Throwing Light on the African Consumer

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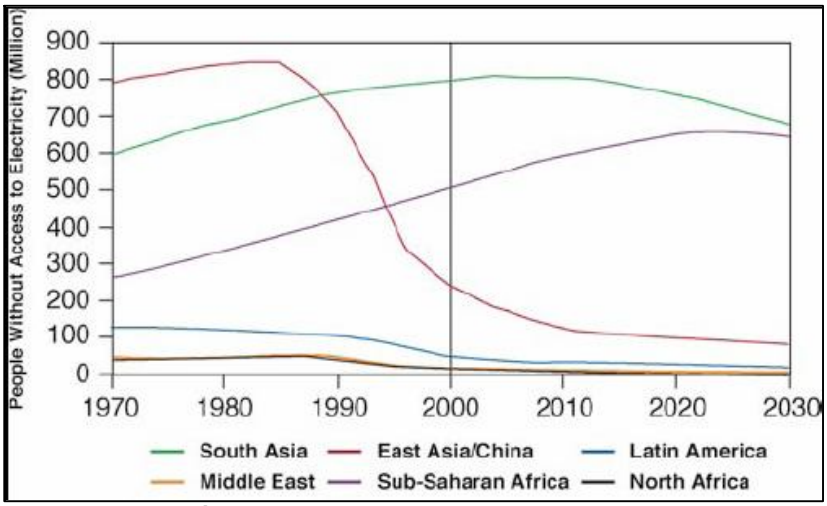
ABSTRACT

Amongst the African poor, lighting is often the most expensive item amongst their household expenditure, accounting for between 10 – 15% of total household income. Yet while the cost of currently used fuel based lighting is high, these products often provide inadequate output in return. The Lighting Africa program which is jointly managed by the IFC and the World Bank, aims to introduce new lighting technologies and products into the African market which have as a promise clean, portable, durable, low cost and high quality lighting. With the help of findings generated through Research Internationals' extensive market research program, the types of lighting needed and specific product requirements African consumers have will guide the program in terms of its output, how to market and what potential pit falls to watch out for, all in an effort to ensure the project becomes a success and will resonate well with African consumers.

1. The Problem Defined

Africa is home to one of the world's largest population of "un-electrifieds"; approximately 880 million people who are not connected to the electricity grid. Compared to other parts of the world, Africa is the only continent with a population of "un-electrifieds" which is projected to expand over the next 30 years,[1] as illustrated by the graph below.

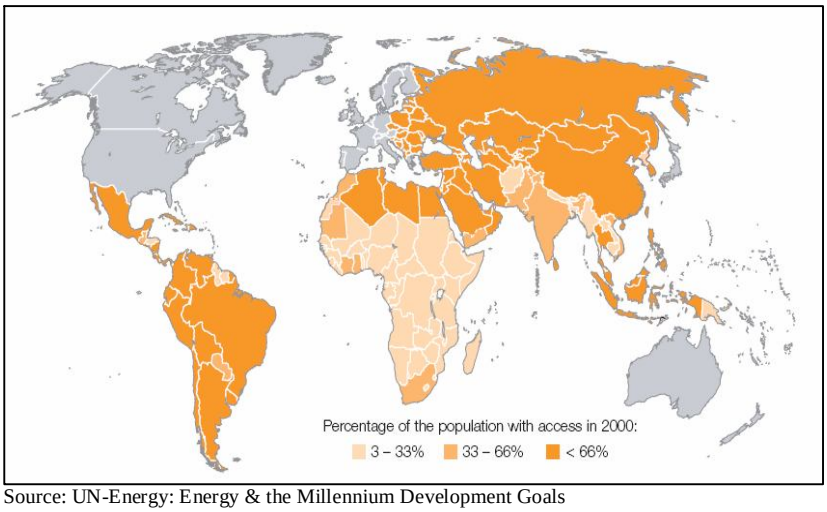


Source: US International Energy Agency

Although African governments are making an effort to increase electricity coverage, the basic problem faced is that population growth is outstripping the effort. Additionally, centralized grid electrification is not a viable alternative for the majority of consumers living in rural areas; they are simply too far removed from the grid to be able to benefit.

The lack of electrification has as a direct result that household lighting can not be electricity powered. Thus, prevalent on the African continent is that large segments of the poor rely on inconvenient forms of lighting, or have low or no access to lighting at all. Furthermore, what is evident is that the "un-electrified" group of consumers pays the highest cost for electricity and energy access of all consumers in Africa.

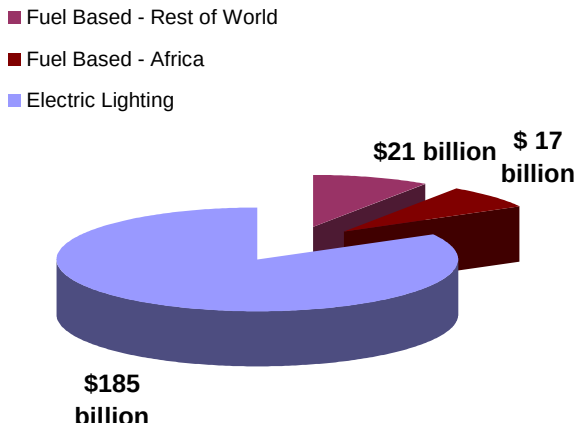
[1] US International Energy Agency



Source: UN-Energy: Energy & the Millennium Development Goals

Amongst the poorest of the poor, lighting is often the most expensive item among their energy uses, typically accounting for 10 to 15% of total household income.[2] Yet while consuming a large chunk of people's income, fossil based fuel lighting provides little in return.

With expenditures in fuel based lighting estimated at USD 38 billion annually, of which Africa represents a USD 17 billion chunk, the potential exists to engage the international lighting industry in this new market area.[3] Potentially this forms an enormous market for producers of low cost alternative lighting products, such as those relying on Light Emitting Diode technology.



If manufacturers are attracted to the African market and are then able to provide products that meet market needs in terms of price, product, distribution and marketing, and if sales are high, then the situation of lighting across Africa could be revolutionized with all the improvements to life and livelihood that this brings.

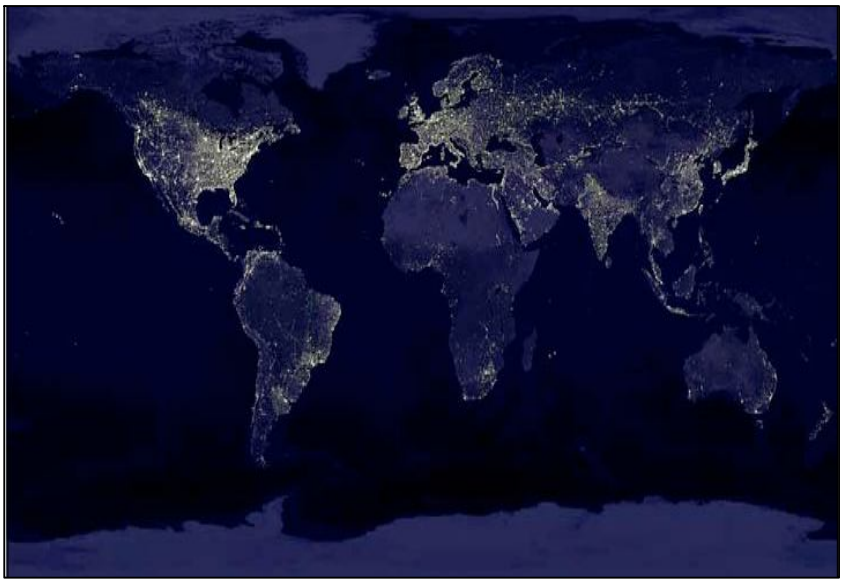
[2] Lighting Africa, Catalyzing Markets for Modern Lighting
[3] IFC Lighting the Bottom of the Pyramid; Evan Mills, International Association of Energy Efficient Lighting & Lawrence Berkley National Laboratory

2. IFC Involvement

Lighting Africa (the Bottom of the Pyramid) is a project jointly initiated by the International Finance Corporation and The World Bank, and is aimed at encouraging companies to focus on and invest in market opportunities presented by the provision of improved lighting to households and micro-businesses in Africa.

The programs mission is to make affordable, environmentally sustainable, durable, and safe lighting available to the masses, which currently depend on lighting methods such as kerosene lanterns and candles. The program aims to address the lighting needs of rural, peri-urban and urban customers without electricity access – predominantly low income households and businesses.

Furthermore, Lighting Africa is designed to contribute to the Millennium Development Goals by reducing poverty and enhancing quality of life.



Source: Laurence Berkley National Laboratory (LBNL)

2.1 Hypotheses

The Lighting Africa program is based on the following assumptions regarding the African market, which will hold true as hypotheses for this paper:

- Recent technological advancements in lighting, particularly in the area of Light-Emitting Diodes (LEDs), demonstrate the potential to deliver affordable and attractive lighting solutions to the African consumer

- A cost saving and environmentally friendly manner in which to recharge modern lighting devices is by the use of solar panels, which are ideally suited to the African environment due to the high number of sun hours available on a daily basis

- The most expedient and sustainable way to bring affordable, reliable lighting to Africa is by supporting the industry to design and deliver an array of products tailored to the needs of African consumers

In order to assess whether these assumptions are indeed correct and to ensure the Lighting Africa program offers consumers the most appropriate lighting solutions at the most affordable prices, market research is needed across the various African markets where the program is rolling out.

3. What will Market Research Provide?

Anecdotal evidence clearly shows a substantial opportunity for the introduction of modern lighting devices. However, there is currently a lack of up-to-date primary information, which is needed to develop and market products appropriate to meet the needs of African consumers.

In response to the lighting industry's call to provide greater comprehension to the scope of this emergent market opportunity[4], Lighting Africa decided to develop a Market Research program together with Research International East Africa which was executed in 2008.

The underlying idea of the market research was that market research information should:

- Enable the industry to overcome potential challenges that are likely to accompany market entry into the African off-grid lighting market, such as:
  - Lack of understanding of current lighting product usage habits
  - Behaviors with regards to lighting both home and business premises
  - Attitudes towards lighting
  - Money currently spent on lighting and willingness to spend on modern lighting devices
- Inform on the desired functionality and design attributes of different types of modern lighting products within several different product classes (i.e.: Torch, Floodlight, Task Light, Lantern and Spot Light)
- Clarify the likelihood of up-take of various types of lighting products

Furthermore the research had as aim to focus on testing "generic" products that were not linked to a specific brand or manufacturer. Although specific products were to be tested in various research stages, no emphasis was to be placed on brand or manufacturer.

As Africa presents a plethora of distinctive markets in which the launch of lighting products is possible, it was imperative that for research purposes the market was narrowed down to a number of defined test markets. To this extent, five key African markets with different characteristics were chosen as research test markets, namely: Kenya, Ghana, Ethiopia, Tanzania and Zambia.

[4] Lighting Africa, Catalyzing Markets for Modern Lighting

4. Market Research Program

The Lighting Africa market research program kicked off at the start of 2008, and had as main defining factor that it results were fully composed of primary data which focuses specifically on providing a comprehensive overview of lighting habits, current lighting product usage, expenditure on lighting products and fuel, as well as different types of modern lighting devices (LED and solar/dynamo powered devices) which would be suitable to use within the five defined African markets.

Both qualitative and quantitative research approaches were used to determine whether Lighting Africa's hypotheses regarding the African market were correct and whether the market really was ready to adopt modern lighting devices. The structure of the research program and the reason for inclusion of each phase are outlined below.

The qualitative phase took place in March and April of 2008 and was primarily used to define the profile and behavior, as well as the wants and needs, of consumers within the off-grid lighting market each of the 5 countries. This method was chosen based on its strength of observing and questioning respondents within their own environment (home or shop) as well as allowing them to test the modern lighting devices in familiar surroundings, therefore giving us the potential to highlight the strengths or weaknesses of the different products. The strength of the qualitative method lies in the fact that it is good at probing below the surface in order to understand what *drives and motivates behavior* and therefore providing an invaluable tool in understanding specific wants and needs of our target market better.

In the qualitative phase data was obtained from 55 respondents in each test market who are currently not connected to the grid. In-depth interviews were conducted which were split over two visits. In the initial visit, respondent behaviors, attitudes and needs and usage of current lighting products were explored, as well as their wishes in terms of lighting and changes in household or business lighting which the respondent wished for. A set of two products was then placed with them for a period of 3 nights (products were placed on a rotational basis so as to ensure an even spread of evaluation amongst respondents and the two products placed were always different in nature, e.g.: one torch and one lantern). Respondents were then briefed on how to use and recharge the products, after which an initial evaluation was conducted pertaining to the esthetics, make, perceived quality and reliability of the product. During the second visit, the interviewer focused predominantly on user experience of each of the two products; how much light the product provided, how long the battery lasted, the ease of recharging and likelihood of product uptake. Findings obtained from this phase were fed into the quantitative research thus helping to structure and design the questionnaire.

The quantitative research, which took place over June and July of 2008, consisted of a robust sample within each market, 1000 consumers and 400 small business owners of which a maximum of 10% were to be connected to the grid. As the sample was spread over key areas in each market and a distribution of urban and rural consumers was

ensured which was in line with national proportions, it is true to say that the quantitative research results can be extrapolated to the target population as a whole.

The main objective of this research phase was to quantify the usage, habits and attitudes of consumers and traders in order to identify behavioral similarities and differences. Additionally it focused on current spend on lighting products and fuel and acceptable levels consumers and small business proprietors would be willing to spend on various types of modern lighting products. A 50 minute questionnaire was used to question respondents which included usage and attitudes questions linked specifically to lighting, lighting behaviour and expenditure on lighting.

The second and final part of the quantitative testing, conducted in November and December of 2008 in all 5 countries simultaneously, took the form of a concept test using Research Internationals proprietary concept testing tool; eValuate^{TM}.

The main objective of the concept testing was to quantitatively identify which specific types and designs of lighting products were most acceptable to consumers and small business proprietors, specifically highlighting the strengths and weaknesses of each product tested. Rather than testing the actual lighting device, a concept board was devised which clearly depicted the modern lighting product to be evaluated and included a short description of its features, battery life and price. Furthermore, it outlined the difference between the amounts of light the modern lighting device provides as compared to a standard paraffin lamp. (LED torches were compared to a regular torch), as indicated in the illustration below.

This is a desk / reading lamp that can be recharged either by plugging it into the mains or using a solar panel. The Cost of using the rechargeable Solar Lamp in the long run is lower than cost of buying paraffin for the lamp, which would add up to 200 Ksh per month. The rechargeable Lamp does not generate smoke and thus does not irritate the eyes, cause coughs or lung diseases.

Features:

- It is charged using Mains Electricity or a Solar Panel
- Brightness: On/Off
- Can last for about 4 hours on brightest setting when fully charged
- Purchase Price: Ksh 1,150 (option with Solar Panel and Electricity charging)

Monthly Cost to Charge the lamp:

Option 1: Charging using the Solar Panel: Ksh 0

5. A Selection of Research Findings

Upon completion of the three research phases of the market research a wealth of information regarding each of the 5 test markets was available from which a number of key findings were distilled in order to provide an answer to the hypotheses as outlined by the Lighting Africa Program.[5]

In overview; in all 5 countries approximately 80% of consumer households have only 1 main income earner who supports between 4 and 6 household members. In very few cases (<15% across all markets) do we see contributions to income from outside the household. On average, Zambian and Tanzanian consumers have the least disposable income and Ghanaian and Kenyan have the highest. In the majority of cases, small business proprietors have help supplementing their earnings by a second member of the household as monthly profits are not sufficient in covering their basic monthly needs.

In Kenya, Tanzania, Ethiopia and Ghana the main type of lighting device, used by consumers and traders alike, is paraffin powered. Only Zambia proves an exception to this rule as the majority of both consumers and traders use candles and to a lesser extent firewood/charcoal as their main lighting source. An important point to note is that these lighting methods provide a level of multi-functionality: paraffin is used for both lighting and cooking as is firewood, which additionally also has a heating function.

What becomes apparent from both qualitative and quantitative research results is that in all 5 countries there generally exists a low appreciation of the harmful effects of paraffin/kerosene on health. Although consumers do recognize that respiratory problems, itchy eyes and 'black nose' are directly related to burning paraffin, the majority feel here are no alternatives and these side effects are just something they have 'to put up with'. Negative environmental effects are not taken into account at all.

Consumers generally use lighting products both in the morning and in the evenings: on average between 6 and 8am and after 6:30pm. The amount of time a lighting devise is used in the evenings is dependant upon the amount of paraffin a person is able to buy i.e. how much money they have in their pocket at the time of paraffin purchase.

On average 1 or 2 rooms in the consumer household are lit, these generally are the living room, kitchen or bedroom, i.e. the main rooms in the house where family members will congregate in order to enjoy the light. Torches are mainly used by consumers who can afford two lighting devices, they will have a lantern at home and the torch will then serve as the lighting device of choice when moving around, i.e. when visiting neighbors or going to the pit latrine. However, for household use it is apparent that consumers want a lighting source which can light an entire room (or preferably more than 1 room) at a time,

[5] Full Market research qualitative and quantitative reports available on the Lighting Africa website: www.lightingafrica.org

and is thus a lighting solution which can be used by a number of different people at the same time. This holds true amongst both households and trade outlets.

In general, consumers feel most comfortable using a product which, by design, looks like something they are familiar with, i.e. a lantern, and does not look too expensive as consumers nor small business proprietors want to draw attention to themselves or the product for the fear of theft. Products which appear to be too unique or different actually alienate the target consumer rather than creating a level of excitement. The 'different' product will be perceived as a devise which falls within a category beyond the respondents' ability to purchase, i.e. 'products for the rich'.

In general, lighting products with a solar recharging option were poorly understood and comprehended and thus believed, across markets. Most apparent was the lack of knowledge and understanding of solar in the Zambian market. Kenyan consumers were the most comfortable with the concept of solar technology as it is already widely available in the market from specialist stores and supermarkets, particularly in urban areas. Another point which was noted during the qualitative product testing was that during cloudy days or rainy season the batteries were not fully charged after placing the solar panel outside all day. Some respondents found they only had light for 10 to 15 minutes which caused them to doubt the functionality of the devices and the charging method.

Initial costs of modern lighting devices are the biggest inhibitor to consumers not wanting to purchase the products. Initial purchase price should be such that ideally respondents will not have to save up for it. Furthermore it must be noted that for the majority of consumers, lower running costs are not a deciding factor in terms of product purchase – most consumers in the target markets live a hand to mouth existence and saving is therefore either not an option or extremely difficult, therefore the only products which are within their budget are ones which they can buy from their weekly or monthly income

In terms of product sales; targeted distribution would be best done through small 'permanent structure' shops and kiosks (Duka's). Apparent in all 5 test markets was that these shop types are the most prolific and therefore are likely to have the greatest level of success and reach amongst customers interested in purchasing modern lighting devices.

6. Summaries and Conclusions

The research results have substantiated the assumption that there is a market opportunity for modern lighting devices within the 5 test markets, consumers and traders alike are not satisfied with their current lighting situation and can clearly identify the areas for improvement; however a number of considerations need to be taken into account before specific products are launched in order to ensure the Lighting Africa offering is successful and resonates with end consumers. Below the considerations are inked back to the hypotheses.

The first Lighting Africa hypothesis held: "Recent technological advancements in lighting, particularly in the area of Light-Emitting Diodes (LEDs), demonstrate the potential to deliver affordable and attractive lighting solutions to the African consumer"

The research has shown that consumer hesitancy to buy into new technology stems from the fact that modern lighting devices, and the technology which powers them, are not (well) understood. The benefits of LEDs over incandescent bulbs are not known and/or understood, and the concept of using solar technology to recharge a lighting devise is not (well) comprehended. Thus, in order for Lighting Africa to achieve a level of buy in from consumers, an extensive educational program must be undertaken which will have as aim to increase understanding and comprehension of modern technology and how it can benefit consumers and their families. This program should ideally take the form of product demonstrations at a grass roots level, i.e. in rural villages and slum areas where these products are the most necessary. This will enable consumers to 'see', 'hear', 'touch' and believe after receiving first hand information, therefore an educational road show would be ideal. Not only the most obvious of benefits should be outlined by this educational drive, i.e. longer and brighter lighting, but effects on personal health and safety could be further emphasized by the Lighting Africa program and may be one of the roads into creating greater acceptability for the modern lighting concepts/LED products.

The second hypothesis held: "A cost saving and environmentally friendly manner in which to recharge modern lighting devices is by the use of solar panels, which are ideally suited to the African environment due to the high number of sun hours available on a daily basis".

Environmental concerns are of little importance to target consumers in the various markets, not too surprising considering their main concern is ensuring their family is fed, clothed and well taken care of. Using the environment in order to create a battery charge, i.e. through soar energy, is a foreign concept to many, as outlined above, and therefore not believed. This issue can be addressed during an educational program. However one element which should be addressed by the Lighting Africa program is that in many African countries rainy season, harmattan and other environmental peculiarities will have as effect that lighting device batteries will not fully charge within a day as light intensity is too low. This will have an impact on consumer willingness to purchase modern lighting devices as inevitably they will need to have a back up lighting mechanism available which as likely to be paraffin. As secondary charging method, such as for

example a crank handle, is therefore necessary in order to ensure that the lighting devise can be used year round.

The final hypothesis held: “The most expedient and sustainable way to bring affordable and reliable lighting to Africa is by supporting the industry to design and deliver an array of products tailored to the needs of African consumers.”

As results have shown, it will be imperative that any new products launched are seen to be affordable for there to be any success in the market place. Affordability levels must be assessed on a per country basis as they will differ largely between end markets. As the main priority among the majority of off-grid consumers is providing food and education for their families, there is little room left to buy relatively expensive modern lighting devices. Additionally consumers are not yet convinced that modern lighting devices will indeed work consistently, will stand up to the African environment and will be as reliable as their paraffin lamps or wood fires currently prove to be. A further consideration is that with the introduction of LED lamps, multi-functionality of current lighting products will be taken away – i.e. kerosene is bought to fuel both lights and stove, firewood lights the house as well as providing warmth and cooking opportunities. With this lower level of multifunctional of modern lighting devices; consumers may perceive products as less value for money than their current solution. In this context, low income consumers will be careful spenders as it is a big gamble to spend 4 days of paraffin money on a modern technology of which they are not sure will still work tomorrow. A lot of these concerns will be targeted and potentially be quelled by means of an educational program; however the starting point must be a pricing strategy which makes the modern lighting devices accessible for consumers in the first place.

Although the Lighting Africa program still has some challenges to conquer it is apparent that ‘for the poorest of the poor, lighting Africa represents the opportunity to move from wicks to modern lighting.’
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