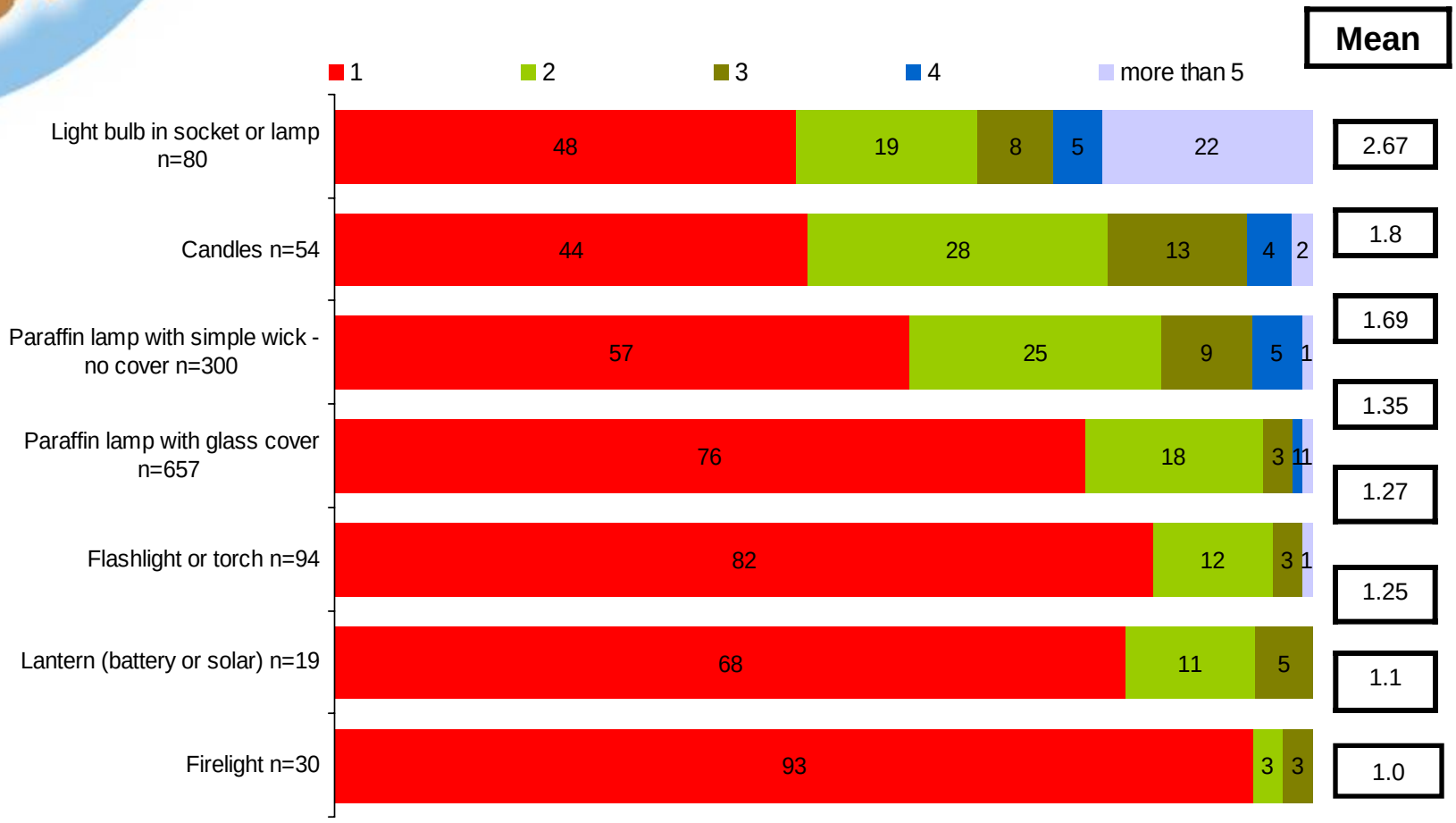
Secondary or backup lighting devices are mainly torches, a second paraffin lamp and candles.

Base = Total sample=1000

CONSUMER

Number of Each Lighting Devices Used

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



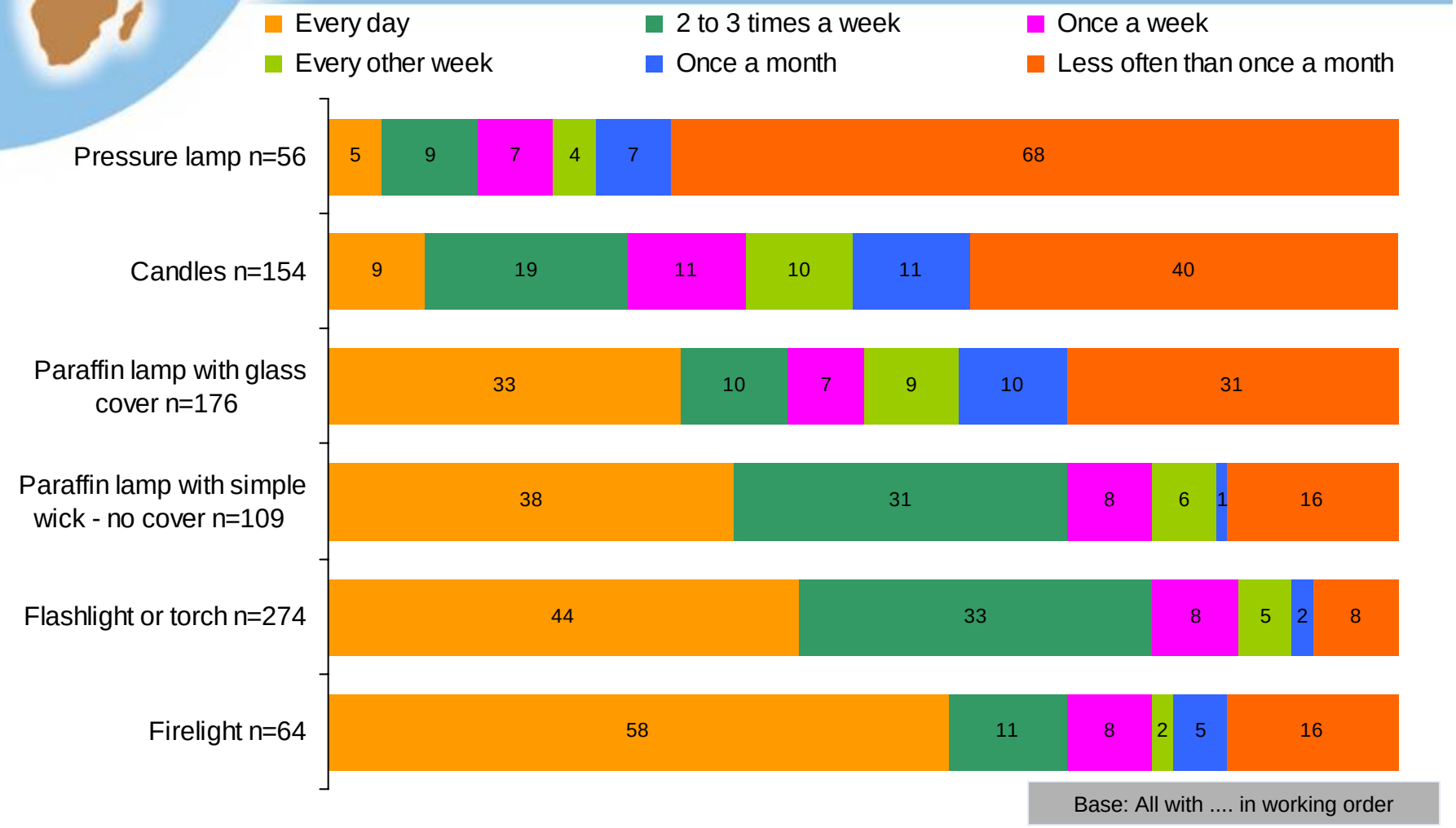
On average between 1 and 2 lighting devices are used at a time to light consumer premises

Base: all who used light last night

CONSUMER

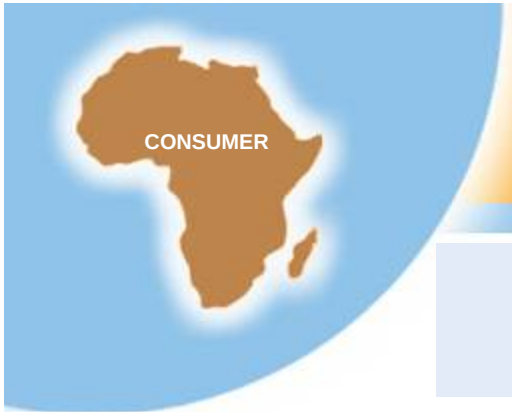
Frequency of Using Lighting Devices

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



Base: All with .... in working order

The flashlight or torch is the most frequently used lighting devise, however it is used for short periods only and as a backup to the main devise. The paraffin lamp with glass cover is the next most used devise, as it takes more fuel to light this lamp it is used interchangeably with the tin lamp (simple wick no cover). Firelight is also used regularly however this remains more prominent amongst lower LSM groups.

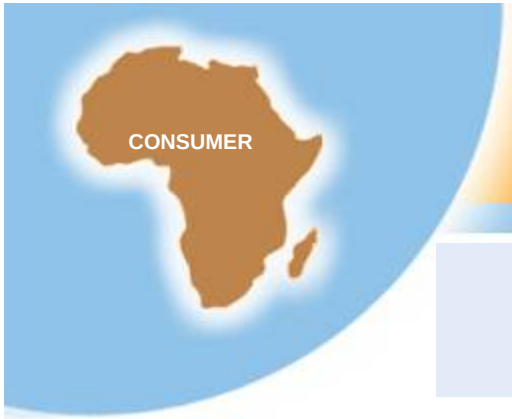


Strengths of Types of Lighting

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

There are many factors that influence choice in lighting for consumers. The main ones are lighting clarity, availability, ease of use, portability and affordability of device

	Total	Firelight	Paraffin lamp with glass cover	Candles	Paraffin lamp with simple wick - no cover	Light bulb in socket or lamp	Flashlight or torch
Base: Total Sample	1000	30	669	52	298	81	95
It has very clear lighting	19	7	18	15	11	56	24
It is portable from one place to another	14	10	16	13	12	2	18
It is easy to operate	12	10	12	10	10	12	11
It does not produce smoke / does not pollute the air	12	10	14	13	12	5	8
It is easily available	11	17	11	12	11	2	12
The device is cheap	10	7	9	16	17	2	11
Paraffin lamp glass is affordable	9	-	22	6	25	5	7
It is economical to use	9	3	6	8	15	4	8
The light is not too bright but enough for the room	8	7	8	10	7	17	7
Easy to maintain the lamp	7	13	8	6	6	-	5
The device is reliable since it doesn't go off easily	6	7	8	4	4	7	12



Weaknesses of Types of Lighting

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

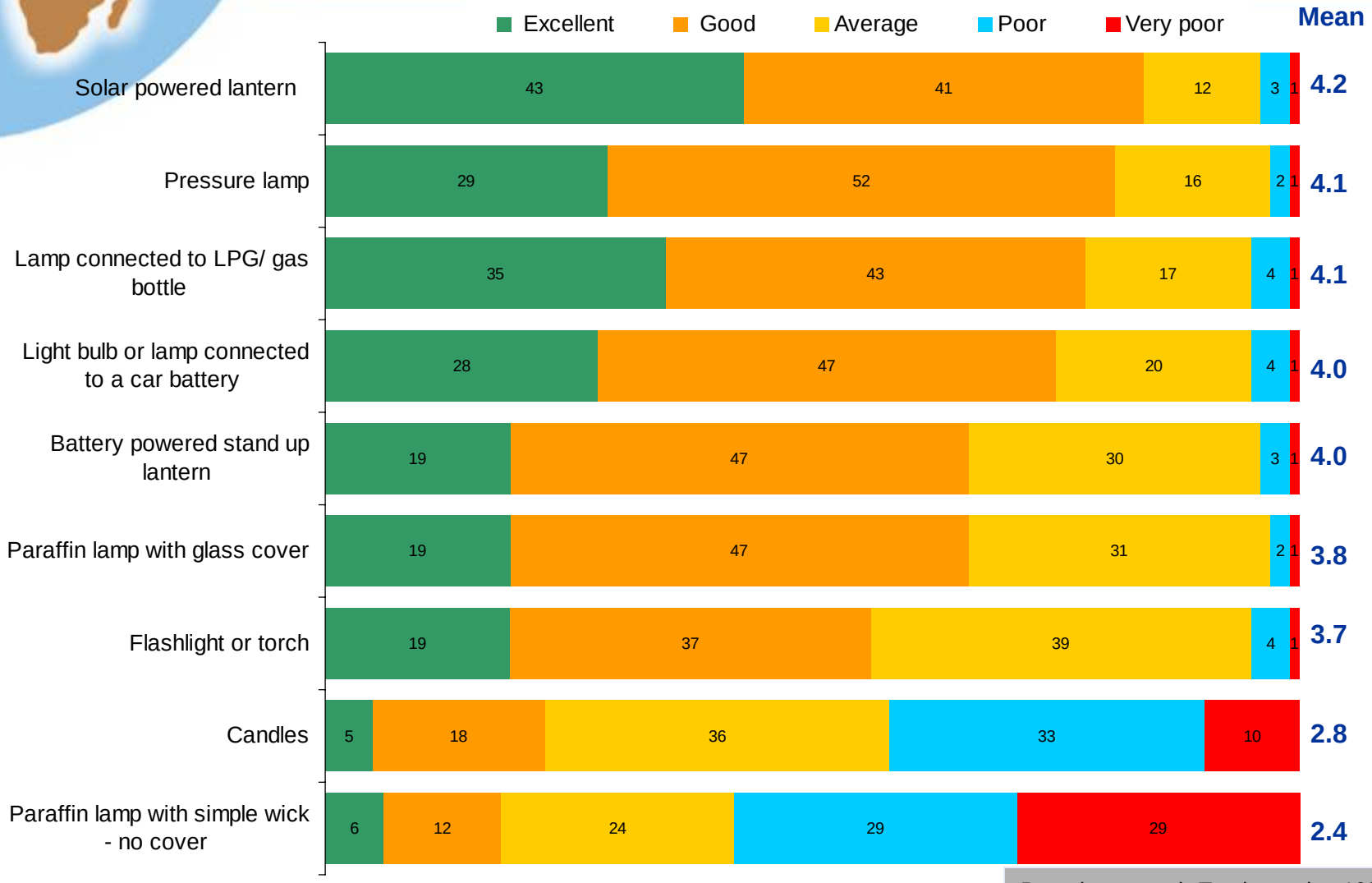
The major weakness of the devices commonly used in many Kenyan households are: lack of adequate lighting, cost of acquisition and maintenance. The greatest weakness for light bulb in socket is the frequent power cuts

	Total	Firelight	Paraffin lamp (glass cover)	Candles	Paraffin lamp (wick – no cover)	Light bulb in socket or lamp	Flashlight or torch
Base samples	**1000**	**30**	**669**	**52**	**298**	**81**	**95**
Does not provide adequate lighting	27	43	33	25	23	5	27
It is expensive	19	17	25	19	11	10	25
It is too smoky, hence pollutes the air	18	10	14	13	34	1	11
It's delicate hence must be handled with care	10	13	14	8	3	6	9
Go off easily when blown by wind	7	7	4	8	15	4	7
It is a health hazard	7	7	6	13	12	6	5
It can easily burn the house	6	3	4	10	11	10	6
Stresses the eyes during use	5	-	2	6	12	1	2
It has some inconveniences like kerosene drying in the middle of the night	5	3	7	6	4	1	5
It's not long lasting	4	3	4	8	2	4	6
Power cuts are so frequent	3	-	1	4	n	38	1

CONSUMER

Rating on Quality

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

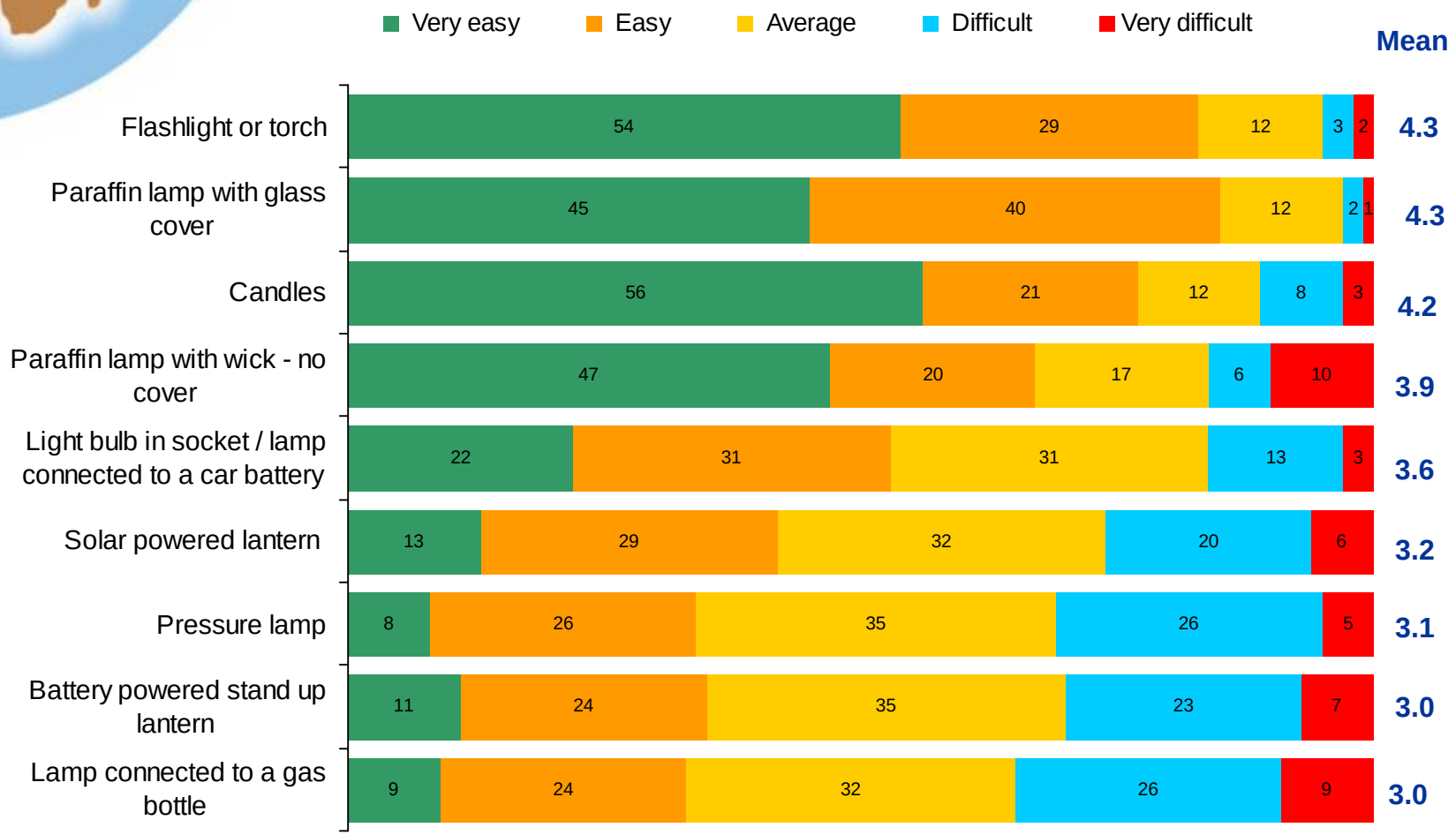


Base (consumer): Total sample =1000

CONSUMER

Rating on Ease of Operation

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

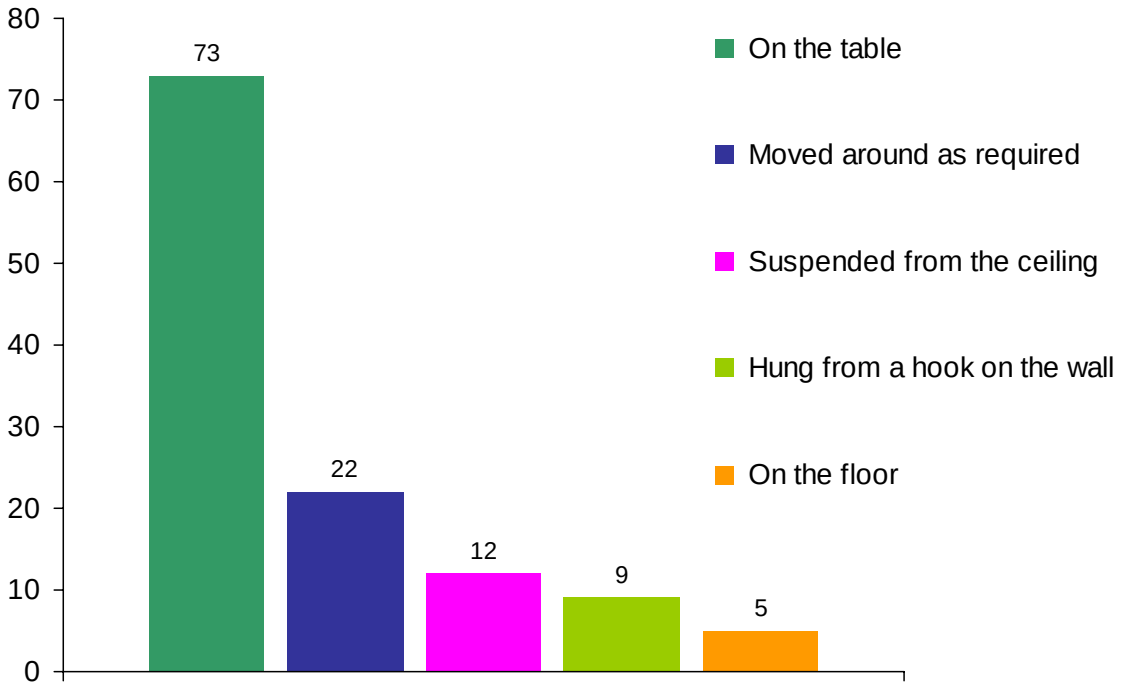


Base (consumer): Total sample =1000

CONSUMER

Placement of Lighting Devices

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



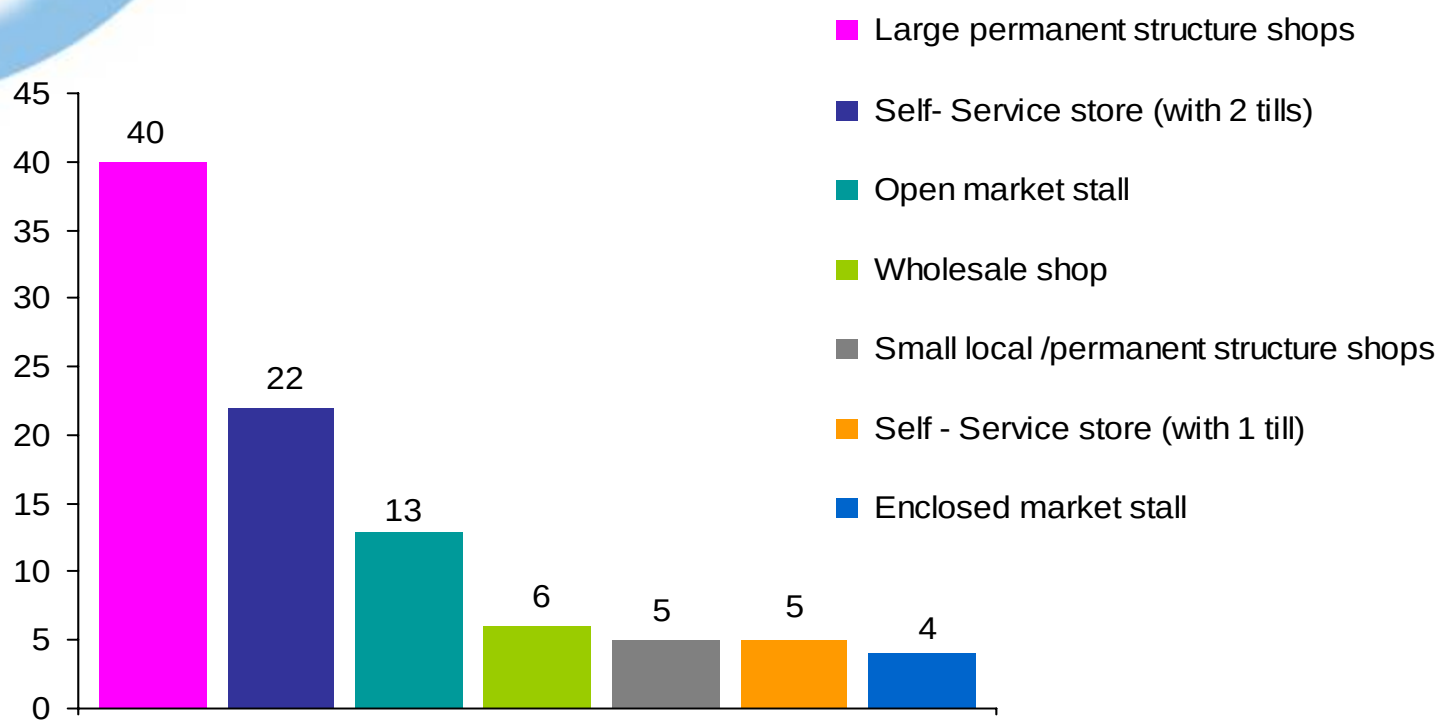
Lights are usually placed in a central position, normally on a table, in a room. There is usually just one light for a room and placing it on a table in the centre of a room ensures that the light spreads and covers a bigger area, so that everyone in the room is able to use it at the same time

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?"



The most common place of purchase for lighting devices is large permanent structure shops.

Base: business Total Sample =(1000)

CONSUMER

Purchasing Paraffin/Kerosene

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

Besides lighting kerosene is mainly used for cooking purposes. Kerosene is mainly obtained from the pump. Bottles and Gallon containers are also used to carry kerosene bought in liters from pumps

***Q53a not charted – answer integrated into comments box**

Others 12%

Kerosene pump 78%

Bottles 10%

***Q53a not charted**

CONSUMER

Health Effects of Paraffin / Kerosene

Q. 53b "Do you worry about the health effects of using paraffin/kerosene?"

Base: All who use Paraffin/Kerosene= 908

Q. 53c "What do you worry about in terms of health effects?"

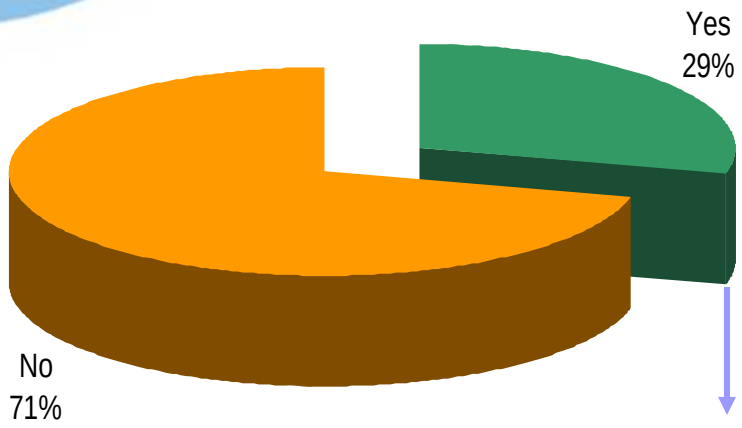
Coughing	52%
Causes asthma	23%
Makes eyes itch	15%
Children can drink the paraffin	9%
Smell of paraffin in cooked food	8%
Can cause fire in the house	6%
Pungent smell/difficulty breathing	6%

Paraffin is the most widely used source of power and light in Kenyan households since it is easily available. 56% of our sample do not worry about the health effects of using it mostly due to lack of awareness. From the 44% that worry about health effects most say paraffin causes them to cough

CONSUMER

Environmental Effects of Paraffin / Kerosene

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



71% of respondents do not worry about environmental effects of paraffin. Again, this is due to lack of awareness of the negative effects kerosene might have. A few respondents feel paraffin smoke is hazardous to the environment

Environmental effects of using paraffin/kerosene:

The smoke produced is hazardous to vegetation and animals	54%
It can make the house get fire destroying property	48%

Base: All who use Paraffin/Kerosene= 908

LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

TRADERS

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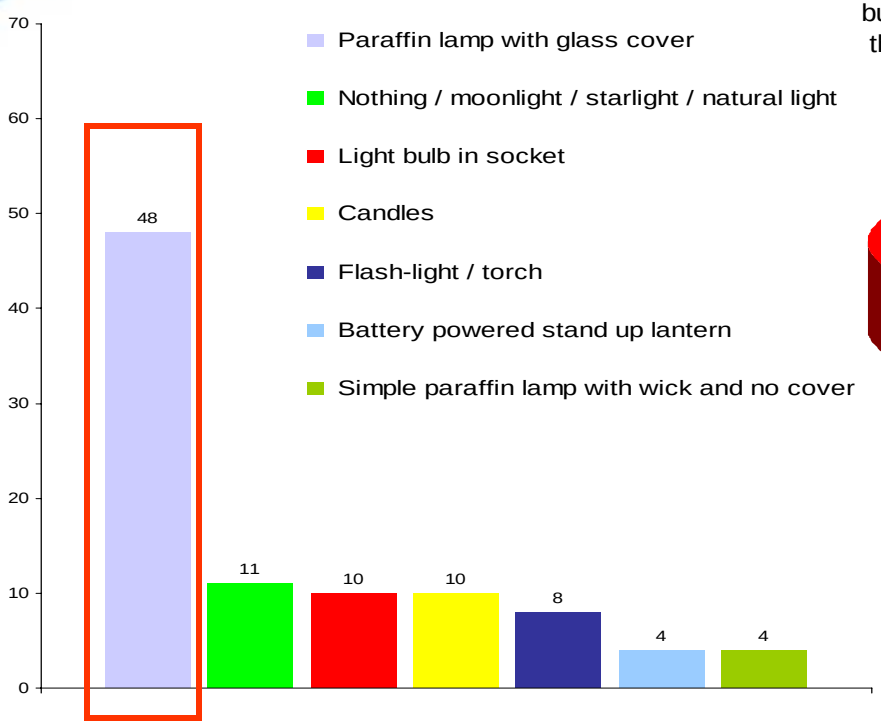
TRADER

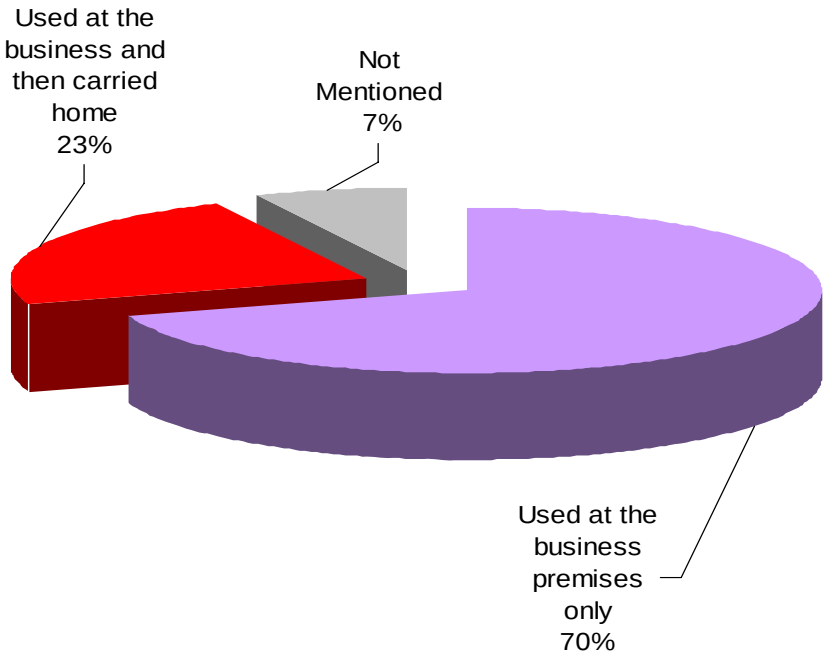
Types of Lighting Devices and where Used

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



Base: All who use lights in their business = 261

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



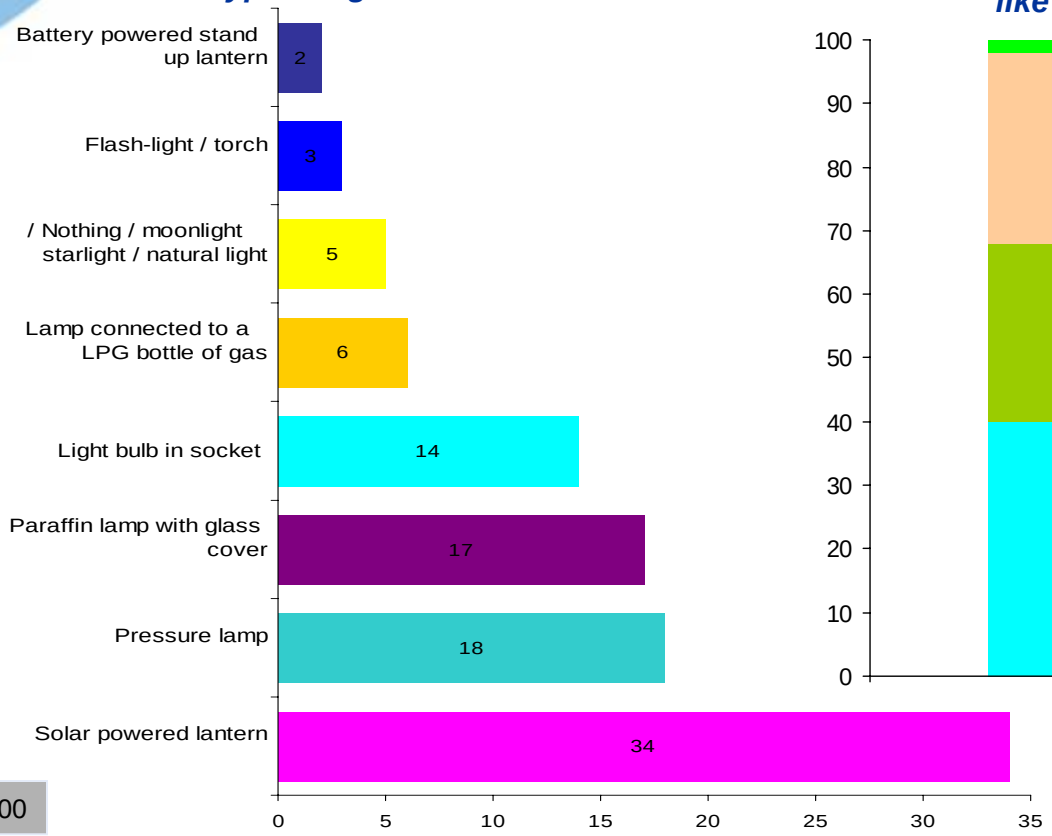
Base (261) = all those who light their business

The most commonly used lighting device is a paraffin lamp with glass cover. These devices are only used at business premises and left there as traders have another set for use in their homes

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

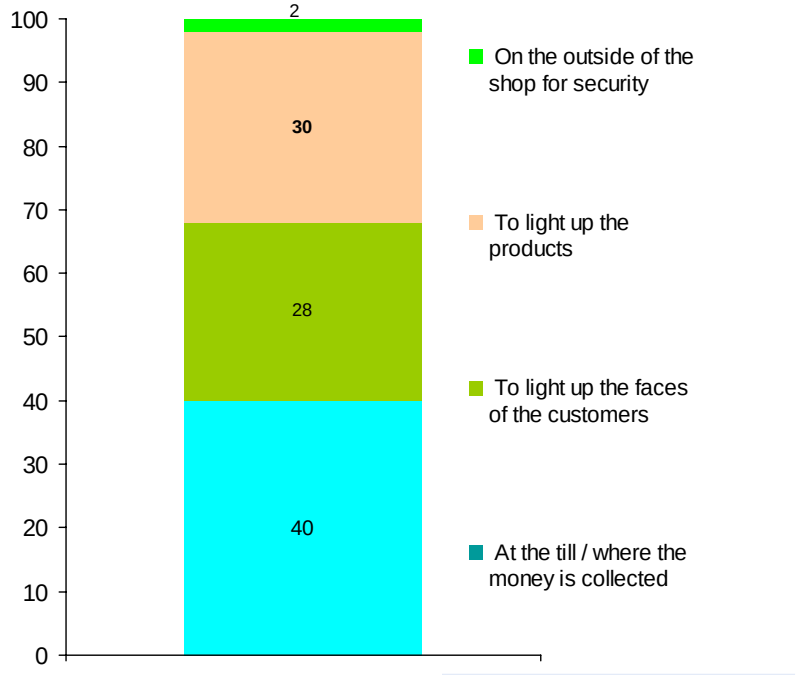
TRADER

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



Base: Total sample =400

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



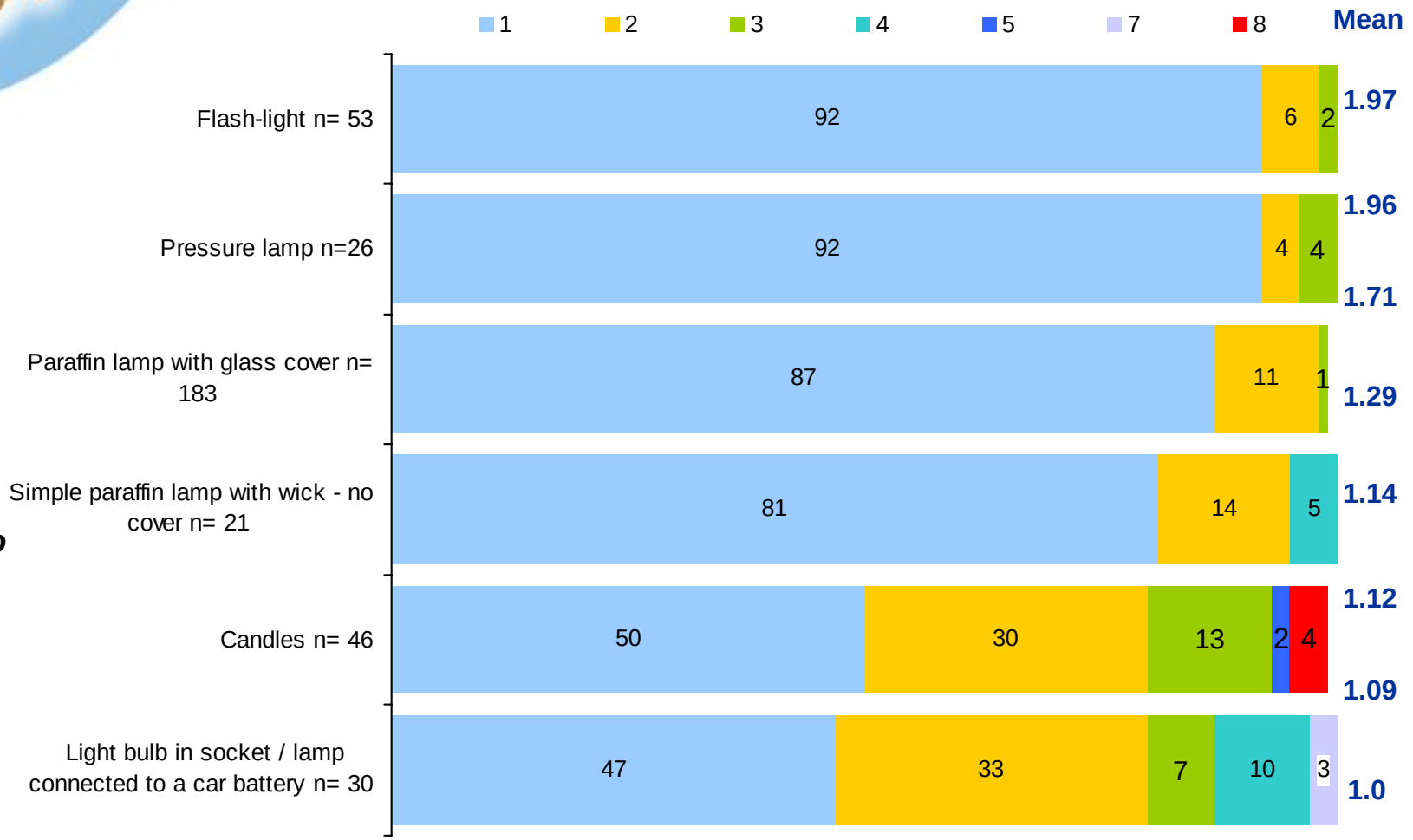
Base (337) = Retail Shops

Although traders mostly use paraffin lamps, they would prefer to use solar powered lanterns, because of their reliability and the fact that they are safe. The lighting device should preferably be positioned where money is collected to avoid any mistakes in receiving or giving incorrect amounts

TRADER

Number of Each Lighting Device Used

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



Lamp connected to gas bottle and solar lantern not charted due to low base sizes

Base = All who use lights in their business=261

Lifespan of Lighting Devices

Q. 37 "For how long do the power sources last?"

Base = Traders who light their business

	Paraffin lamp with glass cover	Simple paraffin lamp with wick and no cover (often could be home made)	Pressure lamp	Light bulb in socket or a lamp connected to a car battery or inverter system or to a non-mains power source	Flash-light / torch (usually hand held)
Base	***183***	***21***	***26***	***30***	***53***
Less than 1 year	**5**	**48**	**12**	**47**	**51**
1 to 1.5 years	**8**	**33**	**4**	**23**	**21**
1.6 to 2 years	**13**	**14**	**12**	**10**	**17**
2.1 to 2.5 years	**13**	**-**	**4**	**-**	**6**
2.6 to 3 years	**19**	**5**	**27**	**3**	**4**
3.1 to 3.5 years	**7**	**-**	**4**	**-**	**-**
3.6 to 4 years	**8**	**-**	**15**	**3**	**-**
4.1 to 4.5 years	**4**	**-**	**4**	**-**	**2**
4.6 to 5 years	**2**	**-**	**4**	**3**	**-**
5.1 to 5.5 years	**3**	**-**	**8**	**-**	**-**
5.6 to 6 years	**1**	**-**	**4**	**-**	**-**
Over 6 years	**16**	**-**	**4**	**7**	**-**

LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

LIGHTING COSTS

IFC International Finance Corporation
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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?

Conversion rate
1US $ = Ksh.66.00

		Average	
Type of power/lighting device	**Base**	**Cost of running per month**	**Price of buying Lighting Device now**
(Paraffin for) paraffin lamp with glass cover	*697*	US $8.06 (Ksh.531.90)	US $8.92 (Ksh.588.50)
(Paraffin for) paraffin lamp with no cover	*442*	US $2.80 (Ksh.187.00)	US $ 0.82 (Ksh.54.30)
Candles	*105*	US $0.77 (Ksh.50.70)	US $0.30 (Ksh.19.60)
(Batteries for) battery powered lantern	*17**	US $10.99 (Ksh.725.20)	US $13.06 (Ksh.861.90)
(Batteries for) battery powered flashlight or torch	*323*	US $1.38 (Ksh.91.10)	US $2.02 (Ksh.133.30)

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 $ = Ksh.66.00

Type of power/lighting device	Base	No. Owned	Cost of running per month	Cost of buying now
Paraffin lamp with glass cover	*183*	1	US $10.12 (Ksh.668.00)	US $7.36 (Ksh.485.90)
Simple paraffin lamp with wick and no cover	*21*	1	US $6.32 (Ksh.417.00)	US $1.06 (Ksh.69.90)
Pressure lamp	*26*	1	US $27.06 (Ksh.1786.00)	US $20.59 (Ksh.1359.00)
Light bulb in socket	*30*	2	US $10.50 (Ksh.693.00)	US $14.63 (Ksh.965.70)
Candles	*46*	2	US $1.29 (Ksh.85.00)	US $0.29 (Ksh.19.20)
Flash-light / torch (usually hand held)	*53*	1	US $2.08 (Ksh.137.00)	US $2.13 (Ksh.140.90)

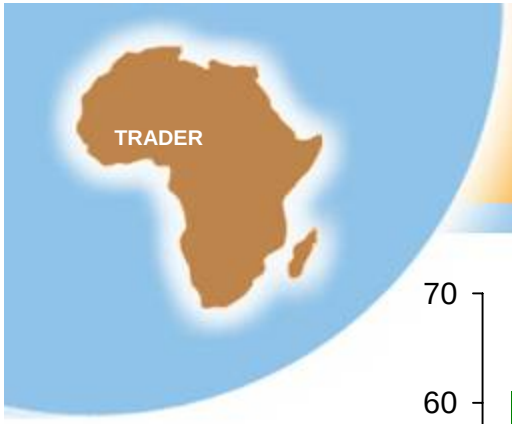
Summary: Average Claimed Spend per Month on Current Lighting Devices

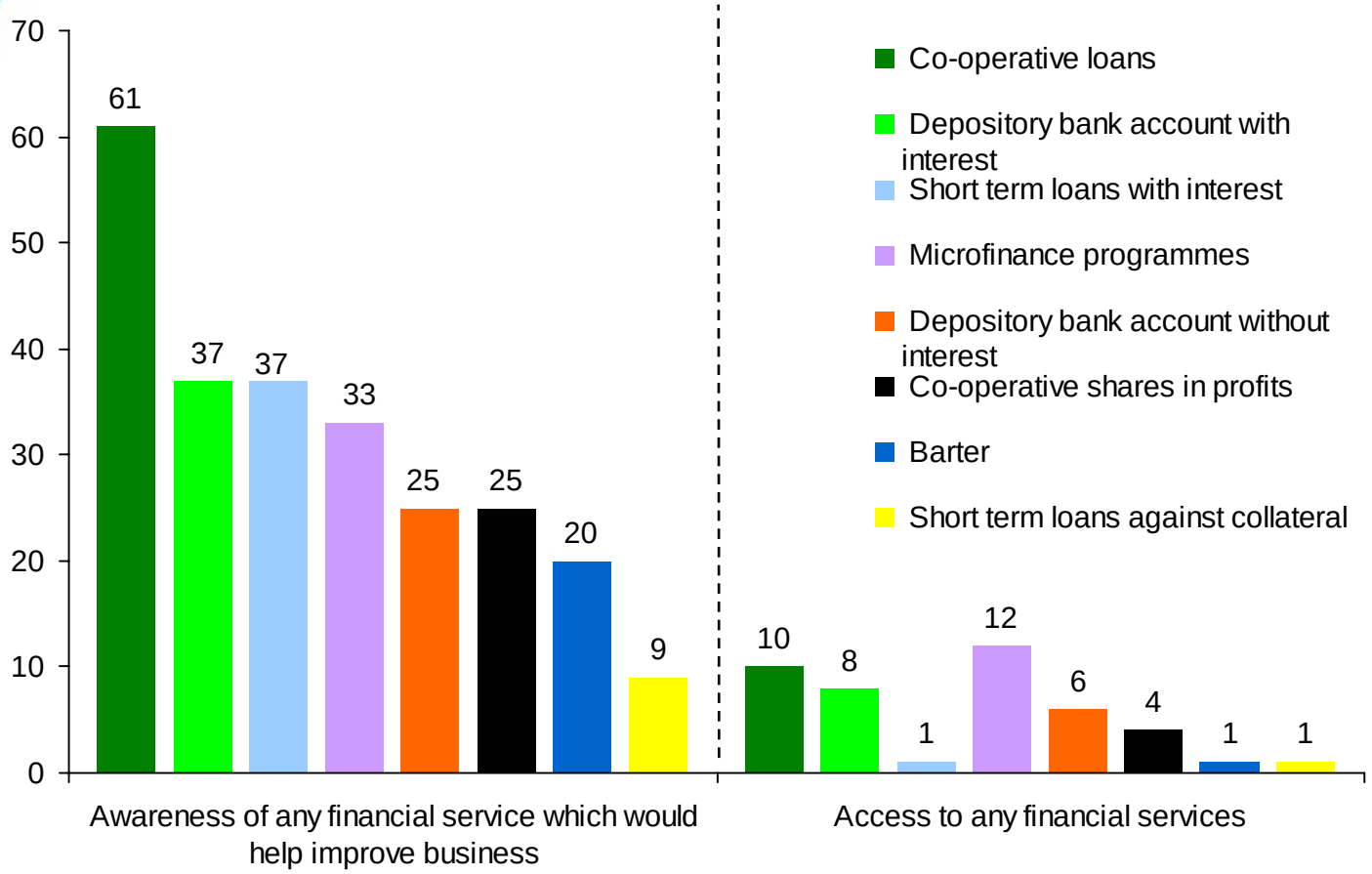
"Majority of respondents buy their paraffin in liters at a cost of US $ 1.33 (Ksh 82.50) per liter"

Conversion rate
1US $ = Ksh 66.00

Type of power/lighting device	App. running costs per month HOUSEHOLD	App. running costs per month BUSINESS	Cost of buying actual item
(Paraffin for) paraffin lamp with glass cover	US $8.06 (Ksh.531.90)	US $10.12 (Ksh.668.00)	US $ 9.50 (Ksh 588. 5)
(Paraffin for) paraffin lamp with no cover	US $2.80 (Ksh.187.00)	US $6.32 (Ksh.417.00)	US $ 0.88 (Ksh 54.3)
Candles	US $0.77 (Ksh.50.70)	US $1.29 (Ksh.85.00)	US $ 0.32 (Ksh 19.6)
(Batteries for) battery powered flash-light or torch	US $1.38 (Ksh.91.10)	US $2.08 (Ksh.137.00)	US $ 2.15 (Ksh 133.3)

Traders: Financial Services





Co-operative loans are the widely known source of financial services that can be used to improve businesses, while the most accessible are microfinance programmes.

Base: Total sample =400

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

LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

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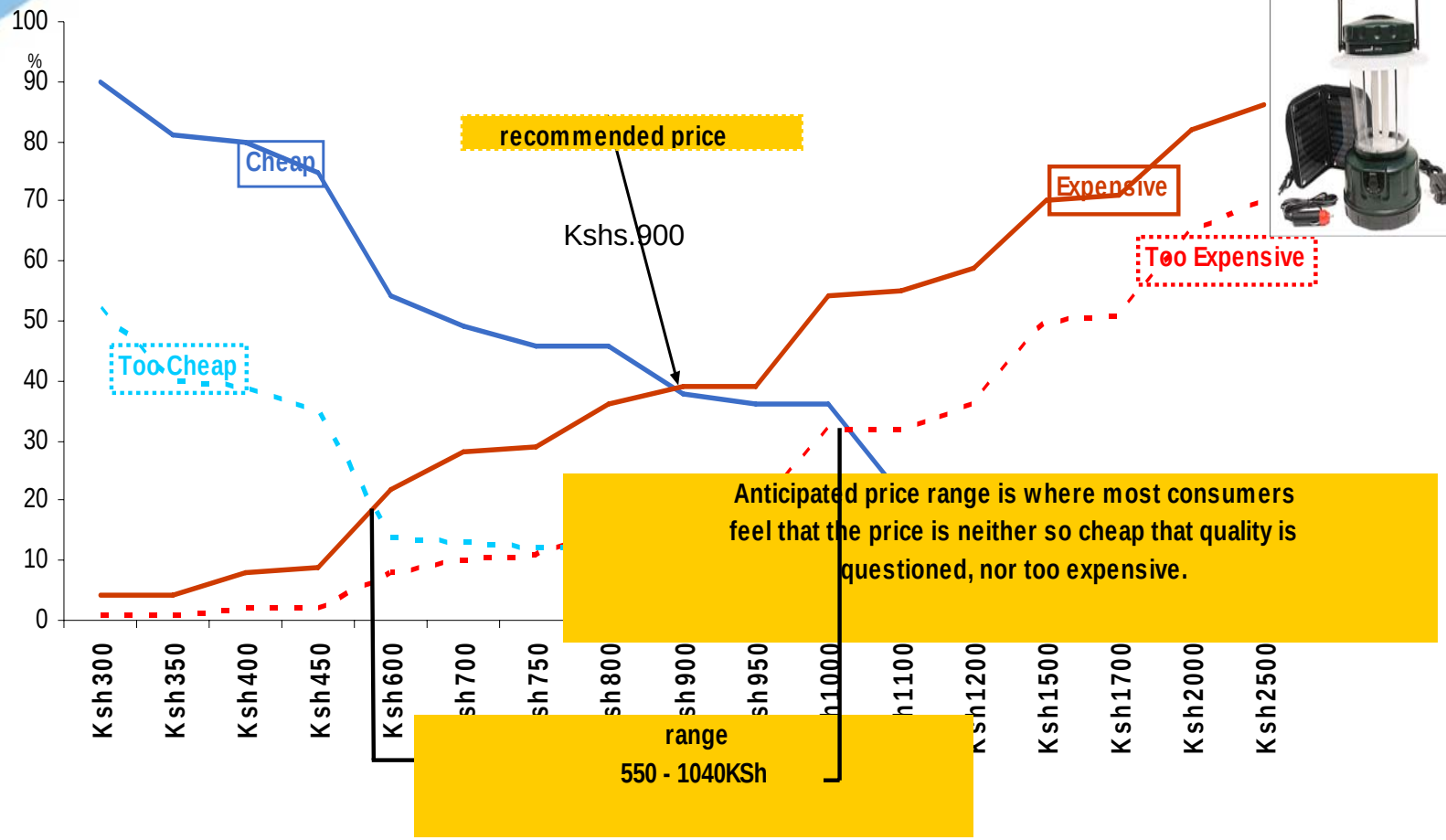
PSM : Rechargeable Lantern

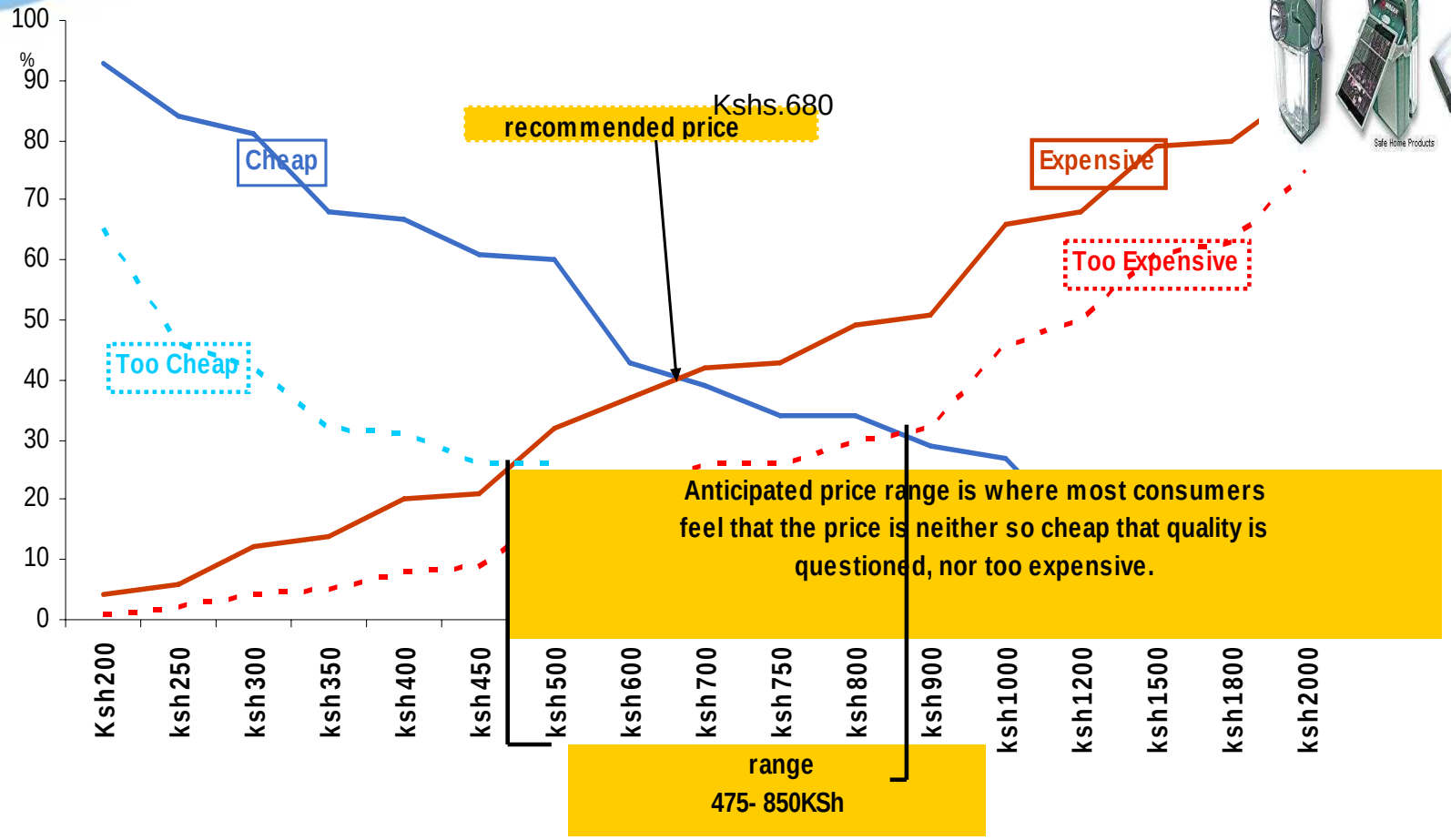
Base: Total sample =1000



CONSUMER

PSM : Rechargeable Task Light

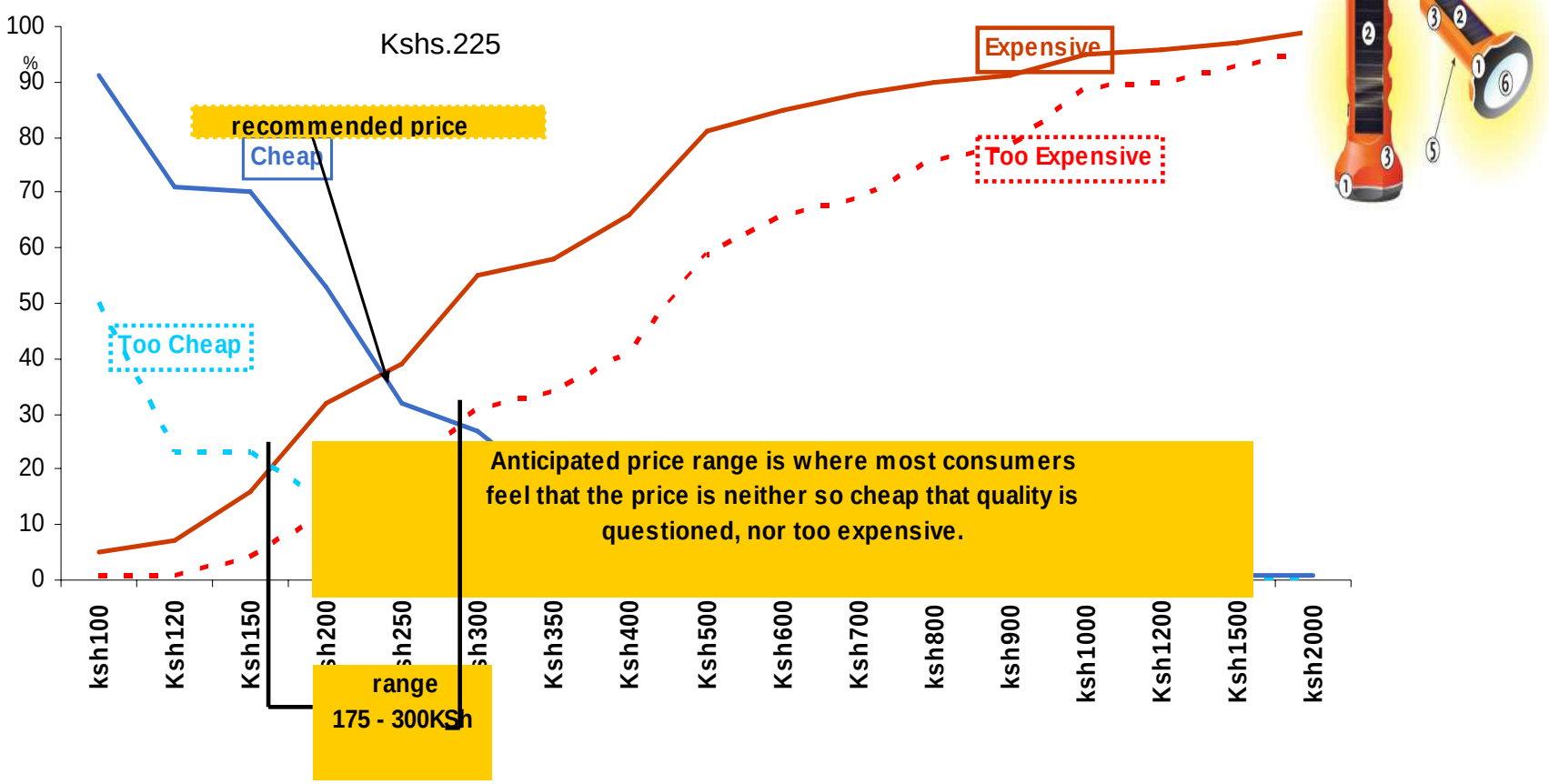
Base: Total sample =1000



CONSUMER

PSM: Rechargeable Torch

Base: Total sample =1000



LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

TRADERS

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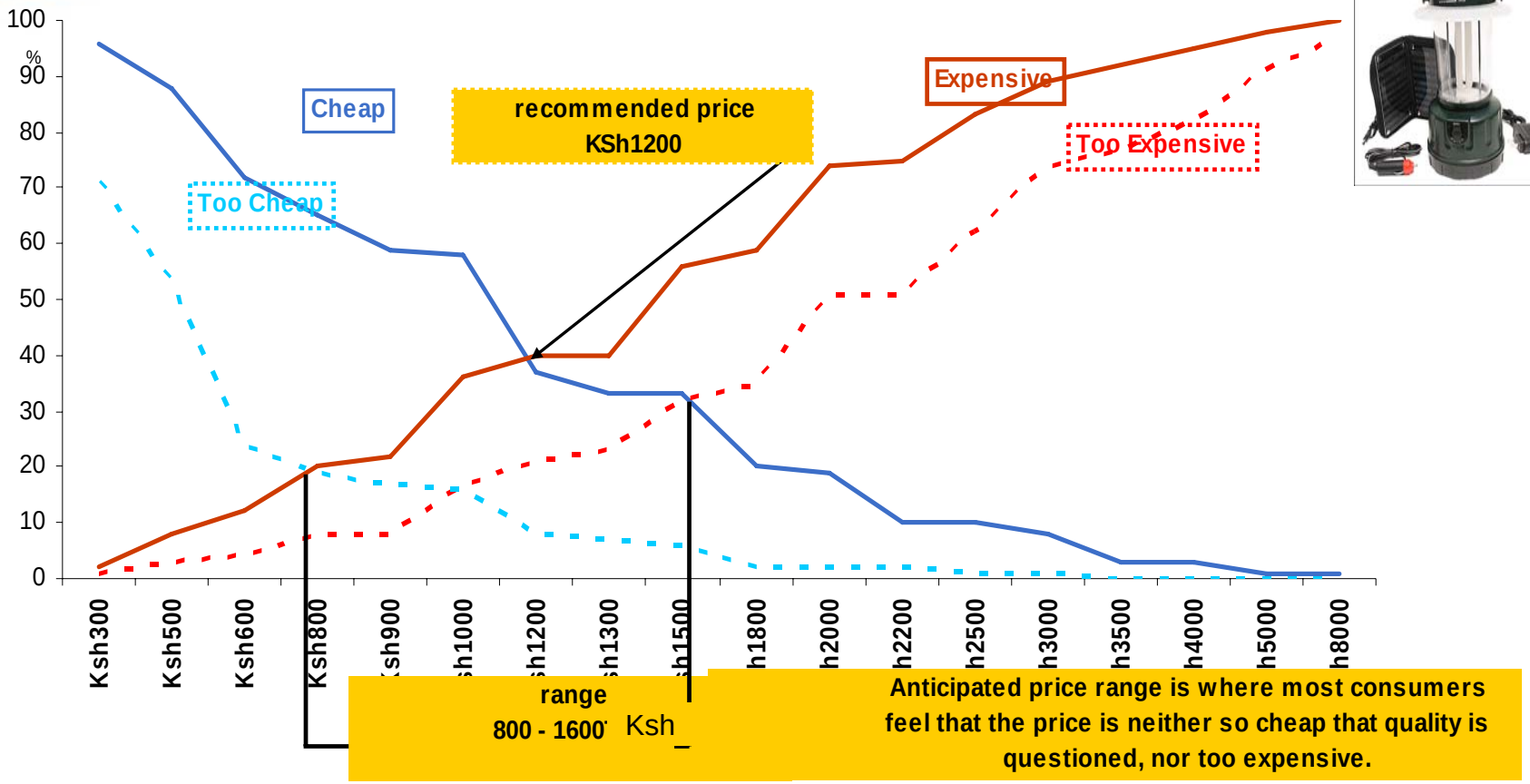
TRADER

PSM: Rechargeable Lantern

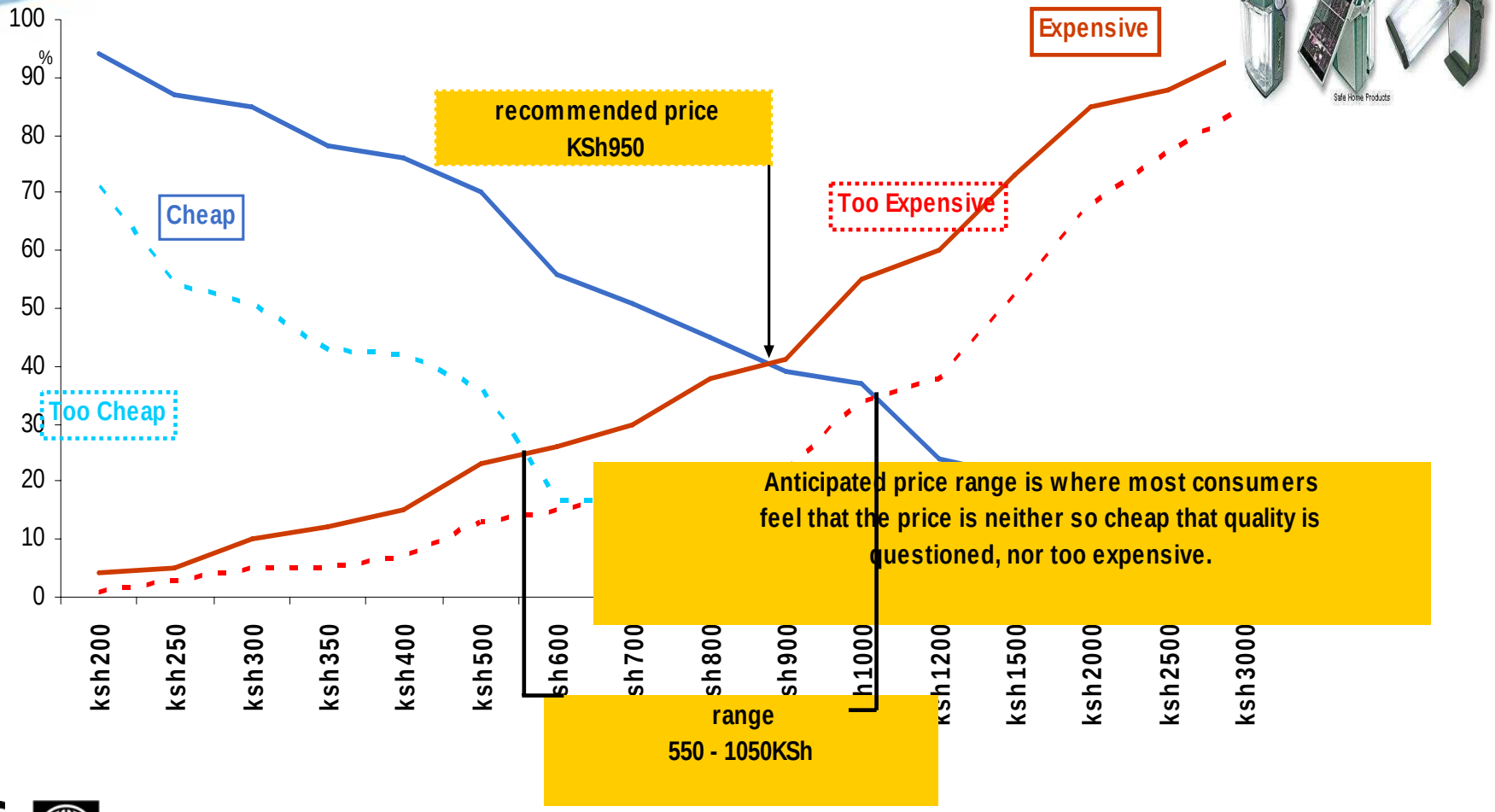
Base: Total sample =400



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

PSM : Rechargeable Task Light

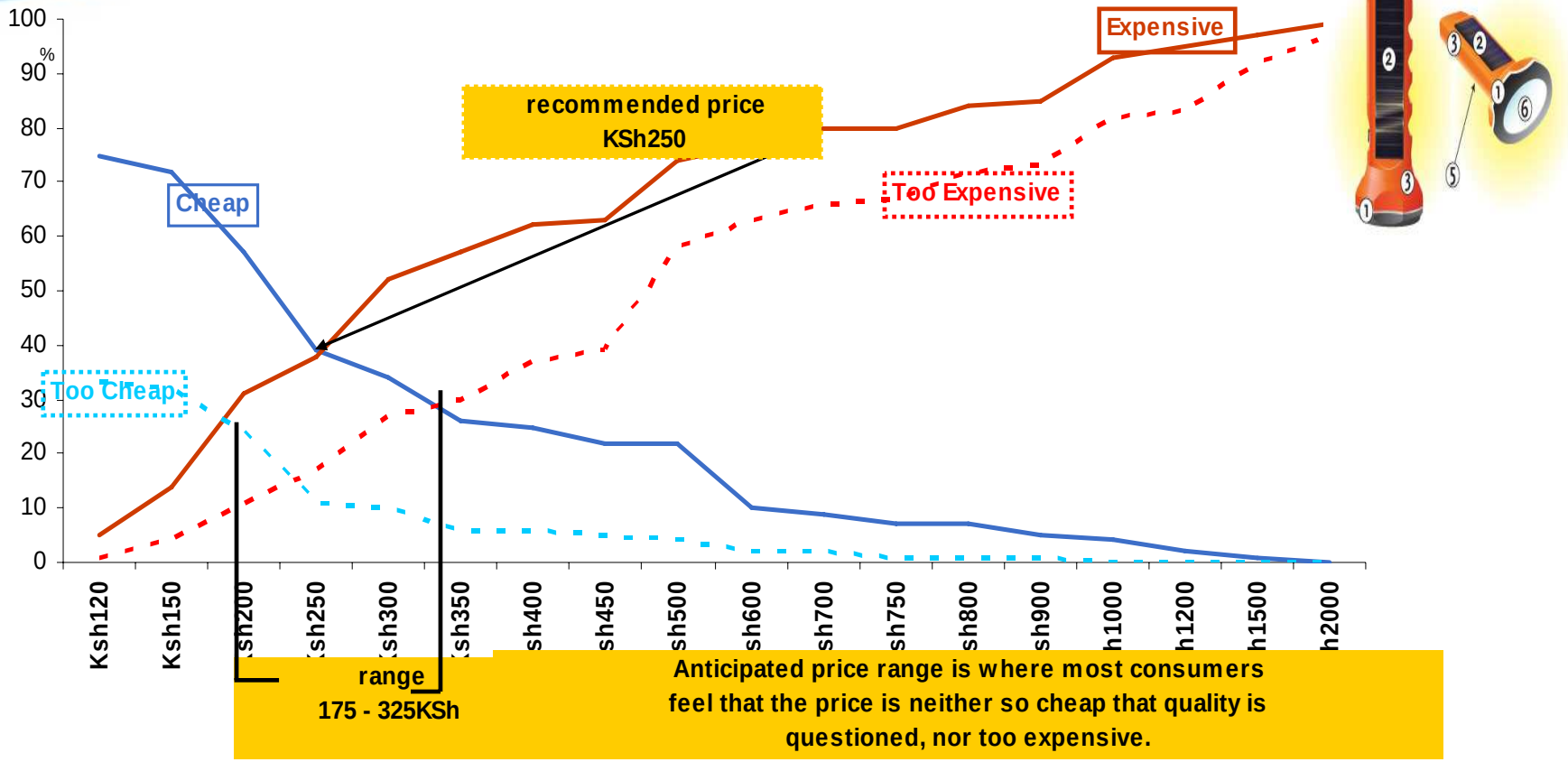
Base: Total sample =400



TRADER

PSM : Rechargeable Torch

Base: Total sample =400

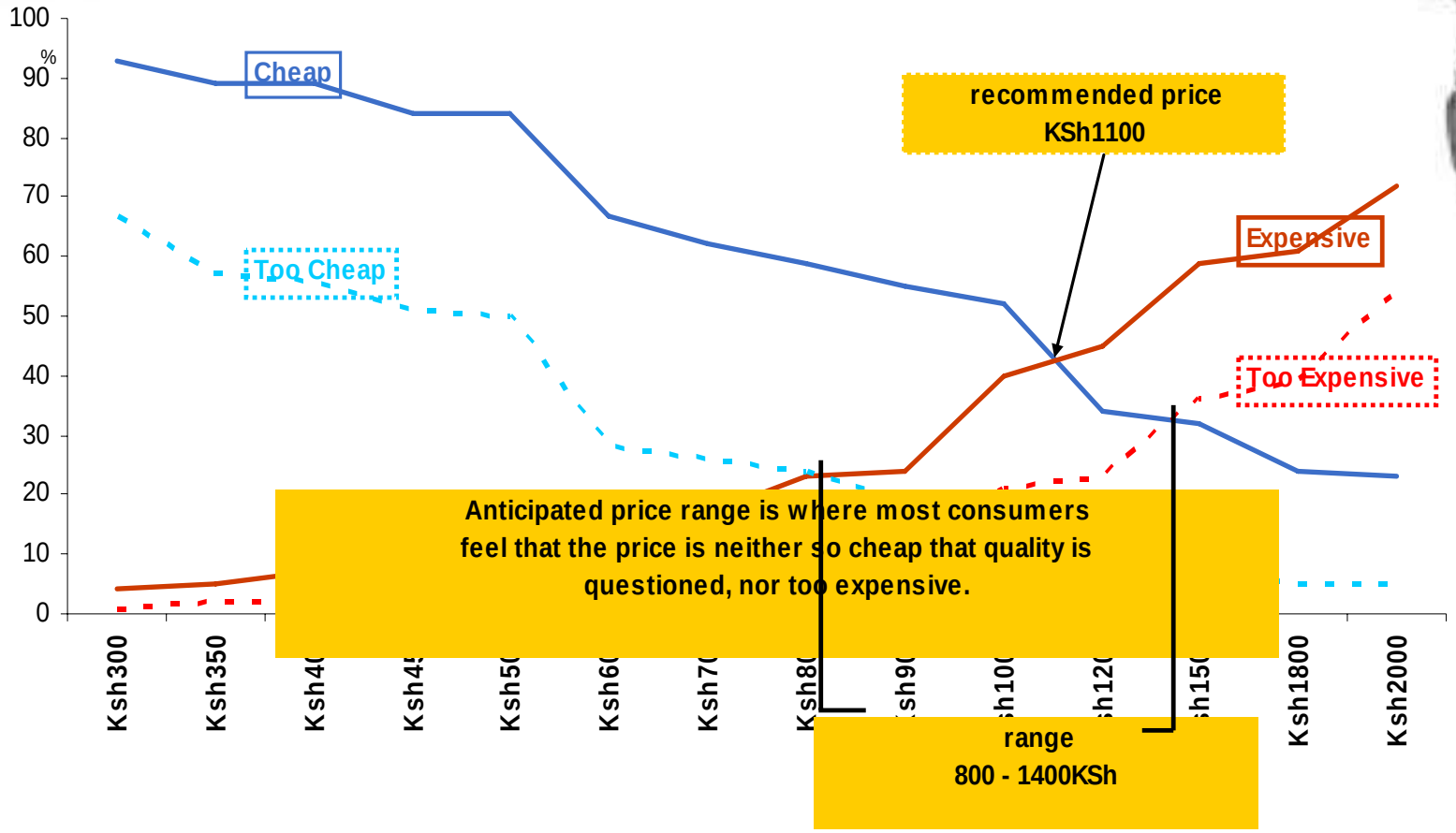


Anticipated price range is where most consumers feel that the price is neither so cheap that quality is questioned, nor too expensive.

TRADER

PSM: Rechargeable Flood Light

Base: Total sample =400



Summary: Most Acceptable Price Point

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

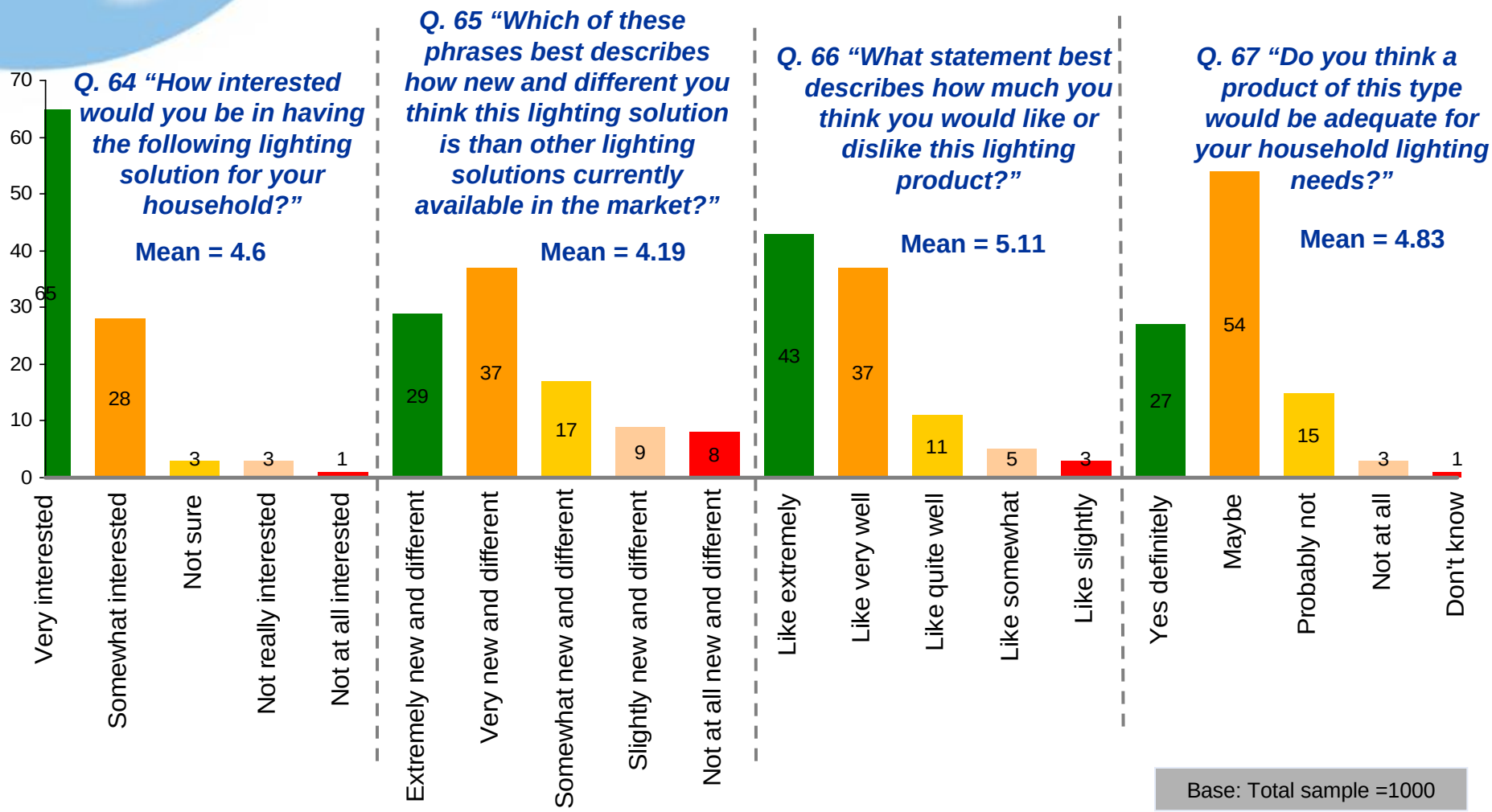
Conversion rate
1US $ = Ksh.66.00

	Household	Trade
 Lantern	US $13.63 (Ksh.900.00)	US $18.18 (Ksh.1200.00)
 Torch	US $3.40 (Ksh.225.00)	US $3.79 (Ksh.250.00)
 Task Light	US $10.30 (Ksh.680.00)	US $14.40 (Ksh.950.00)
 Flood Light	N/A	US $16.67 (Ksh.1100.00)

Home Lighting Concept

Consumers: Evaluation of Lighting Concept

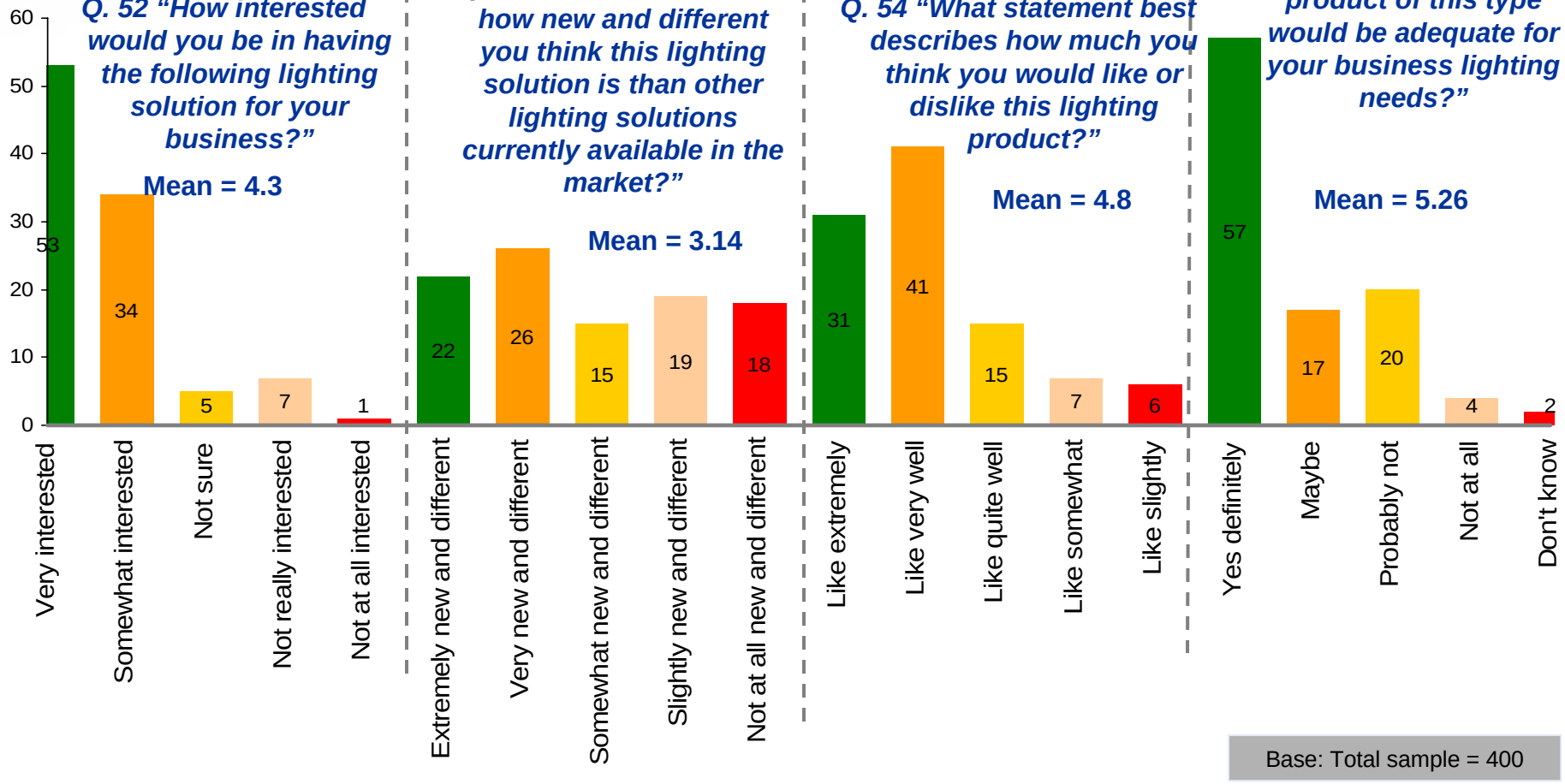
CONSUMER



Base: Total sample =1000

Business: Evaluation of Lighting Concept

TRADER



Base: Total sample = 400

LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

KENYA SUMMARIES

IFC International Finance Corporation
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LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

CONSUMERS

IFC International Finance Corporation
World Bank Group

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Summary: Consumers

Description of Consumer

- Predominantly in lower LSMs (1-3) equivalent of SEC DE,
- Many households are headed by females
- Live in rural environments; semi permanent structures with poor infrastructure and often occupying single rooms
- Averagely 4 to 5 people per household (over 16 years) with average monthly income of US $153.60 which is provided by the household head

Power and Lighting Habits

- Kerosene is the most popular source of power for lighting with 96% of households using it as the main power source
- Use of light in households starts much later after dark so as to reduce the amount of time the lights are on and thus save on costs
- Only a few rooms are lit after dark (often 1 or 2), the longest lit room is the living room – where the majority of family members will gather during the evening, while the least lit is the outside; patio and toilet.
- The main problem experienced after dark is the lack of lighting; as a result, other areas of the house and personal development suffer the most
- About 7 in every 10 households say their households are poorly lit and introduction of more lights would be the ultimate solution

Summary: Consumers

Lighting Devices

- Devices using paraffin are the most widely used i.e. paraffin lamp with glass cover and paraffin lamp with simple wick.
- The lighting devices are placed at a central place within the room so that they can serve everyone
- The drivers towards selection of lighting devices to be used are cost and availability
- As indicated by the qualitative research previously conducted; as a single lighting devise the solar charged LED lantern is the most preferred devise as it gives consumers the maximum amount of flexibility in terms of use by multiple people
- As secondary or tertiary lighting devices, task lights and torches are preferred.
- Prices acceptable to consumers for these devices are:
  - Lantern: US$ 13,63
  - Torch: US$ 3,40
  - Task Light: US$ 10,30
- The Home Lighting Concept is well liked by the majority of consumers evaluating it, mainly due to its flexibility and the fact that multiple people will receive light simultaneously without even having to be in the same room. Consumers would consider purchasing such a concept however their consideration is very much dependant on the price of the devise.

LIGHTING AFRICA

Catalyzing Markets for Modern Lighting

TRADERS

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Summary: Traders

Description of Traders

- Predominantly lower LSMs (3-5) equivalent of SEC C2, many entrepreneurs are males aged 18-44.
- Live in rural planned environments (shopping area's); operate from small permanent structures, and with poor infrastructure.
- Businesses are family managed, being run by one to two people with average weekly sales of US $81.80 and monthly profits of US $83.90.

Power and Lighting Habits

- Just like in Kenyan households, kerosene/paraffin is the most popular source of power for lighting and energy for many businesses
- 4 in every 10 businesses regularly operate after dark, however, 40% state they do not operate after dark specifically due to lack of lighting
- Operating after dark is a very welcome idea as it is thought to increase the number of customers at the shop and hence increase profits

Summary: Traders

- Generally traders are satisfied with their current lighting inside their business premises. However, for those not satisfied, brightness is the real issue, and poor lighting also compromises on security
- The key improvement to be made by businesspeople on their business would be to improve the structure of the business and overall productivity of the business
- The barrier towards increasing lighting needs of the business is lack of money to purchase more and better lighting devices

Current Lighting Devices

- Paraffin lamps are used in 70% of the businesses, however, the preferred source of light would be powered lanterns
- Just like among the consumers the drivers towards use of these devices are cost and availability

Summary: Traders

- As indicated by the qualitative research previously conducted; as a single lighting devise the solar charged LED lantern is the most preferred closely followed by the flood light as it gives traders the maximum amount of flexibility in terms of use by multiple people as well as performing multiple tasks by this light such as: dealing with consumers and counting change.
- As secondary or tertiary lighting devices, task lights and torches are preferred.
- Prices acceptable to consumers for these devices are:
  - Lantern: US$ 18,18
  - Torch: US$ 3,79
  - Task Light: US$ 14,40
  - Flood Light: US$ 16,67
- The Home Lighting Concept is well liked by the majority of traders, although not to the same extent as by consumers, possibly because households are slightly larger in size and therefore traders do not need as many light for their business and consumers do at home. The concept is seen as very new and different the purchase intention for this type of product is quite high with 57% of traders stating they would most probably purchase it

Salient Thought

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

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