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Project Background

Lighting Africa is a joint IFC and World Bank program which seeks to accelerate the development of commercial off-grid lighting markets in Sub-Saharan Africa as part of the World Bank Group's wider efforts to improve access to energy.

It, thus helps to mobilize the private sector to build sustainable markets to provide the rural and urban community not connected to the grid electricity in the region with safe, affordable, and modern off-grid lighting.

As a strategic market in the region, Lighting Africa carried out a market study focused on the communication and consumer education imperatives in the off-grid lighting market in Nigeria between May and July, 2013.

Research Objective 1

The study sought to:

Ascertain the level of awareness of off-grid lighting products and solutions among Nigerians in general and the base of the pyramid population in particular.

Determine the general perception of key stakeholder groups in Nigeria about off-grid products (e.g. solar lanterns) and identify any negative perceptions or perceived barriers in the adoption of these products.

Uncover key consumer concerns, benefits sought, types of products and product features required. This will also include the identification of unmet and underserved needs with respect to off-grid lighting products and a determination of specific consumer needs by demographic/ socio-economic and regional classifications.

Research Objective 2

Determine the key messaging objectives and themes to drive demand and adoption and ascertain the most effective media channels and media mix for communication efforts.

An evaluation of the current communication environment including, sources of information, communication originators, prevalent media usage and communication gaps.

Key Information as required

The study covered the following information areas:

- Consumer awareness, perception and behavior towards the use of solar lighting products.
- · Consumers' awareness of off-grid lighting products and solutions;
- Level of specific brand awareness of different off-grid lighting products;
- Consumer preference in terms of product types, brands, features and price;
- Consumer perceptions of the benefit of off-grid lighting products, and determine if and why any negative perceptions are held.
- Social or cultural factors influencing consumer perception, buying behavior and usage patterns, carefully teasing out any militating social or cultural issues that need to be addressed

Key information as required 2

Competitive analysis

- Clear mapping of the current communication and consumer education environment to identify the existing trends in terms of messaging themes, channel uses and mix, frequency of communication and the key communication originators;
- Existing market participants on the basis of their segmentation strategies, positioning and targeting approaches
- Share of Voice of market participants, top of mind (TOMA) rankings and brand recall;
- Communication spend by market participants, geography, segment, product type and media channels;

Key information as required 3

Opportunity mapping

- What are the most important audiences to be considered in our consumer education initiatives?
- What are the key consumer and stakeholder concerns that need to be prioritized in the design and deployment of communication?
- Which market segments and regions present the most potentially viable commercial opportunities?
- What messaging themes will be most appropriate to help Lighting Africa achieve its objectives and how should these messages be targeted to the various consumer segments
- What consumer engagement platforms will be most effective in influencing behavior, and should be the optimum media mix?

Any other pertinent stakeholder and market participant insights.



Nigeria Socio-Economic Environment

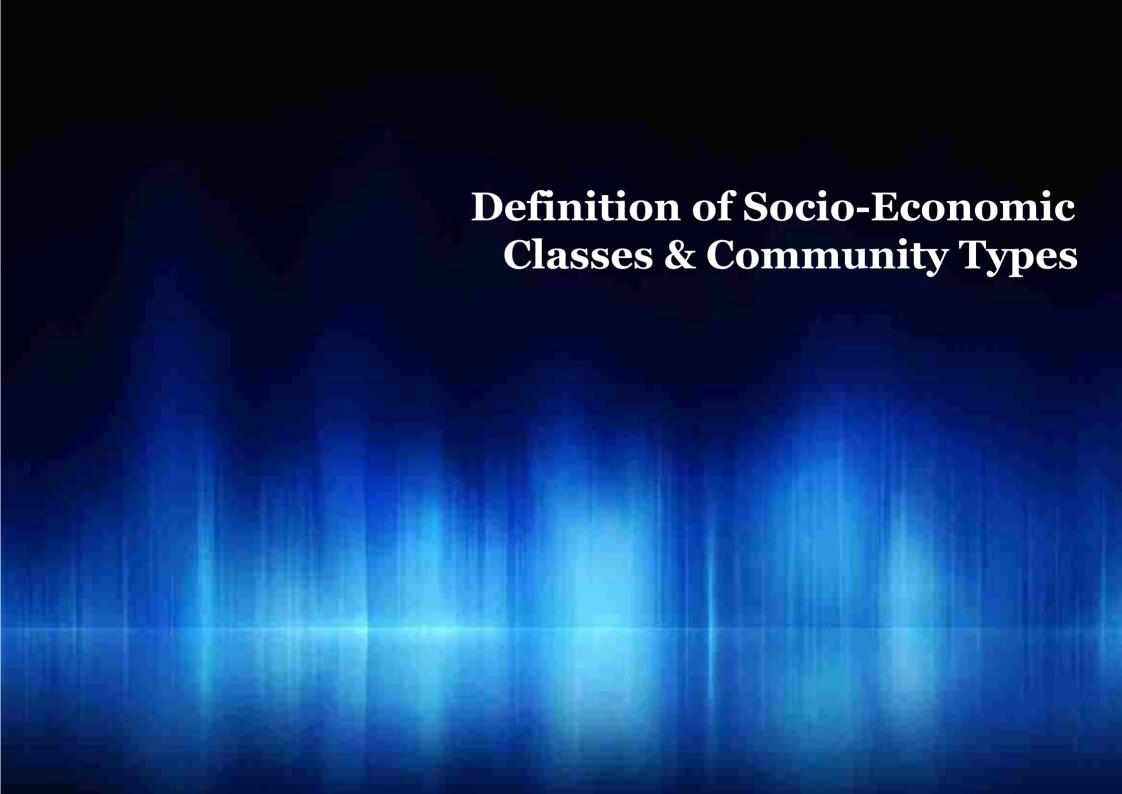
- Nigeria is the most populous country in Africa, with a population of 167 million (World Bank projection for 2012, based on 2.55% annual population growth rate)
- With a national average household size of 5.8, Nigeria has a total number of about 30 million households (NBS, 2010)
- By 2010, Nigeria had a total tertiary student enrollment figure of about 2.5 million (NUC/NBTE, 2010). There are 117 Universities, 68 Polytechnics and Monotechnics and 45 Colleges of Education. Of the total student population, less than 25% are accommodated in official hostels with access to school lighting facilities. Others live off-campus
- Nigeria is a middle income, mixed economy. It is an emerging market, with expanding financial service, communications, and entertainment sectors.

Nigeria Socio-Economic Environment

- It is ranked 30th (40th in 2005, 52nd in 2000), in the world in terms of GDP (PPP) (2012), and 2nd largest within Africa (behind South Africa), on track to becoming one of the 20 largest economies in the world by 2020 (Government's Vision 20, 2020).
- Despite its present under-performance, the manufacturing sector is the third-largest in Africa and provides goods and services to much of the West African sub-region.
- Despite years of mismanagement, economic reforms of the past decade aim to put the country back on track towards achieving its full economic potential
- Nigerian GDP at purchasing power parity (PPP) has almost trippled from \$170 billion in 2000 to \$451 billion in 2012, although estimates of the size of the informal sector (which is not included in official figures) put the actual numbers closer to \$630 billion.

Nigeria Socio-Economic Environment

- Correspondingly, the GDP per capita doubled from \$1400 per person in 2000 to an estimated \$2,800 per person in 2012 (again, with the inclusion of the informal sector, it is estimated that GDP per capita hovers around \$3,900 per person)
- Nigeria is a key member of OPEC (Organization of Petroleum Exporting Countries) and the 6th largest oil exporting nation in the world
- Over the years, Nigeria's electricity supply capacity has not kept up with rapid population and industrial growth. The result is a huge power supply deficit



Socio-Economic Classes of Target Respondents

A: Upper upper class

- This segment constitutes about 2% of the total population.
- Mainly university educated
- Live in low population density environment
- Dwelling structures include bungalows, duplexes, terrace houses, with well maintained courts
- They are successful business, commercial entrepreneurs, professionals, top government officials
- Annual income of N10 million (USD68,000) and over
- Major household durables include Satellite dish, washing machine, cable TV, high capacity diesel electricity-generator (about 167 KVA)

B: Lower upper class

- This segment constitutes about 4% of the total population.
- Mainly university educated
- Live in low population density environment
- Dwelling structures include bungalows, duplexes, terrace houses, with well maintained courts
- They are successful business, commercial entrepreneurs, professionals, top government officials
- Annual income range between N5 9.9
 million (USD31,250 67,999))
- Major household durables include satellite dish, washing machine, cable TV, high capacity diesel electricity-generator (about 167 KVA)

Socio-economic classes of target respondents

C1: Upper middle class

- This segment constitutes about 9% of the total population. They, generally have tertiary education (university, polytechnic and college of education).
- Generally live in medium density
 population environment; they
 occupy own or live in rented flats,
 not necessarily detached building
 structures, with averagely furnished
 sitting rooms.
- Average annual income is
 N2,000,000 4,999,000 (\$12,500 31,243). Major HH durables include radio, colour TV, Satellite dish, fridge, water dispenser, 1-3 cell phones

C2: Lower middle class

- This segment constitutes about 16% of the total population. They, generally have secondary to tertiary education .
- Generally live in medium to high density population environment; they occupy own or rented 2-3 bedroom flats or bungalows.
 Mostly skilled, manual workers.
- Average annual income is N600,000 – 1,999,000 (\$3,750 12,493). Major HH durables include radio, colour TV, satellite dish, fridge, 1-2 cell phones

DE: BoP Population

- This segment constitutes about 69% of the total population. They, have no to very little education (at most completed primary).
- Generally live in high density
 population environment; they
 occupy rented single-room
 apartments or own low-grade
 bungalows. Mostly employed or
 self-employed semi- and unskilled
 workers, traders
- Average annual income is less than N599,000 (\$ 3,750). Major HH durables include radio, TV, fridge, one cell phone

Socio-economic classes of target respondents

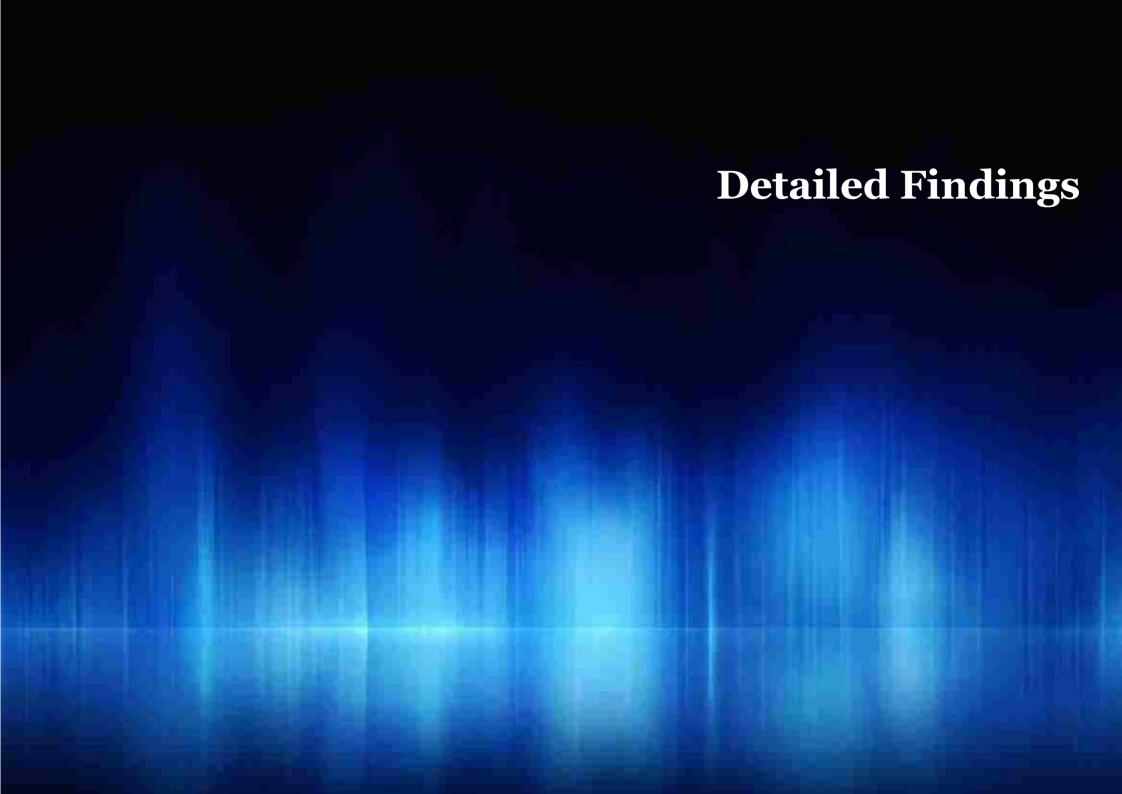
Urban area

- A community is classified as urban if it has a population size of 20,000 and over, and has the following social amenities:
- grid electricity supply
- functional educational institutions
- standard health facilities
- good road networks (most of them tarred)
- post office(s)
- standard markets
- organized motor park(s)
- banking facilities

Rural area

- A community is classified as rural if has a
 population size of less than 20,000 inhabitants
 and has none, some or all of the following basic
 social amenities:
- grid electricity connection
- primary/secondary school
- primary health centre

Source: National Population Commission





Qualitative research Methodology

- Based on the depth of information required, we conducted a part of the study using the qualitative approach; focus group discussions (FGD) and in-depth interviews (IDI).
- The Focus Group Discussions were carried out in six states, each selected from one geopolitical zone, namely, Kano-North West, Bauchi -North East, Benue North Central, Abia South East, Edo South South and Oyo South West. The studies was carried out in both urban and rural areas of the states with a total of seven FGDs per state.
 - A total of 28 IDIs were conducted amongst the following stakeholder groups; Standards Organization of Nigeria (SON), Ministry of environment, Consumer Protection Council (CPC), NESREA, National Orientation Agency (NOA), Federal Ministry of Information, Environmental Rights Action, Friends of the Earth; Nigeria, UNEP, media owners, energy journalists, advertising practitioners, suppliers, importers, wholesalers, retailers.

Sample distribution – FGD

Consumer group	Age bracket			No of FGD's
	18-30yrs	31-45yrs	45-60yrs	
Individuals	1 rural	1 urban	1 rural	3
Household Heads		1 urban	1 rural	2
Owners of micro-enterprises (bar-	Mixed group			2
bers, pretty traders, farmers, vul- canizers etc)		1 rural	1 urban	
Total number of FGD's per state				7

Current challenges

The problems in Nigeria are both economic and social. However, rural areas are more disadvantaged in terms of social amenities. Below, in no particular order, are the identified problems;

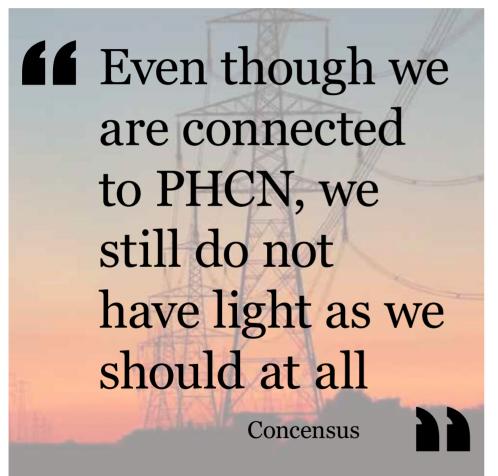
Rural	Urban		
Poor funding of education	Insecurity/high crime rate		
No health facilities	Unemployment/ no job opportunities		
Poor telecom network	Double taxation		
Inadequate support for farmers	Bad roads		
No good market	Inconsistent power supply		
Communal clash	Non-empowerment of youths		
Poor road network	Lack of drinking water		
Lack of industries	Corruption		
Lack of drinking water	Bad drainages		
Inconsistent electricity supply	Lack of industries		
High government taxation	Substandard health facilities		
Bad leadership			
Poverty			

Across groups and locations, erratic power supply was mentioned

Evaluation of the current lighting environment

Current lighting situation - Urban

Connection to the National grid



Nearly all residents in the urban area across locations are connected to the National grid

Those who are not connected willingly decided not to for reasons such as recurrent high bills and prolonged faulty transformer

"they give us high bills all the time so we decided to stay without it for now as we have more pressing needs"

Although majority of respondents say they are connected to the national grid, hours of no electricity supply is a common occurrence

Current lighting situation - Rural

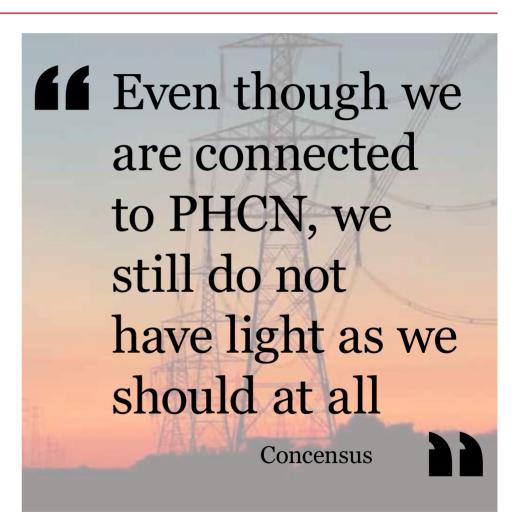
Connection to the National grid

Nearly all residents in the rural area across locations are connected to the National grid, except for Makurdi

No single house in Makurdi rural (Adaka village) is connected to the national grid. They say they cannot afford the wires to connect to the transformer.

"They just brought a transformer and we have not yet run the wires to our houses because the money is too much" HHH, Makurdi rural

Although majority of respondents, except Makurdi rural, are connected to the National grid, it still does not quarantee stable power supply



Peculiar problems with the National grid

- Irregular supply of power
- Low voltage
- Estimated bills/over billing (crazy bills)
- PHCN staff demanding bribes
- Delayed response to complaints/ poor customer service
- Billing when power is not in use
 - High reconnection bills
 - . No meter



"There has never been steady light"

- Consensus

Sometimes, we get light once or twice in two weeks"

- Benin rural

"We get light twice or thrice a month, yet they bring high bill"

- Aba urban

"We get light twice a week, for two hours, its really frustrating"

- Kano urban

Regardless of the connection to the National grid, majority barely derive full utility

Monthly payment for National grid

Respondents say that PHCN billings do not depend on consumption any longer, as in most cases, what they receive is estimated bills and not bills based on what is consumed

Urban spend

\$9.3 - \$93.3 (N1,500

-N15,000)

Even with the inconsistent light they still give us very high bills and when we don't pay they cut off our light — Urban Bauchi

You can imagine the high bills they give us not minding if they give us light or not — Rural Kano

\$9.3 - \$93.3 (N1,500 -N15,000)

Rural spend

Monthly spend on electricity from the National grid is high and there is no satisfaction with their service offerings



Awareness of alternative sources of lighting products



Usage by locality

A few rural dwellers use firewood and dried grass to light up their houses because they say cannot afford to buy kerosene everyday for their lanterns

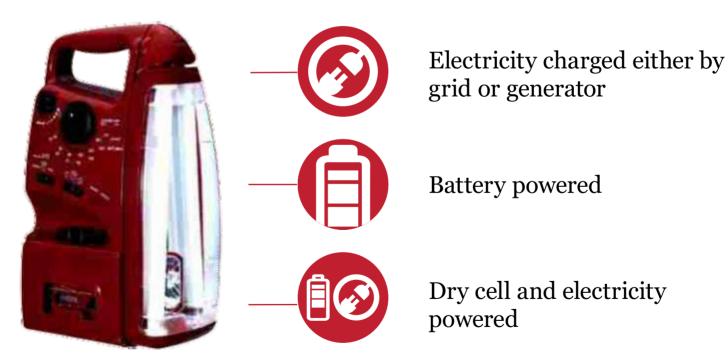
Urban	Rural
Generators	Locally made lamps
Rechargeable lanterns	Kerosene lanterns
 See types of rechargeable 	Candle
used on next slide	Torch lights
Mobile phone light	head lamp (hunters lamp)
Gas lamp – only in Kano	Fire wood
and Bauchi	Battery lantern

Rural areas use cheaper and more alternatives as they are more deprived of power from the National grid

Types of rechargeable lanterns used

I use rechargeable lantern that is charged by both electricity and battery so that if there is no light, I buy batteries", - SME Edo urban





Rechargeable lanterns are differentiated based on the source of recharging

Types of rechargeable lanterns used



- Can be charged with either a privately owned generator, on-grid or at a commercial center e.g. business centers, phone call centers or barber shops.
- Mainly found in on-grid communities
- Average cost for charging \$0.3 to \$0.6 per full charging at commercial centers at a time
- Amount spent on average per month \$0.6 to \$2.4



- Use between 3 to 5 pairs of batteries at a time.
- A set of 3 batteries lasts for an average of 10 days, while 5 pairs last for 2 weeks minimum.
- Each pair costs \$0.4. Monthly spend per month is \$3.4 to \$3.7
- Mainly found in off-grid communities, mainly rural areas.



- Found in both rural and urban areas.
- Mainly used in areas where there power is uneven
- Battery is put in at least twice a month.
- Monthly spend is \$2.2 to \$3.7

In-depth perception Generators



- Serves as an alternative to PHCN
- Used for emergency purposes
- Easy to use
- Generate bright light
- Can power other household appliances.
- Light always available as long as you want it
- Can light up the entire house like PHCN.

Majority were positively disposed to generators; appeal is driven by its multi-benefits although thought of as expensive

NEGATIVE



- Expensive
- Noisy
- Not convenient for neighbors
- Produces smoke that is harmful to health
- It is inflammable
- · High cost of maintenance

In-depth perception Rechargeable lantern



- Gives bright light
- Affordable
- Portable
- Fashionable
- · Good for reading
- · Lasts relatively long after charging

NEGATIVE



- It is fragile/ breaks easily
- Depends on generator/national grid
 - many fake products exist
- It is not durable

Majority were positively disposed to the rechargeable lanterns. Seen as near ideal since it does not portend any harm

In-depth perception Candles





- . Cheap
- · Readily available

- It produces smoke which is harmful to the eyes
- It can cause fire outbreak if carelessly handled
- Generates heat
- Harmful to children if kept within their reach

Majority were negatively disposed to it; mainly used because it is within the reach of the common man

In-depth perception Battery lanterns and headlamps



NEGATIVE 7

- Cheap to maintain
- Affordable

- Battery easily rusts especially when it comes in contact with water
- Battery don't last for long/ counterfeit battery

Main likes centered around cost.

In-depth perception Mobile phone light



- Portable
- . Always handy for use
- Economical

•

NEGATIVE

- Runs down the battery of phones
- Cannot light up an entire room

Majority were negatively disposed to it; mainly used because it is within the reach of the common man

In-depth perception Kerosene lanterns



NEGATIVE

Affordable

- It gives off smoke
- . It is inflammable
- Generates heat
- · High cost of kerosene
- Old fashioned

Majority were negatively disposed to it; seen as out-dated

In-depth perception firewood/local lamp/ gas lamp

POSITIVE

- Very cheap –fire wood and local lamp
- Gives very bright light
- Serves as room heater during cold periods
- Drives away flying insects from perchinglocal lamp
- Can be self made: local lamp and firewood
- Easy to use

NEGATIVE



- It produces smoke firewood and local lamp
- It is inflammable
- Generates heat

Majority were negatively disposed to it; mainly used because it is within the reach of the common man

Consumer speaks Likes of alternatives

- "
- one thing about generator is that you are the one controlling it, you know when to put in off or on *SME Ibadan urban*
- If there is no light and you don't have enough money to buy kerosene, you buy candle. It is very cheap to use *SME Aba urban*
- The cost of maintenance of a kerosene lantern is much lower than that of generator *SME Benin urban*
- Battery lamp is less risky, easy to repair and cheap to maintain HHH, Bauchi rural



- "
- Firewood burnt down our house during Harmattan

- SME Makurdi rural

- 'Atupa' (local lamp) brings out smoke and it makes our clothes dirty if it is inside the bedroom *Individual Ibadan rural*
- I have seen a whole family get burnt to death when their generator caught fire Household, Aba urban
- Kerosene is expensive to buy considering that I have four wives and each of them will have to keep buying it everyday Head of household, Bauchi
- The gas lamp is very expensive to maintain and produces a lot of heat that is why it is used outdoors SME, Kano



Generator

Uses

- More in use in the urban areas than the rural as a substitute to the national grid, because it is seen as expensive
- It provides light and enables consumers to enjoy their household appliances.
- Small scale enterprises such as barber, hairdresser, business centre, cybercafé, etc depend heavily on generator to run their businesses. It was pointed out that the use of generator for businesses leads to higher charges. By implication, the cost of running a generator is passed on to the consumers.

Duration

- Rural areas only switch on between the hours of 7pm and 10pm.
- Urban areas put on at any time of the day that there is need for it.



Rechargeable Lantern

Uses

- Used in both urban and rural areas, although patronized more in the urban areas because it depends on either electricity or generator to recharge it.
- It is used in the house, shop and market for lighting purposes only

Duration

• Used in the evenings and early mornings in both rural and urban areas



Kerosene Lantern

Uses

- It is used to light up the house and shop among the lower class in both urban and rural areas.
- It is used by women in the kitchen to cook when there is no light
- Used when the family is gathered at evenings for family times

Duration

• Used at evenings and early mornings



Candles

Uses

- It is a product used by small-scale traders, some students, lower class (DE) in the rural areas.
 - Petty traders use it to provide light for their markets as well as drive away flies.
 - · Students use it for reading during examination period

Duration



Firewood

Uses

- · The use of firewood/dried grass was only mentioned in Makurdi rural.
- It is used in front of the house to brighten the environment.
- · Occasionally used inside the house particularly during raining/harmattan seasons.

Duration



Locally made lamp

Uses

- It is a product used by petty traders, lower class(DE) in the rural and urban areas.
- Petty traders use it to provide light for their markets as well as drive away flies.
- It is used in front of the corridor of the house to brighten the environment.
- Occasionally used inside the house particularly during raining/harmattan seasons to warm up the body.

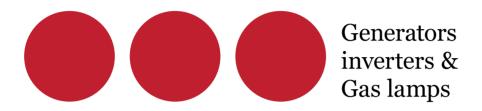
Duration

Monthly amount spent for alternative lighting



Some respondents' monthly spend is high because they use multiple alternatives at home and at their place of work

Purchase decision of alternative lighting products



 Mainly head of household because of the financial implications. However, any other financially buoyant adult

can also decide on the purchase

I take the decision when my husband is not around", HH Aba urban

and use of generator



 Any adult in the household can decide on the purchase and use of other alternative lighting products because of their low financial implications

"I take the decision myself" SME Ibadan urban

Social/Cultural inhibition for the use of alternative lighting products

- There was no identifiable social/cultural factors in all the urban and rural areas covered in this study that inhibits the use of any lighting products.
- By implication, because of the deplorable situation of the national grid, any lighting products that meets the need and aspiration of the people at an affordable price will thrive in any part of the country.

Modern Lighting Products: Awareness & Perception

Spontaneous awareness of modern lighting devices

Some of the respondents spontaneously recalled the following modern lighting devices:



It is pertinent to note that solar energy and inverter were mentioned unaided in all the locations except Bauchi rural where inverter was not mentioned. Gas-to-power and power caster transmitters were only mentioned in Aba and Makurdi urban.



Consumers voice...

Mainly positive associations across all groups.

...they are products that can be charged with the sun.

... it's electricity without any monthly charges.

... alternative to PHCN

What does solar lighting product mean to you?

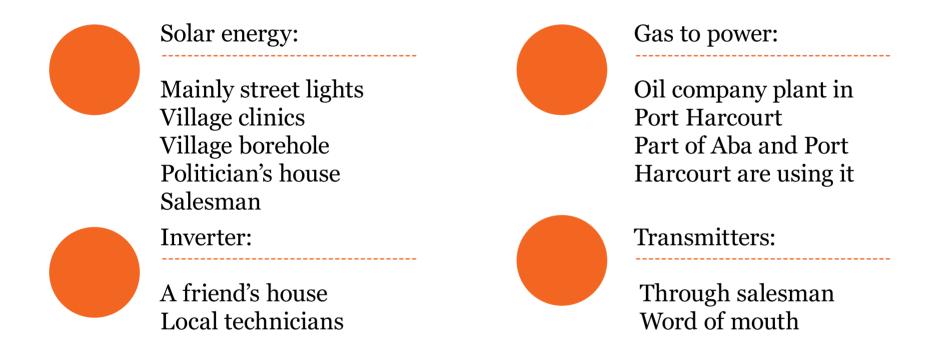
... it's expensive but reliable.

...it is fashionable and adds to the beauty of the home.

... its an alternative source of power supply.



Sources of awareness of modern lighting devices



Respondents awareness of solar lighting is mainly from street lights

In depth perceptions: Solar Lighting products

Solar lighting products rated high in terms of quality associations



- Cheap to maintain does not require fuelling
- Risk-free
- Noiseless
- Fashionable
- No pollution
- Economical in the long term
- Usage can be controlled



It does not produce noise and smoke, it is natural



- Routine charging is stressful
- Expensive
- Ineffective during periods of low/no sunlight



Mainly positive disposition to solar lighting products; concerns border on cost and seasons of low amount of sun

Readiness to buy modern lighting devices that will last for 5 years

- Nearly all the respondents expressed readiness to buy a modern lighting device that will last for five years. The basic assumption is that such a device should be able to light up the whole house at a price they can afford to make a one-off payments on.
- However, a few declined if it is only going to serve the purpose of lighting without powering other electrical appliances in the house. Such a device is seen as similar to rechargeable lanterns.
- Respondents varied widely in terms of cost price of such a device since it cannot power their household appliances; but gave a range of between \$6.2 \$62.2 (N1000 to N10,000).

Ideal solar lighting product...

- It should work exactly like the National grid (PHCN
- Comes in different lighting colours
 - Ability to charge phone – inbuilt charging point

It should carry all kinds of electrical appliances including refrigerator

Ideal Solar Lighting **Product**

It should be user -friendly

It should have many lighting points. Provides light for the whole house

It should carry basic electronics in the house – television, radio and fans

It should be durable and portable



Due to appalling experiences with the national grid, respondents say their ideal solar lighting product should be such that can replace the grid.

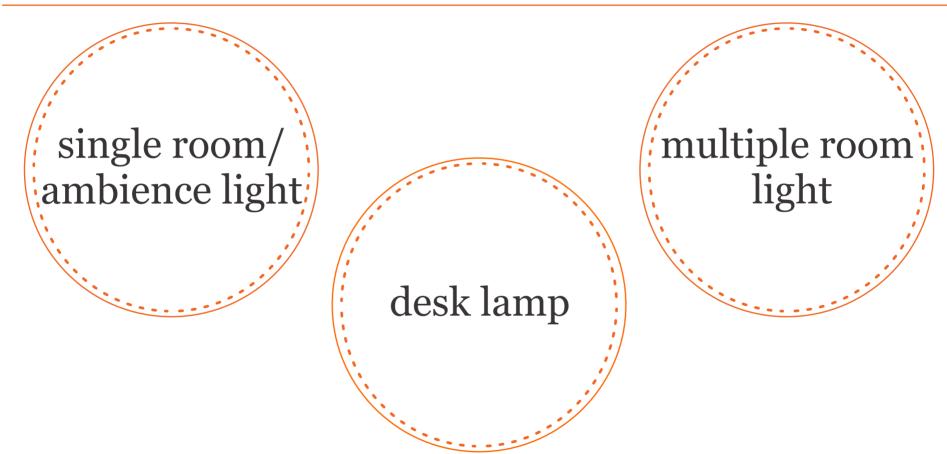
Reasons why solar products will be rejected...

- Poverty
- Lack of education on its importance and uses
- Ignorance
- High cost
- Poor quality products

Although all respondents were positively disposed to solar lighting products they believe that ignorance and poverty can make their countrymen reject the product.



Products tested



Respondents were overwhelmed on seeing the three products. They were all anxious to touch it because they have not seen such lighting products before.

Spontaneous responses...



...It is a good product





... it is very presentable and fashionable

Spontaneous responsed

... Since the source of power is sunlight, it is free to use; just buy it once and that is all.



...I like it because it uses sunlight to generate power.

... it looks 'take away



Due to appalling experiences with the National grid, respondents say their ideal solar lighting product should be such that can replace it .

In-depth perception of desk light



- Handy, portable and flexible
- Durable and unique
- Economical to use
- Brightness of the light is good enough for reading
- Useful when cooking at night/early morning
- Can be used at any time
- Easy to use
- No need for battery
- Stronger than the ambient light



Negative

- Too small. "Children can easily mistake it for a ball and would like to take it outside to play with it"
- Not as bright as rechargeable lantern
- Does not charge phone "It just for only light"
- Cannot be used to power home appliances
- Looks like toy

Stakeholder group

- Student for reading
- Single individual
- Housewife for cooking
- Rural dwellers-for moving about in the dark
- Petty traders and shop owners
- Children in their bedroom

Mainly positive disposition to desk light driven by its portability and shatterproof quality

In-depth perception of ambient light



- Charge mobile phones
- Unique and durable
- Dual purposes
- Economical to use
- Brighter and bigger than desk light
- It is handy
- Portable
- Attractive shape
- Look more matured
- Will reduce cost of charging phones



Negative

- Shape not appealing "it looks like a hunter's torchlight"
- Outdated shape
- Not as portable as the desk lamp

Stakeholder group

- Matured/older adults
- Household
- Artisans
- Student
- People in the villages
- Housewives

Mainly positive disposition to ambient light driven by its ability to charge phones and stronger quality of light when compared to the desk lamp

In-depth perception of multiple light



- Ability to charge mobile phone
- Unique and durable
- Dual purposes
- Economical to use
- Brighter light than the other two
- Two lighting points
- Can serve as security light
- Attractive shape/fashionable
- Look more matured than the others
- Light can brighten a bigger space when compared to the other products



Negative

- Stationary (for a very few)
- One control switch for two lighting points

Stakeholder group

- The entire household
- Young working class
- Rich people
- People living in flats

[•] Mainly positive disposition to the multiple light; driven by the strength, uniqueness and coverage of light when compared to the other two products

Amount willing to pay for the products - Rural ...



Conversion rate: 1USD = N160.7

Amount willing to pay for the products - Urban ...



Conversion rate: 1USD = N160.7

Best price for the products

Desk light	Ambient light	Multiple light	
\$15.5 and abor (N2,501 and above)	ve \$24.9 and above (N4,000 and above)	\$37.3 and above (N6,000 and above)	Too expensive; not worth it
\$12.5 - \$15.5	\$18.7 – \$24.9	\$31.1 – \$37.3	Too expensive
(N2,001 - 2,50	00 (N3,000 –4,000)	(N5,001 – 5,999)	
\$9.3 – \$12.5	\$15.5 – \$18.7	\$24.9 – \$31.1	Worth it but not af-
(N1,501 – 2,00	00) (N2,501 –3,000)	(N4,000 – 5000)	fordable
\$6.2 – \$9.3	\$9.3 — \$15.6	\$15.6 – \$21.8	Worth it and Afford-
N1,000 –1,500	(N1,501 —2,500)	(N2,500 –3,500)	able
\$3.1 – \$6.2	\$5 – \$9.3	\$9.3 – \$12.5	Affordable
(N500 –999)	(N800 – 1,500)	(N1,501 – 2,000)	
\$1.6 – \$3.1	\$1.9 – \$5	\$3.1 – \$9.3	Too cheap; wont buy it
(N250 – 499)	(N300 – 799)	(N500 – 1,499)	

Comparison between solar lighting and alternative lighting products

- Interestingly, all the respondents across regions and localities preferred solar lighting products to the other alternative lighting products in terms of:
 - **Durability-** "Based on what you have shown to us, it will last longer than the other alternatives we mentioned earlier" Household, Makurdi urban.
 - **Safety-** "It can be used in children bedroom instead of using candle or kerosene lantern that may catch fire if not properly handled" SME Ibadan urban
 - Ease of operation-"It saves me the stress of going to filling stations to buy fuel", Individual Benin urban
- Life span- "Based on what you have shown to us, it will last longer than the other alternatives we mentioned earlier" *Household, Makurdi urban*.
- Cost (in the long term)- "It is a product you can use at any time and there is no additional fee" *SME Kano rural*
- Nonetheless, generator is preferred on brightness of the light in view of the fact that generator light shines exactly like the national grid light and its ability to power other household appliances.
- Respondents say if solar product is adopted, they will save monthly between \$6.2 (N1,000) and \$31.1 (N5,000) for urban dwellers and \$1.3 (N200) to \$31.1 (N5000) for rural dwellers.

(note that the upper value represents all costs incurred by polygamous homes and SMEs)

Summary of uses of the three solar products

- Notably, majority of older adults in urban and rural locations preferred the multiple room light, while young adults preferred the ambient singe room light.
- The rural dwellers preferred the multiple roomlight; however, they feel that the product will be too expensive for them to buy.
- Students and married women preferred the desk light; they say it will be useful for reading, cooking and going out when it is late, especially in the north where women are not allowed to go out at night.
- SMEs prefer the multiple room light and the desk lamp. The multiple roomlight for home and shop use while the desk lamp to move around with.

Community groups/leaders that can influence purchase ...

Urban

Trade/market association leaders
Community leaders
Religious leaders
Head of schools
Companies co-operative association leaders
Major electrical parts sellers
Film producers (esp. in the north, Kaniwood)

Rural

Religious leaders (pastors and Imam)
The village head/district heads
The royal highness
Youth leaders
Women leaders
Film producers (esp. in the north, Kaniwood)

No strong differentiation between community groups and leaders than can influence purchase in urban and rural areas

Channels through which they get to know about new products...

Urban Rural

Television

Radio

Billboard

Word of mouth

Newspapers

Road show

Through salesmen

Seminars

Flyers (esp. when written in

local dialects)

Word of mouth

Through salesmen / one on

one marketing

Television

Radio – very effective in the

north

Text messages (written in local

dialects)

Neighborhood stores

Radio, direct marketing and road shows were adjudged the most effective channels through which they get to know new products

Most effective channels of knowing new products

- Television is most preferred channel since it allows viewers to better appreciate the product. However, because of the erratic power supply, it will not be very effective in the advertisements of the products.
 - "This place is rural, not everybody owns a TV. Even if you do, there's no constant light to watch it" SME Ibadan rural
- Radio was adjudged the most effective especially in the north as radio listening is a custom that is enshrined in their system.
- Road show/market storm and direct sales (one on one marketing) was next preferred because it gives room for the physical demonstration of the products;
 - The product features, how to use it, price among other things will be elaborated upon.
 - It also provides room for intending buyers to express their concerns and have them answered
 - Actual purchase can also take place there

Communication environment

Current communication environment

Messaging themes	Channels used and mix	Frequency of communication	Sponsors of the communication	Key influencers in the rural areas
Energy saving	Newspaper	Relatively low	Marketers	Community based organizations (CBOs)
Env. friendly	Radio		International NGOs	Local radio stations
Safe handling/ disposal	TV			School events
Brighter light	Government endorsed messages Documentaries			Rural leaders

Longer lasting

The various platforms for communication are adequate for effective communication; however frequency of communication is low

Product essence....

Product samples	Product essence	
Desk /task lamp	Makes reading easier in the dark without disturbing the activity of another in the same room Durable Fashionable	 Unique and portable Easy to use Easy to handle Convenient / handy Modern
Ambient /room light	Its unique Moveable	Dual purpose Brighter
Multiple room light	Unique Trendy Elegant	Multiple purpose Brightest

Product essence reflects product emotional benefits

Messaging themes Solar lighting product

- Solar lighting is risk free and low cost
- Alternative lighting
- Save on kerosene
- Uninterrupted power
- Economical and affordable
- Recharge your phone through solar
- Free light

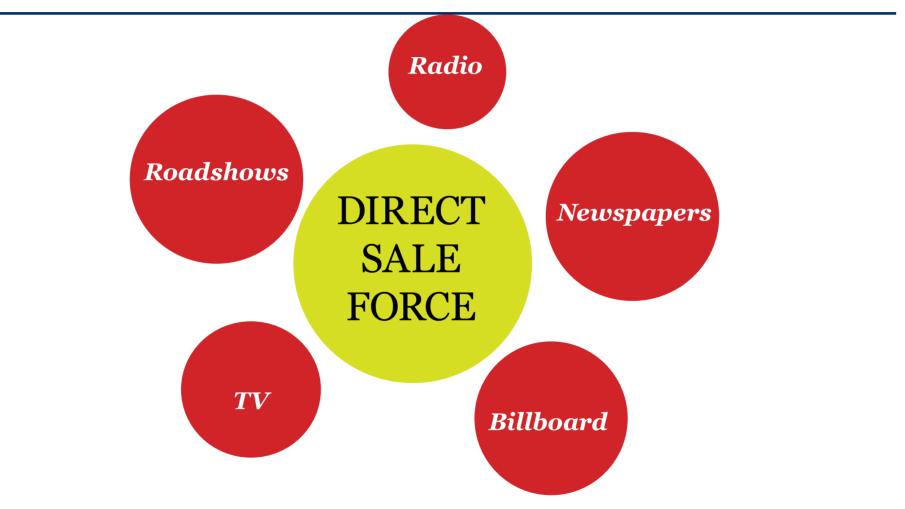
Messaging themes should reflect product benefits as this will in crease likelihood of adoption of products

Channel mix vs. stakeholders...

Consumer segment	Channel mix		Language
Student	Campus show Product display	Television/Internet Sales pitch	English and pidgin (local English)
Traders	Product display Radio Road show	Sales pitch Street rally Billboards	3 common languages, English and pidgin (local English)
SMEs	Newspapers Road show	Television Radio	3 common languages, English and pidgin (local English)
Household	Radio T.V Product display	Street rally Direct sales Product display	English and pidgin(local English)
Individuals	Billboard Radio Street rally	Direct sales T V Magazines	English and pidgin (local English)

Physical display of product to stakeholders is key to increase in demand of the product

Channels mix for communication



A mix of different channels complementing a direct sale force will enhance awareness of the product

Consumer education programs...

- Energy conservation programs
 - programs that highlight energy efficiency and the use of less energy for the same service
- Informative adverts on local television, radio channels, and newspaper advertorials
 - Advertisements that demonstrate the benefits of solar lighting over other off grid lighting products
- Green / Safe energy programs
 - Programs that educate people on healthy, clean and environmental friendliness in the use of solar lighting products over other lighting devices
- Educative talk shows
 - engaging, interactive and entertaining such that promote the use of solar lighting products

Consumer education programs should border on health, and energy conservation benefits; such communication should be used to enlight - en and also erase wrong views (such as solar energy is expensive, it is for the rich)

Communication spend per annum

- \$1556 \$12,500 (N250,000 to 2million naira)
- Some say 30% of the total sale this value should be used for purpose

Messaging themes should reflect product benefits as this will increase likelihood of adoption of products



Summary of findings

- Constant power supply is a major challenge faced in all the localities
- Generator is heavily depended upon as a close substitute to the national grid
- Other alternative lighting products are rechargeable lantern, kerosene lantern, handset torch light, battery rechargeable lantern, rechargeable torch light, gas lamp, candle, atupa/chakabula/achubalbal (locally made lamp) and firewood.
- Modern lighting devices spontaneously recalled were solar energy, inverter and gas-topower transmitter.
- Major source of awareness for solar energy is street light
- The solar lighting products were well appreciated for their unique benefits of providing free energy for lighting and other purposes as well as being a renewable energy source
- There is high intention to buy solar product if it is affordable, available and user friendly.

Summary of findings

- Desk/task light was considered a product for students and housewives. It is more useful for students reading for examination and house wives when cooking in the kitchen.
- The Ambient/room light was considered to be a product for the older adults, petty traders and artisans.
- Multiple room light was considered to be a product for the entire household and occupants of flat or bungalow.
- Potential for the sampled solar products is high as there was no identifiable cultural or social inhibitions to usage of any lighting products
- Price is critical to product adoption. Much as they want quality products, they are sometimes hindered by the product's cost as they would like to save some cost wherever they can, little wonder their choice of price range
- Market storm and direct sales were perceived to be the most effective communication channels for the products in all the locations.

Qualitative Report

Survey Methodology and Sample

Survey methodology

- Nationally representative sample comprising Nigerians of working age (18-60 years), mainly BoP population domiciled in rural and urban locations was surveyed
- Given the diversity of Nigeria, the cluster sampling approach was adopted because of its economy and simplicity. Randomly selected enumeration areas (EAs) were used as Primary Sampling Units (PSUs). In total, 3,000 effective interviews were conducted, with no more than 15 done in each selected EA
- The Pen and Paper Interview (PAPI) technique was used. Interviews were conducted in home and face-to-face, using structured questionnaire
- Fieldwork for this survey was conducted between 11th May and 4th June, 2013

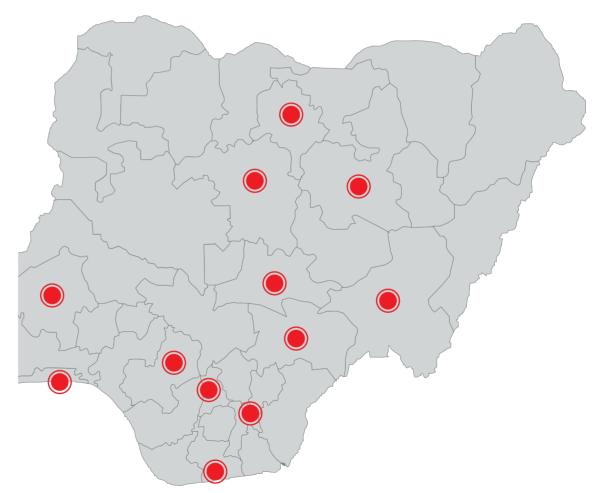
Scope of survey

• 3,000 interviews were completed in

the following states

• 462 in Lagos

- 288 in Oyo
- 144 in Abia
- 213 in Anambra
- 267 in Rivers
- 165 in Edo
- 480 in Kano
- 312 in Kaduna
- · 240 in Bauchi
- 117 in Taraba
- 96 in Nassarawa
- 216 in Benue



The 6 Geo-political Zones

Serial No	States surveyed	Geo-political zone
1	Lagos	South West
2	Oyo	
3	Abia	South East
4	Anambra	
5	Rivers	South South
6	Edo	
7	Kano	North West
8	Kaduna	
9	Bauchi	North East
10	Taraba	
11	Nasarawa	North Central
	Benue	
Total	12	6

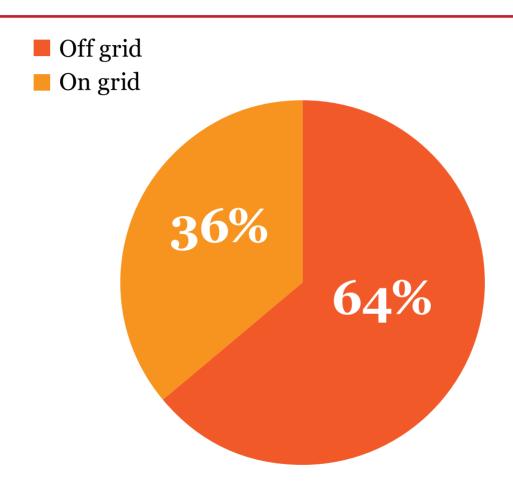
- Politically, Nigeria is structured into 36 states and 6 zones
- It has over 250 ethnic groups
- The 3 largest ethnic groups are:
- Hausa/Fulani mainly in the NW, NE and NC zones;
- · Yoruba mainly in the SW, zone;
- Ibo mainly in the SE zone
- Others include Ijaw, Ibibio & Urhobo (SS), Tiv (NC), Kanuri (NE/NW)
- Southern Nigeria (SW, SE & SS) is mainly Christian, more urbanized and more westernized
- Northern Nigeria (NW, NE & NC) is mainly Muslim

Completed interviews by demographics

Zones	Sample	%tage distr.	Area	Sample	%tage distr.
South West	750	25	Urban	901	30
South East	357	11.9	Rural	2099	70
South South	432	14.4	GENDER		
North Central	312	10.4	Male	1816	61
North West	792	26.4	Female	1184	39
North East	357	11.9	AGE		
Total	3000		18 - 29	1423	47
SEC			30 - 44	1262	42
CIC 2	1103	37	45 - 60	315	11
DE	1891	63			

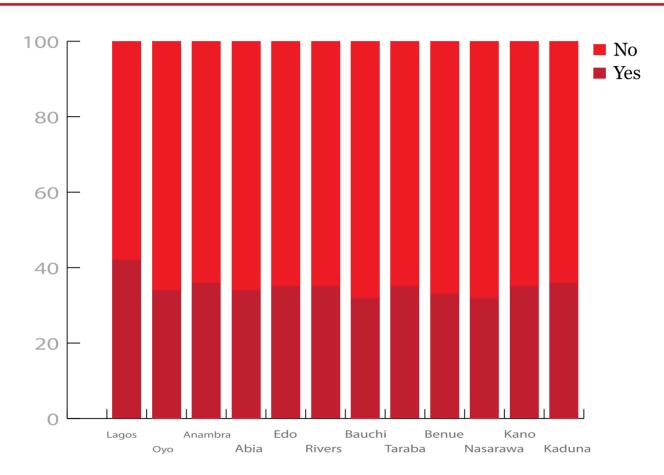
Grid connection & access to electricity

HHs currently connected to national grid



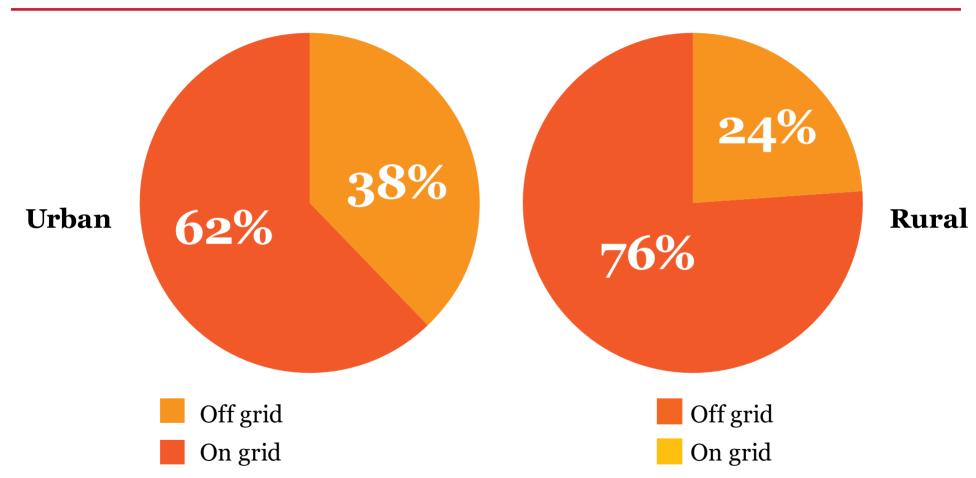
Nationally, only 36% of HHs surveyed are connected to the national grid (PHCN); 64% are not connected

Hhs connected to national grid by State



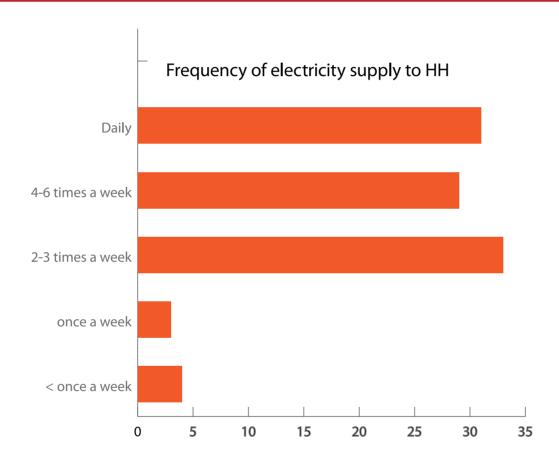
Lagos state has the highest number of households (HHs) connected to the national grid, while Bauchi, and Nassarawa have the least

HHs connected to national grid by Residence type



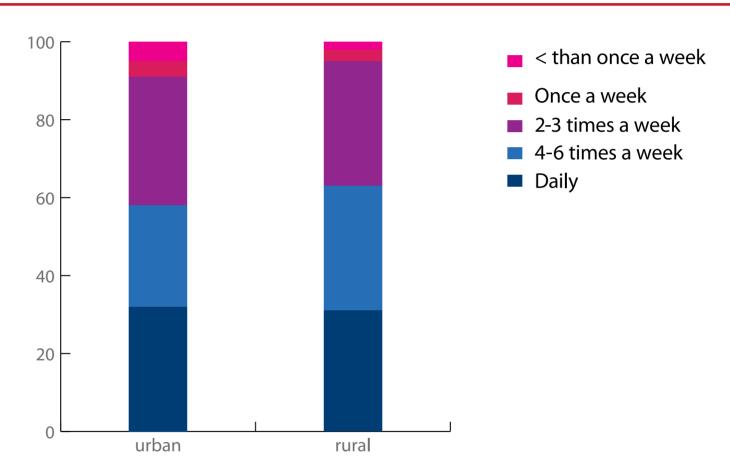
62% of urban households is connected to the national grid, while 24% of HHs in the rural area is connected

Frequency of electricity supply to HH National



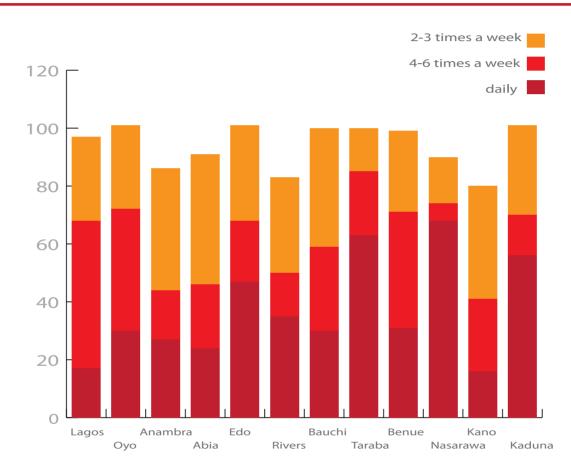
Nationally, only one-third of households get some grid electricity supply daily. Most get less frequently e.g 4-6 times a week (29%), 2-3 times a week (33%)

Frequency of electricity supply to HH – Urban & Rural



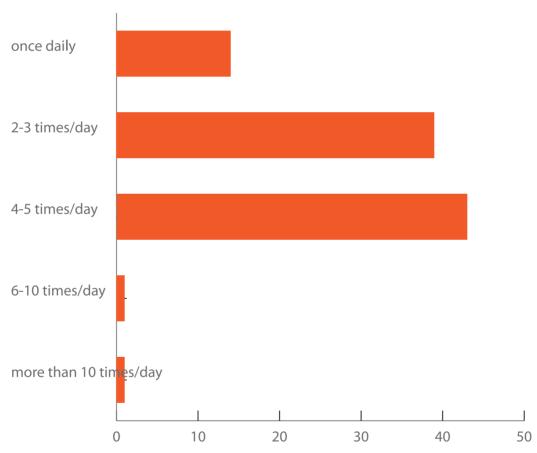
No significant difference on frequency of grid electricity supply between urban and rural communities

Frequency of electricity supply to HH States



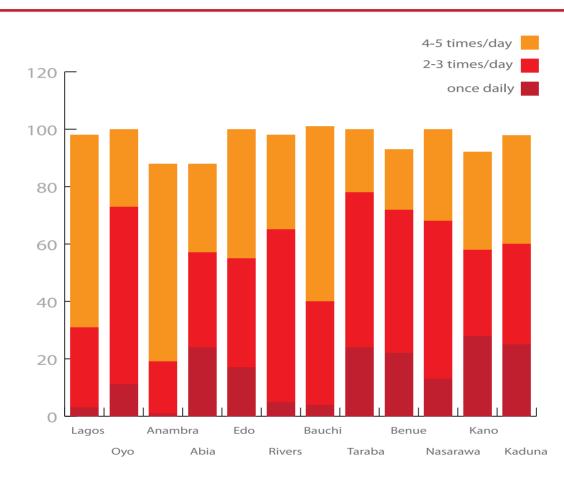
Taraba, Nassarawa and Kaduna get grid electricity supply most frequent Kano, Abia and Anambra states experience grid electricity supply least frequently

Average power outage per day – National



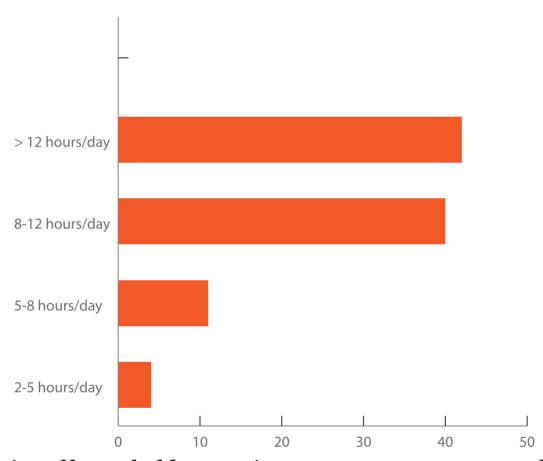
82% of households experience power outage as frequent as 2 - 5 times per day

Average power outage per day – States



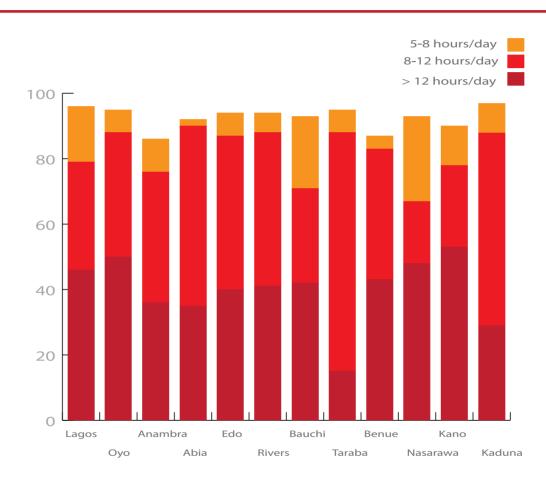
The frequency of power outage is highest in Anambra, Bauchi and Lagos states (4-5 times per day)

Average hours of power outage per day National



Nationally, majority of households experience power outage over 12 hours per day

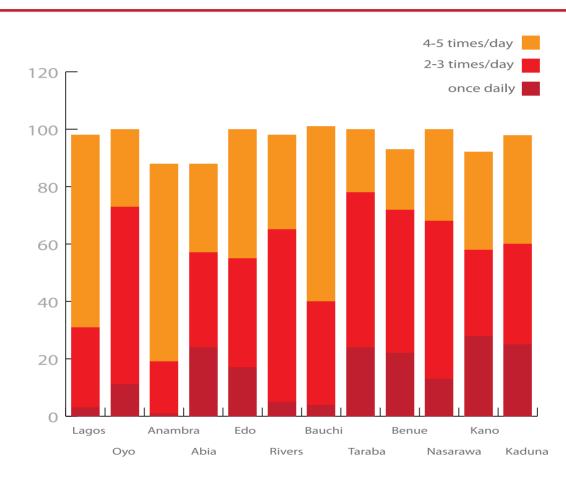
Average hours of power outage per day State



Kano, Oyo, Nassarawa and Lagos states experience the longest hours of power outage (over 12 hours) per day. Taraba state experiences the least hours of power fail failure per day

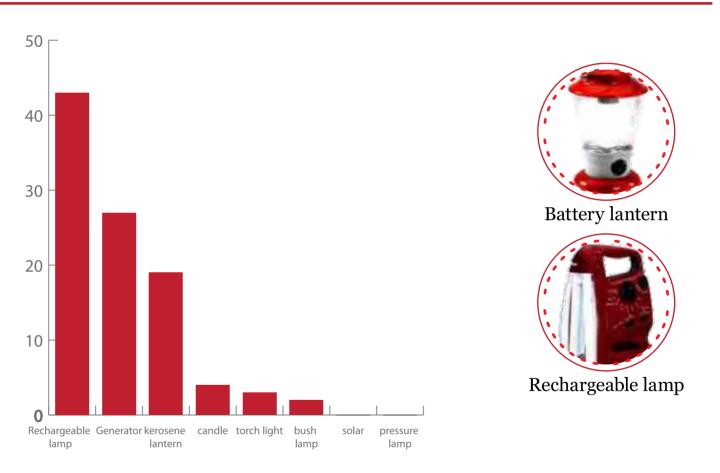
Alternative lighting devices: Awareness & usage pattern

Most often used alternative lighting device



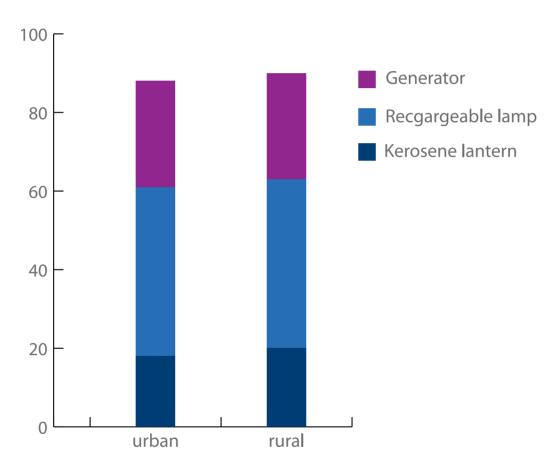
Nationally, the 3 alternative lighting products used most often are Rechargeable lamp, Generator and Glass covered lantern.

Most often used alternative lighting device



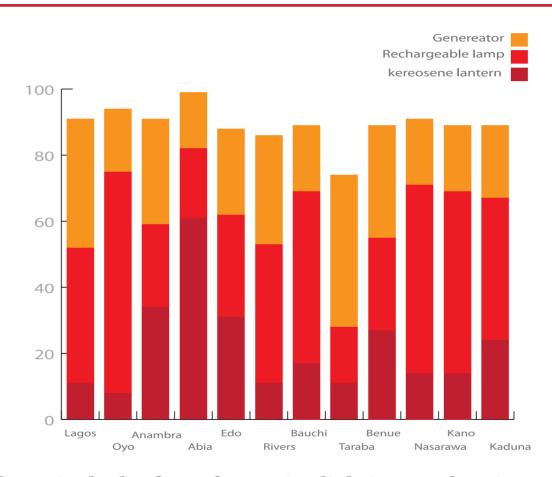
Nationally, the 3 alternative lighting products used most often are Rechargeable lamp, Generator and Glass covered lantern.

Most often used alternative product Urban & Rural



Types of alternative lighting devices used in urban and rural areas are similar. This is a strong indication that households aspire for better lighting systems, irrespective of location as they have similar aspirations

Most often used alternative product States



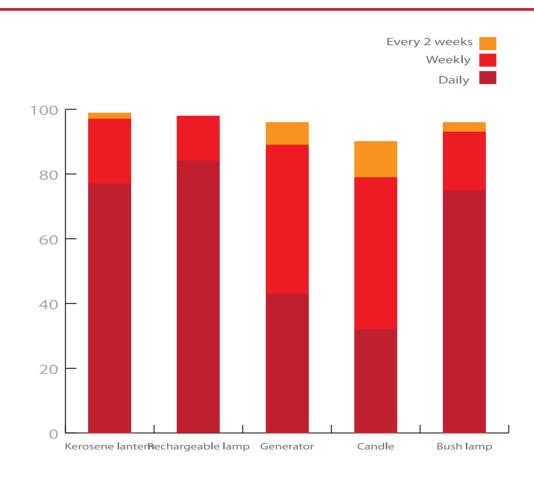
- Rechargeable lamp is the leading alternative lighting product in Lagos, Oyo, Rivers, Bauchi, Nassarawa, Kano & Kaduna
- Kerosene lantern is the leading alternative in Anambra, Abia, & Edo, while Generator leads in Taraba and Benue states

Reasons for using alternative product

	Total	Rechargeable lamp	Generator	Glass covered lantern	Candle	Torch light	Bush lamp	Solar
Total	2976	1282	821	583	116	102	63	6
It is cheaper to operate beacuse it needs no fuel	32	39	5	46	59	44	49	50
It produces a full current and gives a brighter light	24	26	30	13	8	27	22	50
It performs the same function as PHCN	18	7	48	7	7	11	3	0
It is safer beacuse it causes no harm or pollutions	14	20	6	12	4	14	11	0
It is portable and easy to use	13	14	6	19	11	28	13	0

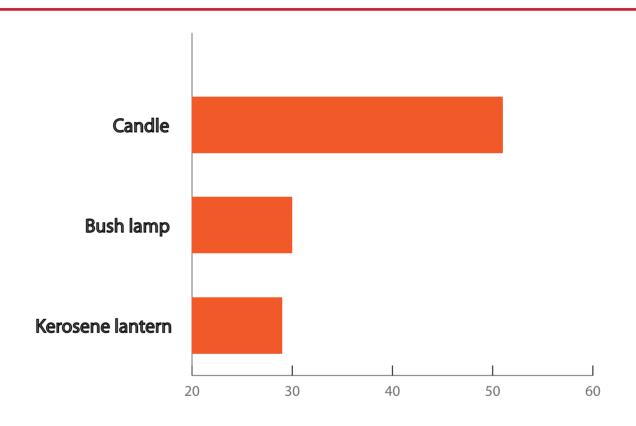
Low maintenance cost, brightness and safety are the key usage drivers of alternative lighting solutions

Alternative lighting products: usage frequency



• Alternative lighting devices are used almost daily by majority of households. This is a strong indication of a huge grid electricity supply gap

Why did they stop using these alternatives, and Lighting Africa had not yet come to town?



- Top 3 products stopped using are candle (51%), bush lamp (30%), glass covered kerosene lantern (29%)
- Reasons for stopping include impacts on health, being old fashioned and high cost of maintenance

Alternative product stopped using

Candle

It causes fire accident or out break
The light produced is not bright enough
It produces smoke
It produces a lot of heat

Bush Lamp

It smokes a lot
It consumes to much kerosene
It caused fire accident
Its too local and outdated
It affects the eye
The light is too dull

Glass covered lantern

Its no lonfer in vogue / old fashioned
It smokes a lot
It is not economical due to scarcity of
kerosene
Its too risky to use, because it leads to
fire accident
It generates a lot of heat
The light produce is not bright enough
The glass is too fragile

Rechargeable lamp - types



Rechargeable lamps can be differentiated into 3 types based on the process of recharging. The first is exclusive electricity-rechargeable and the source of recharging can be either grid electricity or Generator. Electricity-charging through Generator may be HH own Generator or at commercial charging centres, (barbing salons, phone call centres, business centres) where GSM phones, Rechaegeable lamps and Lap Tops are charged for fees ranging between N50 – N100 for full "charging". This is commonly used in underserved on-grid communities (urban and rural)



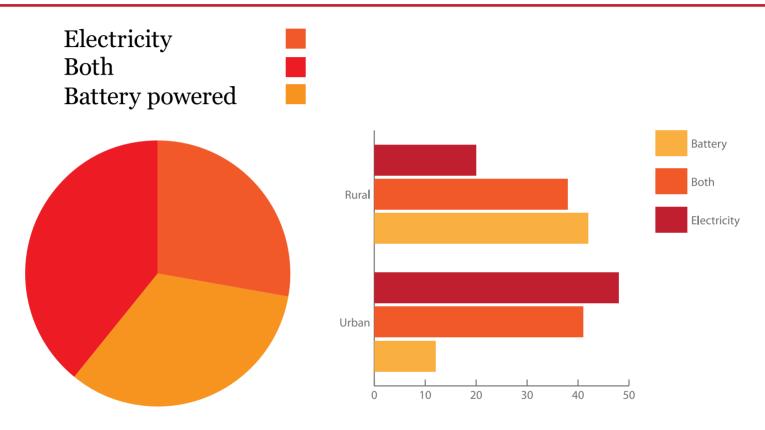
The second type of Rechargeable lamp is that powered by dry cell batteries (mainly U-2). It ranges in capacity from 3 pairs to 5 pairs of dry cell battery, with the 3 pairs being most common. The 3-pair battery-powered lamp lasts for an average of 10 days before replacement

Rechargeable lamp - types

The 5 pairs-powered type lasts for an average of 14 days. This type is commonly used in off-grid communities (rural and urban areas)

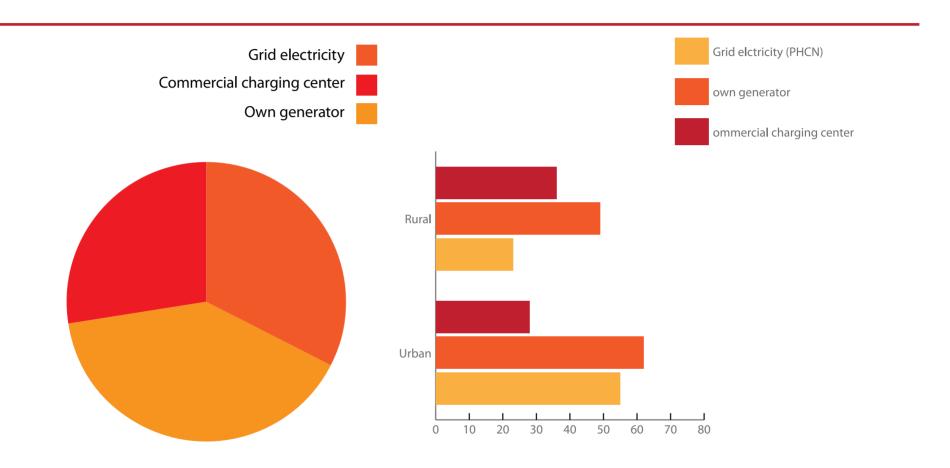
The third type of Rechargeable lam has combined electricity-rechargeable and bat - tery-powered features. This is used in both on-grid and off-grid communities (urban and rural)

Rechargeable lamp: usage by type & residence type



The 3 types of Rechargeable lamp commonly used are exclusive battery-powered (33%), exclusive electricity-charged (29%) and combined battery & electricity-charged (In urban areas, majority of Rechargeable lamp users use the electricity-charged type (48%); in rural areas, battery-powered types dominate (42%)

Rechargeable lamp: sources of recharging



Identified means of recharging are own generator (48%), grid electricity (39%) and commercial charging centres (38%)

In urban and rural areas, the leading means of recharging is own generator

HH product ownership and usership pattern

The Table below shows the HH ownership and usership pattern of the 3 main alternative lighting products

Item	Rechargeable lamp	Generator	Glass covered lantern
Average No . In use in HH	1 - 2	1	1 - 2
Price product was purchased	N1,000-N2,000 (\$6.3-12.5) 1 KVA	N10,000-20,000 (\$375-500)	N400-800 (\$2.5-5.0)
No. of times needs replacement	Once every 2 years	Once every 4 years	Once every 3 years

In the course of using products, HHs incur certain expenses which differ from product to product. To determine the average monthly cost of providing alternative lighting by households, consumers were asked to indicate how much they spend on each of the devices each month

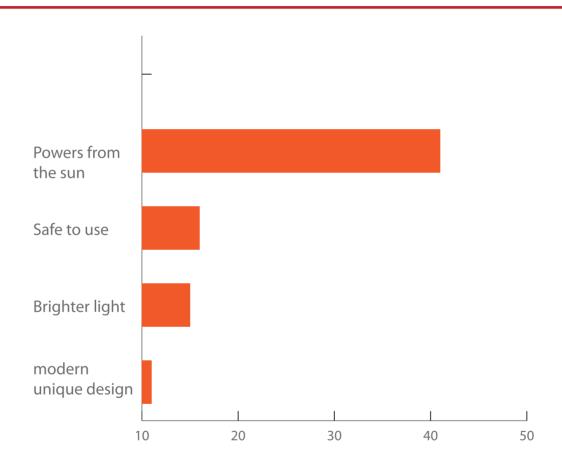
The next slide shows in detail, the average monthly expenditure on each device used

Monthly HH running expenses per device

Expenditure elements				Generator	Kerosene	
	Electricity rechargeable	Dry cell battery powered	Combined (battery/ electricity)	- (1KVA)	covered lantern	
Servicing	N10	N10	N10	N660	N/A	
Repairs	N41.6	N41.6	N41.6	N616	N/A	
Electriicty recharging	N800 (16 times a month @ N50 each)	N/A	N200 (4 times a month @ N50 each)	N/A	N/A	
Battery replacement	N/A	N540 (3 pais of batteries @ N60 each)	N360 (3 pairs of battery @ N60 each, 2 times a month	N/A	N/A	
Fuel	N/A	N/A	N/A	N5,197	N/A	
Oil	N/A	N/A	N/A	N600	N/A	
Kerosene	N/A	N/A	N/A	N/A	N348	
Replacement of cover glass	N/A	N/A	N/A	N/A	N250	
Wick replacement	N/A	N/A	N/A	N/A	N8o	
Avg. monthly total expence per device	N851.6 (\$5.3)	N591.6 (\$3.69)	N611.6 (\$3.82)	N7,063 (\$44.1)	N678 (\$4)	

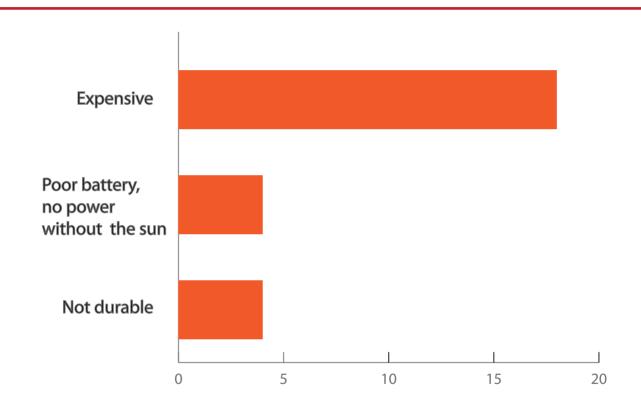
Solar lighting system: Consumer perceptions

Solar lighting – positive perceptions



- The key positive associations include:
- free charging, using sunlight
- . Safe to use
- .bright lighting output

Solar lighting - negative perceptions



- Although small in base (small number of consumers expressing negatives), the major negative associations include:
- · high purchase price,
- low battery capacity

Test solar lighting products: Consumer evaluation

How to interpret the rating scale/slides

• Samples of three categories of solar lighting products (Desk/task light;, Ambient/room light and Multiple room) were presented to consumers one after the other for physical examination. Thereafter, questions were asked on three evaluation criteria of interest:

Overall opinion

- · Comparison with alternative lighting device used most often
- Willingness to purchase (WTP)
- Universal product rating scales were employed, i.e Overall opinion (7-point rating scale, where 1 is lowest and 7 is highest); comparison (5-point rating scale, where 1 is lowest and 5 is highest) and WTP (5-point rating scale, where 1 is lowest and 5 is highest). Each rating point represents a rating factor, e.g on overall opinion, 1means extremely poor with rating factor 1.0; 7 means extremely good with rating factor 7.0. The average of the aggregate rating scores achieved by a product is the "Mean score", which is where the overall opinion lies
- Note that the next 3 slides do not include ratings where product were scored very low

Overall opinion

	Desk light	Ambient light	Multiple light
Base	3000	3000	3000
Good (5.0)	39	35	30
Very good (6.0)	39	41	40
Excellent (7.0)	16	19	25
Mean score	5.6	5.7	5.8

- Overall opinion means a general perception of the product, ie, everything about the product considered, without reference to specific product attribute
- Desk light achieved a mean score of 5.6 (Very good), Ambient 5.7 (Very good) and Multiple 5.8 (Very good)

Comparison with alternative lighting product used most often

	Desk light	Ambient light	Multiple light
Base	3000	3000	3000
Better (4.0)	52	51	47
Much better (5.0)	27	31	37
Mean score	4.0	4.1	4.1

- The 3 products were compared independently with alternative devices used most often on a 5-point scale where, 1=Much worse; 2= Worse; 3=Same; 4=Better and 5=Much better
- Desk light achieves rating mean score of 4 (Better), Ambient 4.1 (Better) and Multiple 4.1 (Better)
- The results indicate that all 3 products are perceived slightly better than consumers' current lighting device on basic lighting criteria. These alternatives include rechargeable lamps, generator, and glass covered lantern

Willingness to purchase (WTP)

	Desk light	Ambient light	Multiple light
Base	3000	3000	3000
I will probably buy (4.0)	42	42	38
I will definitely buy (5.0)	43	45	51
Mean score	4.3	4.3	4.4

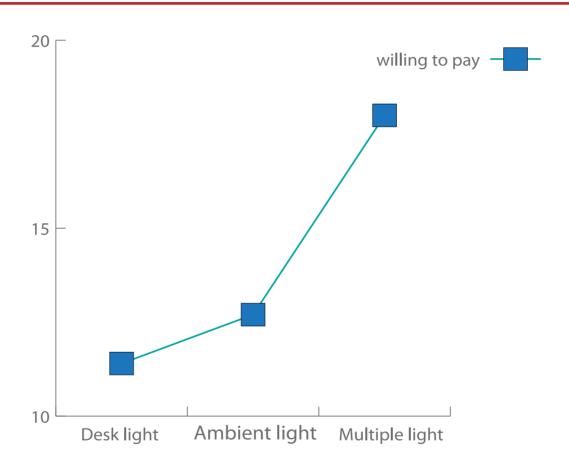
- On Willingness to purchase, products were rated on a 5-point scale where 1=definitely not buy; 2=Probably not buy; 3=Not sure; 4=Probably buy. 5=Definitely buy
- Desk light achieves a rating mean score of 4.3 (Probably buy), Ambient 4.3 (Probably buy) and Multiple 4.4 (Probably buy)
- This result indicates that although consumers expressed willingness to purchase, intention is not definite but conditional

Price willing to pay (top of mind reaction)

	Desk light	Ambient light	Multiple light
Base	3000	3000	3000
Price consumer is will	ing to pay		
Price willing to pay	N1,000-2,000	N1,200-2,000	N1,000-3,000
%	50%	45%	52%
Price at which product	will bee seen as too c	heap	
Price too cheap	N500-1,000	N500-1,000	N1,000-2,000
%	41%	44%	36%
Price at which product	will bee seen as too e	xpensive	
Price too expensive	N2,000-3,000	N2,000-3,000	N3,000-4,000
%	26%	36%	21%

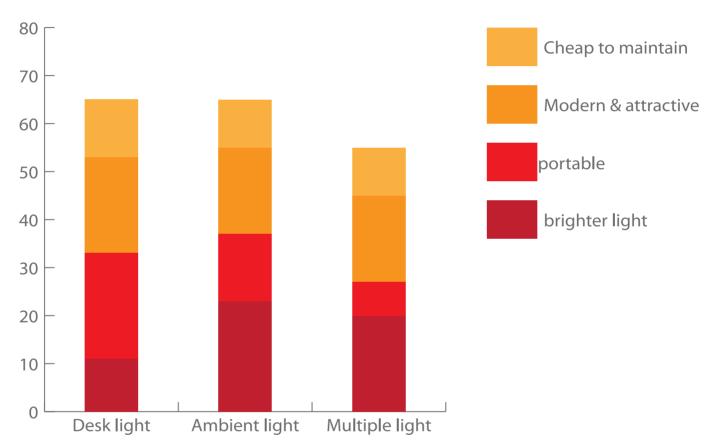
- Post products evaluation, the price ranges majority of consumers are willing to pay are:
- Desk light N1,000-2,000 (\$6.25-12.5) 50% of respondents
- Ambient light $N_{1,000-2,000}$ (\$6.25-12.5) 45% of respondents
- Multiple N1,000-3,000 (\$6.25-18.75) 53% of respondents

Average price willing to pay



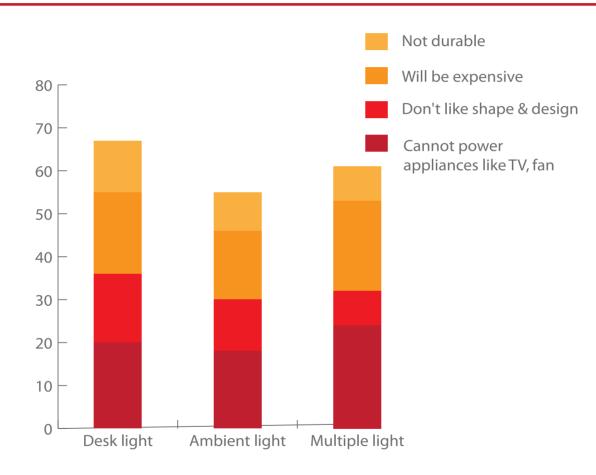
• On average, consumers are willing to pay N1,816 (USD 11.4) for desk light, N2,027 (USD 12.7) for ambient and N3,120 (USD18.9) for multiple room light.

Likes about solar lighting product evaluated



- Two leading appeal drivers for the 3 test products are:
- modern design
- bright lighting output
- In addition, portability is a major attribute consumers like about desk light

Dislikes for solar lighting product evaluated



- Although the number expressing some dislike is low (low base), main dislikes about the 3 samples are:
- perceived lack of capacity to power home appliances,
- perceive high purchase price

Test solar lighting products: Market viability

Market viability: how to interpret the slides

- Two indicators of market viability of the 3 product categories (desk, ambient and multiple) are Willingness to purchase (WTP) and the quantity consumers are willing to pay at a purchase occasion
- In the next few slides, states with the biggest market potential are identified based on these two indicators
- Market potential by WTP is measured by the rating mean score of a product in the state. Market potential by quantity willing to buy is measured by the mean score of the quantities of the product consumers are willing to buy at a time
- The Table below shows WTP rating scale. It ranges between 1-5,where mean score 1.0=will definitely not buy and 5.0=will definitely buy

Rating scale					
Performance indicator	1	2	3	4	5
Willingness to buy solar light evaluated	I will definitely not buy it	I will probably not buy it	Not sure	I will probably buy it	I will definitely buy it

Market viability by Willingness to Purchase (WTP)

	Total	Lagos	Oyo	Anambra	Abia	Edo	Rivers	Bauchi	Taraba	Benue	Nasarawa	Kano	Kaduna
Total	3000	`462	288	213	144	165	267	240	117	216	96	480	312
Desk light	4.3	4.3	4.4	4.1	4.4	4.2	4.4	3.5	4.7	4.3	4.3	4.5	4.3
Ambient light	4.3	4.4	4.4	4.1	4.4	4.5	4.7	3.5	4.1	4.3	4.3	4.4	4.4
Multiple light	4.4	4.5	4.5	4.1	4.5	4.6	4.8	3.7	4.3	4.4	4.4	4.5	4.4

- Although across the states willingness to buy (WTB) is high. States with relatively higher market potential by product category are:
- Desk light Taraba, Kano
- Ambient light Edo, Rivers
- · Multiple light Lagos, Oyo, Abia, Kano, Rivers

Desk light: Market viability by quantity to buy

Quantity willing to purchase	Total	Lagos	Oyo	Anambra	Abia	Edo	Rivers	Bauchi	Taraba	Benne	Nasarawa	Kano	Kaduna
Base	3000	`462	288	213	144	165	267	240	117	216	96	480	312
2 (2.0)	12	14	14	11	10	10	6	13	32	27	8	6	6
1 (1.0)	73	81	79	83	81	79	73	54	58	25	76	86	74
Mean score	1.2	1.6	1.1	1.2	1.0	1.1	0.9	1.2	1.5	1.4	1.0	1.1	1.0

- Across the states, quantity of desk/ task light consumers are willing to buy at any one purchase occasion ranges between 1 2
- · However, states with relatively higher market potentials are Lagos, Taraba, Benue

Ambient light: Market viability by quantity to buy

Quantity willing to purchase	Total	Lagos	Oyo	Anambra	Abia	Edo	Rivers	Bauchi	Taraba	Benue	Nasarawa	Kano	Kaduna
Base	3000	`462	288	213	144	165	267	240	117	216	96	480	312
2 (2.0)	12	9	16	13	O	19	7	15	15	21	11	9	13
1 (1.0)	75	87	79	81	92	73	87	59	48	39	78	78	74
Mean score	1.0	1.1	1.1	1.2	0.9	1.3	1.0	1.0	0.8	1.1	1.0	1.0	1.0

- Across the states, quantity consumers are willing to buy at any one purchase occasion ranges between 1-2
- However, states with relatively higher market potentials are Edo, Anambra, Oyo, Lagos, Benue

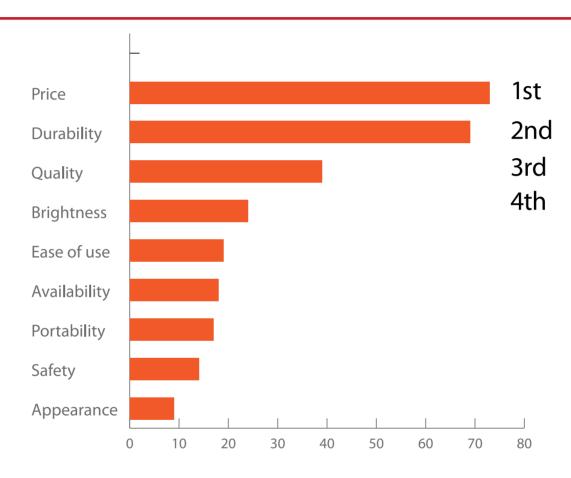
Multiple light: Market viability by quantity to buy

Quantity willing to purchase	Total	Lagos	Oyo	Anambra	Abia	Edo	Rivers	Bauchi	Taraba	Benue	Nasarawa	Kano	Kaduna
Base	3000	`462	288	213	144	165	267	240	117	216	96	480	312
2 (2.0)	10	10	15	4	11	15	7	18	4	21	7	5	5
1 (1.0)	79	85	78	94	89	84	86	59	58	45	82	84	83
Mean score	1.1	1.2	1.2	1.0	1.1	1.2	1.1	1.1	0.7	1.2	1.1	1.0	1.0

- Across the states, quantity consumers are willing to buy at any one purchase occasion ranges between 1-2
- · However, states with relatively higher market potentials are Lagos, Oyo, Edo, Benue

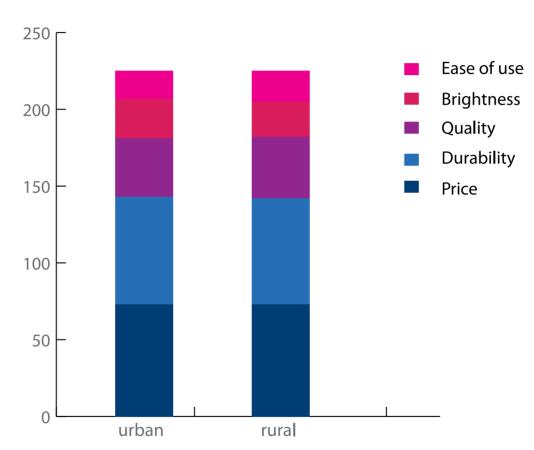


Products purchase drivers



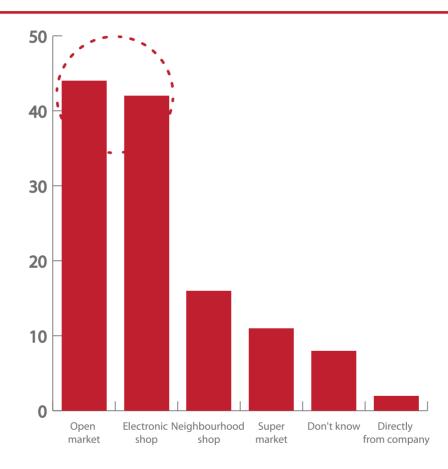
- Post evaluation, four leading consumer purchase drivers for solar lighting products are:
- purchase price
- product durability
- product quality
- lighting quality

Products purchase drivers – Urban vs Rural



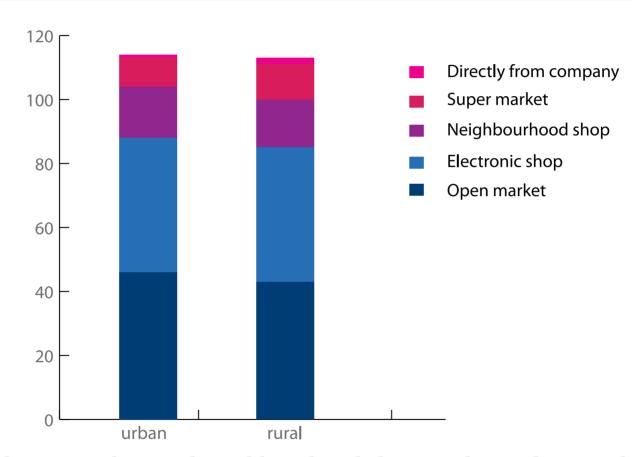
• Similar motivations drive purchase of solar lighting products in urban and rural communities. There is no clear difference in consumer perception of purchase drivers between the two communities

Where consumers would like to buy the product



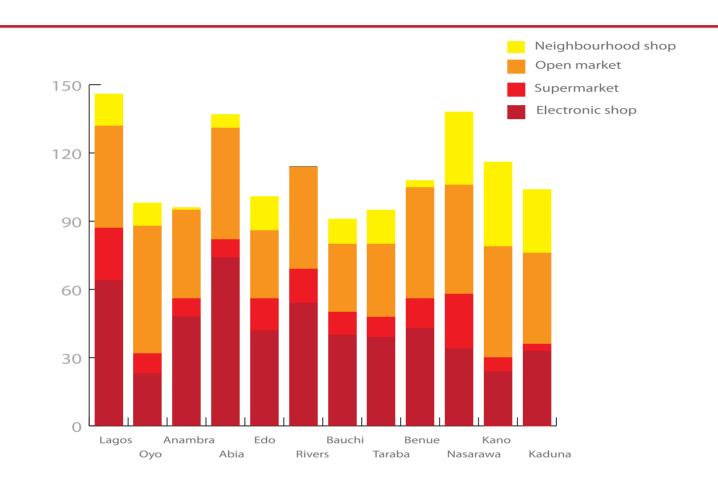
- Overall, the preferred purchase outlets for solar lighting products are:
- Open markets
- electronics shops

Products purchase drivers – Urban vs Rural

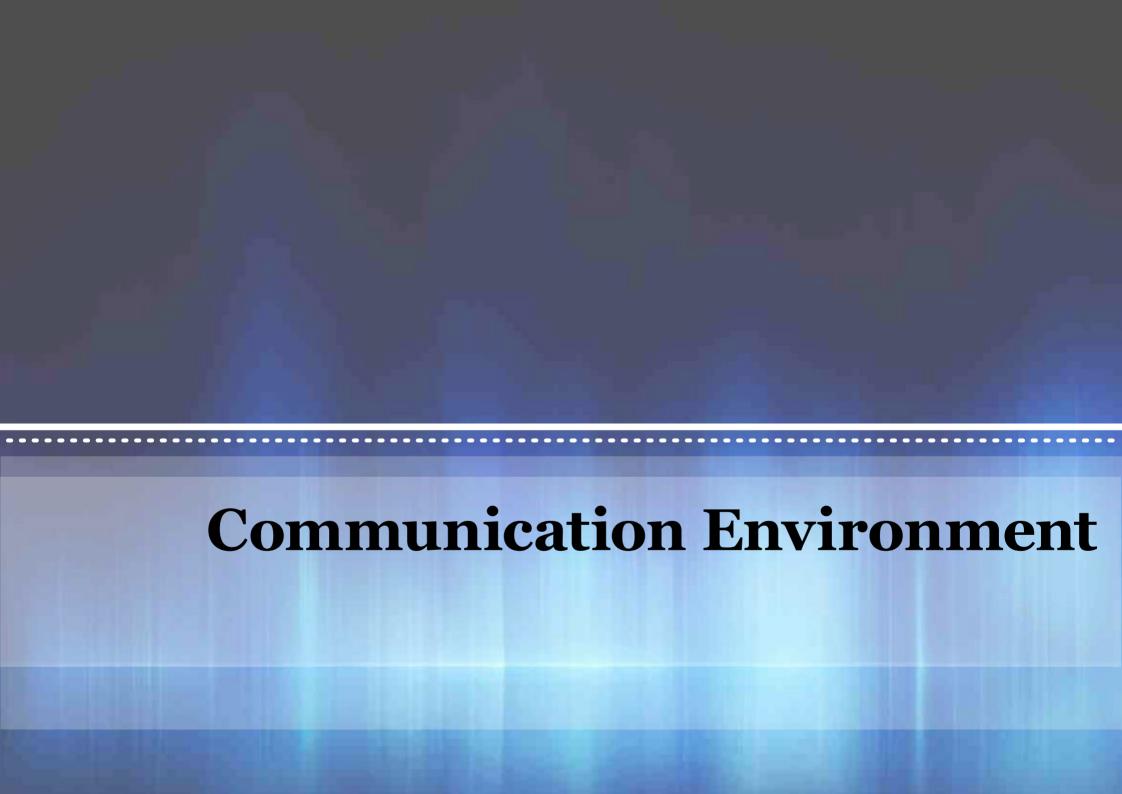


• Open market, electronic shop and neighbourhood shop, in that order, are the leading purchase outlets for Solar lighting products in urban and rural areas

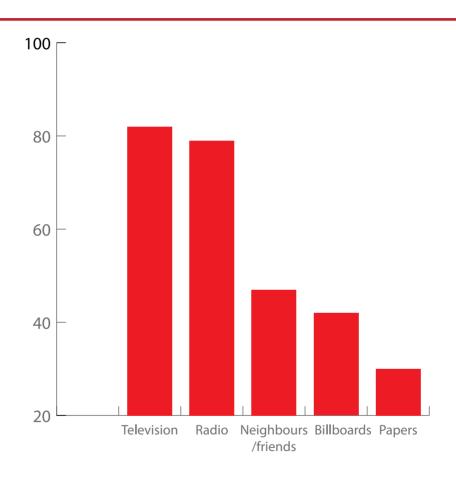
Purchase outlets by state



• Across the 12 states, open market and electronics shop are the preferred purchase outlets. However, in Nassarawa, Kano and Kaduna states, neighbourhood store is a potentially viable retail outlet

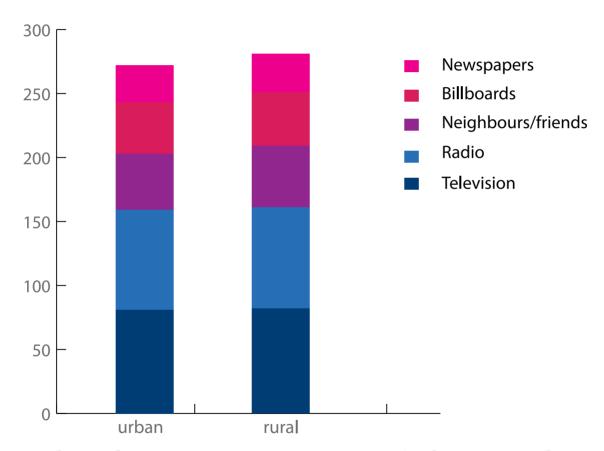


Sources of news/Information - national



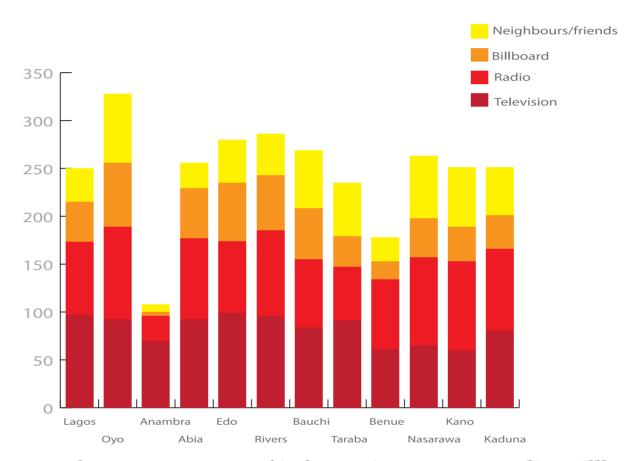
• Nationally, the top 5 sources of News/information for households are TV, Radio, Neighbors/friends, Billboard and Newspaper

Sources of news/information Urban vs Rural



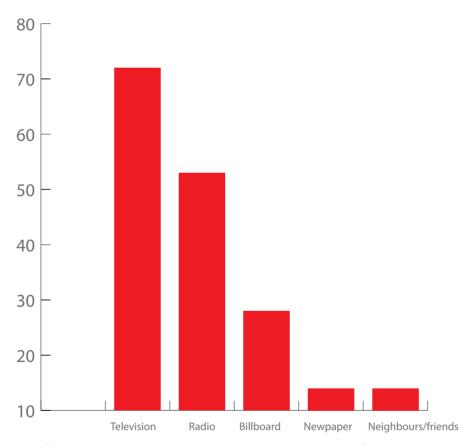
• HHs in urban and rural communities access news/information through similar media sources. No major difference in media channel used

Sources of news/Information - States



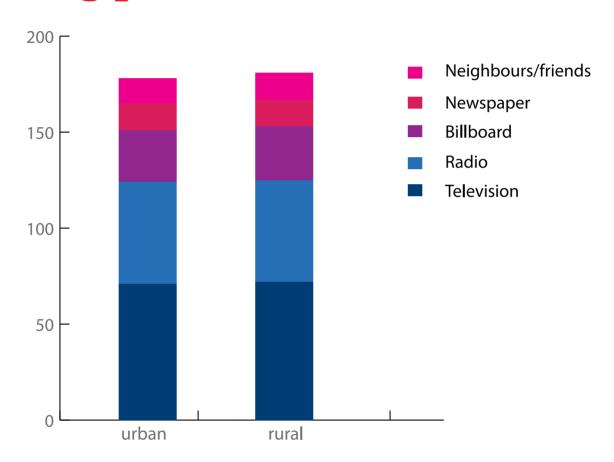
- Across the states, the 4 top sources of information are TV, Radio, Billboard and Neighbors/friends
- While in the Southern states (Lagos, Oyo, Anambra, Abia, Edo and River, TV is the leading source, in most of the Northern states (Benue, Nassarawa, Kano and Kaduna), Radio is the leading source of information

Expected sources of information about solar lighting products



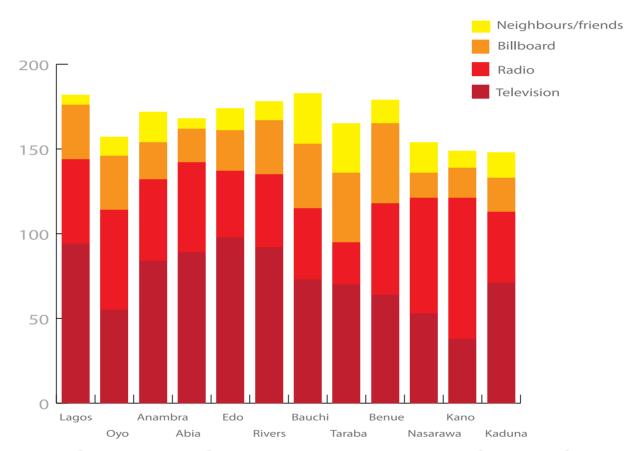
• HHs in urban and rural communities access news/information through similar media sources. No major difference in media channel used

Expected sources of information about solar lighting products – Urban vs Rural



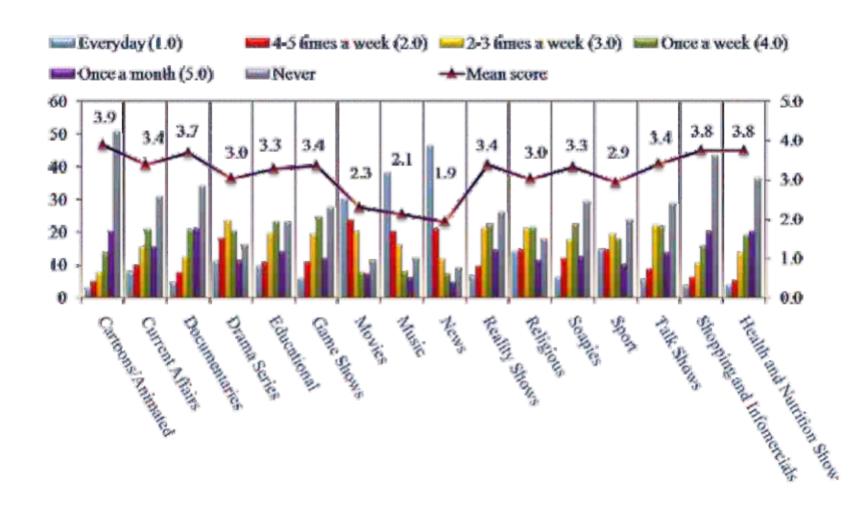
• HHs in urban and rural communities expect to access information about Solar lighting products through similar media channels

Expected sources of information about solar lighting products



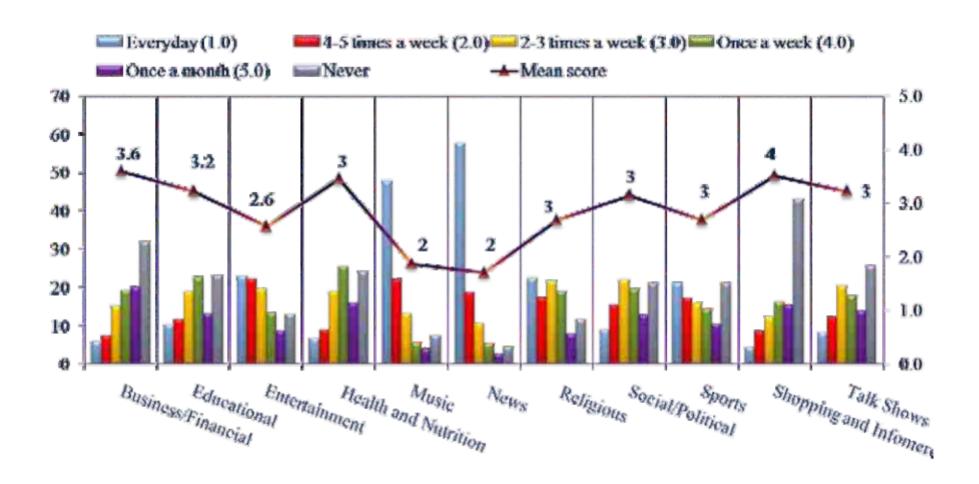
- Across the states, the top 3 media, consumers expect to obtain information about solar lighting products are TV, Radio and Billboard
- While in all Southern states (Lagos, Oyo, Anambra, Abia, Edo, Rivers), the leading medium is TV, in some Northern states (Benue & Kano), Radio is most popular

Frequency of watching TV programs



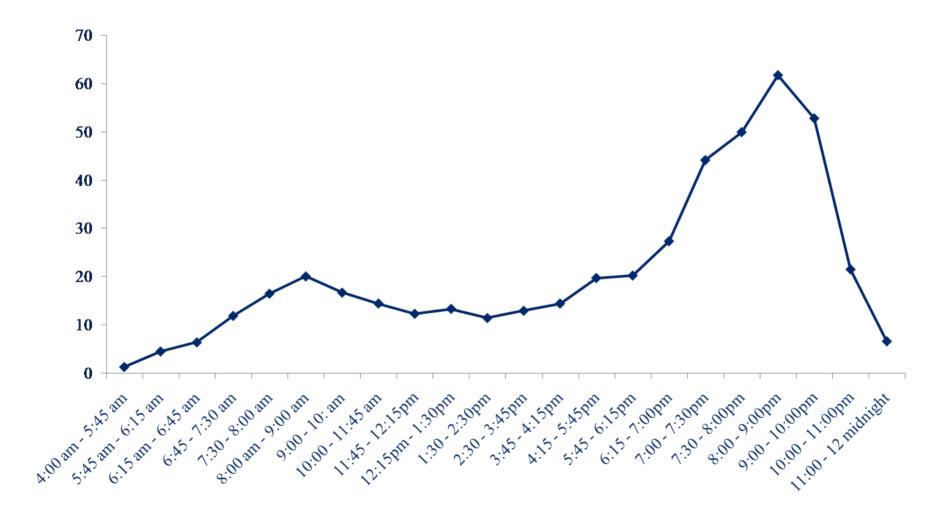
The most popular TV programs are News, Music, Movies, Sports, Drama

Frequency of listening to Radio programs



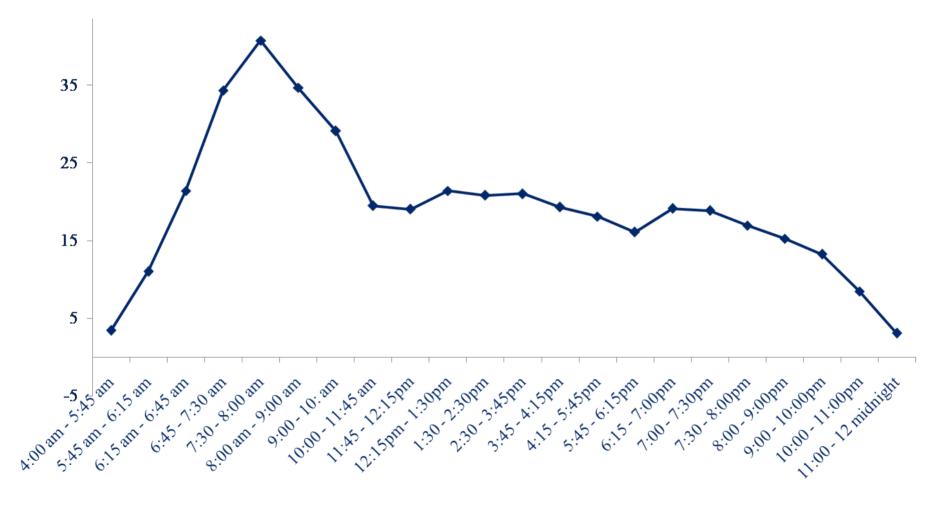
The most popular radio programs are News, Music, Entertainment, Sports, Educational

TV viewership habit



- Majority of households watch TV in the evenings
- Viewership range between 3-11 p.m and peak at 9 p.m

Periods of usage – Radio programmes



- Although radio listenership spreads through out the day, majority use it between 6 a.m and 10 p.m
- Listenership peak between 7 a.m − 12 noon



Summary of findings

- Nationally, only 36% of HHs is connected to the national grid. Only one third of HHs get some grid electricity supply daily; most HHs get 2 6 times a week. Majority of Hhs experience power outage as frequent as 2-5 times a day
- Rechargeable lamp, generator and glass covered lantern are the most common lighting sources as alternative to grid electricity light
- The major concerns about these products include health/safety issues, high running cost and the fact some of the products are old fashioned
- On average,
- Generator costs N10,000-N20,000 (USD 375-500), with monthly maintenance cost of N7,063 (USD 44.1) per 1 KVA capacity.
- Glass lantern costs N400-N800 (USD 2.5-5), with monthly maintenance cost of N678 (USD 4.1)
- An average rechargeable lamp costs cost N1,000-2,000(USD 6.3-12.5) and monthly maintenance cost of N851.6 (USD 5.3)

Summary of findings

- Awareness of solar lighting is low. Knowledge and usage of solar lighting products are equally low. However, the few current users acknowledge it is economical
- All three tested solar products (Desk light, Ambient and Multiple room light) passed the acceptability test on overall opinion and intention to purchase. They were also rated better than consumers' current alternative lighting products
- The average prices consumers are willing to pay are as follows:
 - Desk N1,816
 - Ambient N2,027
 - Multiple N3,120
- The major purchase outlets where consumers would like to buy solar lighting products are:
 - Open market
 - Electronic shops
 - Neighbourhood stores

Conclusion

- Due to political pressure, the Federal government of Nigeria is making frantic efforts to conclude the on-going privatization of the energy sector, which it insists, will bring sanity as well as stabilize electricity supply.
- However, despite the assurances, the current grid electricity supply gap continues to widen. Expectedly, this will engender household demand for cleaner, convenient, safer but affordable alternative sources of lighting, as consumers get more discerning
- To this end, solar lighting products seem to have a good chance of eventual adoption against the backdrop of better consumer rating over the current leading alternative lighting products in the market. However, the products stand better chances if the the concerns raised about the products are addressed before launch

- On "willingness to purchase" during product evaluation, all three products were rated "will probably purchase". This indicates that although consumers expressed purchase intention, certain product issues need to be addressed to guarantee definite purchase intention
- A major concern about solar lighting solution is the perceived incapacity to retain energy for long periods due to a bad experience; a bad experience consumers have with current products used (street solar lighting). To give Solar products the desired competitive edge, the battery should be able to retain power long enough after being charged
- An obvious advantage that even the smallest generator has over others is the capacity to charge phones in household. Making the products in bigger panels would increase their energy generating and retaining capacity

- The price consumers are willing to pay for each of the 3 test products may not have been the outcome of rational decision. For a new product, a reasonable price consideration should be based on a price sensitivity evaluation following cycles of consumer interaction with the product, including coupling, charging, usage, observation
- For a more realistic consumer price expectation (price willing to pay), we recommend a 14 day placement of products with randomly selected household participants of the initial survey. We recommend a sample size of 210 households (the number of products currently at our disposal)
- Solar lighting has low consumer awareness and huge knowledge gap. To connect with the consumer, create strong top of mind awareness and thus engender product interest, trial and eventual adoption, a two-pronged consumer awareness program is recommended, viz:

• Consumer education:

- The consumer education plan should articulate a strategic direction for a multistakeholder approach to the delivery of product education programs across various target groups. Key areas include:
- Enlighten consumers on the key features of Solar lighting products, how to operate, charge and use
- Provide general information and specifically on purchase, maintenance and spare parts
- Leverage on the growing influence of Community Based Organizations (CBOs) in Northern Nigeria and Community Development Associations (CDAs) in the South, as well as traditional and religious institutions as vehicles for the transmission of information to rural areas
- Engage in massive market activation via road shows, town storming and product displays in academic institutions and parks
- Seize the opportunities provided by the annual International Trade Fairs in Lagos, Kaduna and Enugu to display and highlight the products

- Communication strategy:
 - Communication messaging to leverage on the emotional benefits of modernity (being up to date with the trends) and renewable energy framework (environmentally friendly)
 - Based on current trends in Nigeria's communication environment, leverage on the massive usership base of the electronic media (Television and Radio), as well as Billboards and fliers to effectively drive message delivery to the target audience

Thank You