

**ATTITUDE OF ELECTRICITY CUSTOMERS TOWARDS ENERGY  
EFFICIENCY MESSAGES IN LIGHTING ACTIVITIES: THE CASE  
OF KPLC'S DOMESTIC CUSTOMERS IN NAIROBI**

**By**

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**D61/P/8770/2000**

**A MANAGEMENT RESEARCH PROJECT SUBMITTED IN PARTIAL  
FULFILLMENT OF REQUIREMENTS FOR THE DEGREE OF MASTER OF  
BUSINESS ADMINISTRATION (MBA),  
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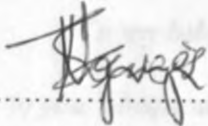
**October, 2004**

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## DECLARATION

This Management Research Project is my original work and has not been submitted for a degree in any other University.

Signed.....



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This Management Research Project has been submitted for examination with my approval as the University Supervisor.

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## DEDICATION

*To my beloved and astute daughter, Ciru,  
to you I bequeath the forte of boundless scholarship*

*and*

*to God and the rest of my Family,  
for your momentous succor and stimulus*

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## **ABBREVIATIONS**

<b>KPLC</b>	-	<b>Kenya Power &amp; Lighting Company Limited</b>
<b>ERB</b>	-	<b>Electricity Regulatory Board</b>
<b>IPPs</b>	-	<b>Independent Power Producers</b>
<b>KenGen</b>	-	<b>Kenya Electricity Generating Company Limited</b>
<b>UNEP</b>	-	<b>United Nations Environmental Programme</b>
<b>LPG</b>	-	<b>Liquefied Petroleum Gas</b>
<b>Gwhr</b>	-	<b>Gigawatt Hours</b>
<b>KWHRS</b>	-	<b>Kilowatt Hours</b>
<b>MW</b>	-	<b>Megawatts</b>
<b>W</b>	-	<b>Watt</b>
<b>ASK</b>	-	<b>Agricultural Society of Kenya</b>
<b>SPSS</b>	-	<b>Statistical Package on Social Sciences</b>
<b>KBC</b>	-	<b>Kenya Broadcasting Corporation</b>

## ABSTRACT

Electricity is a versatile, clean and environment friendly source of energy. Its availability, pricing and use will continue to be important factors as more customers get connected to the national grid in Kenya. However major challenges are expected to continue presenting themselves in the areas of affordability and use. There is emphasis worldwide for promotion of efficient use of electricity in order to benefit various stakeholders such as customers, electricity companies and governments. This is because sources of energy are limited; energy is a major portion of operating costs; there is need to reduce bills; short lead time for energy conservation is advantageous compared to long lead time for new power generation; energy conservation costs are only a fraction compared to new power plants; and it ensures favorable environmental impact.

Hence, efficient use of electric energy would play a crucial role in this regard. It is therefore critical to understand the attitude of KPLC's domestic customers towards electric energy efficiency promotional messages in lighting among other areas, given that this constitutes about 90% of all electric energy usage activities in Kenyan homes. This will help to gauge the effectiveness of such messages disseminated by KPLC and a few NGOs, with a view to developing measures that may facilitate effective use of electricity in lighting activities. This study sought to establish this among domestic customers who form 80% of KPLC customers countrywide, with the focus being in Nairobi.

Using a descriptive research design, it has produced data regarding the key features of customers' attitudes towards electric energy efficiency in lighting and developed profiles of the same. Key among the findings, is that on overall attitude, customers rate as positive and significantly high the attitude variable on believability/credibility of past/current energy efficiency messages as indicated by the calculated standard deviation of 1.03, grand mean of 3.9 and coefficient of variation of 26.4%. Significant also is that 92% of customers in Nairobi have heard about energy saving bulbs and 97% of them are willing to learn more about the bulbs.

It was established that the leading attributes contributing to positive attitudes towards energy efficiency messages as well as subsequent positive behaviour, are Savings on electricity bills followed by Long Life and Brightness of energy efficient bulbs. Conversely, the leading attributes associated with negative attitudes on the same are that the bulbs are Too expensive followed by Lack of understanding about their benefits and Lack of believability in their benefits. To be effective, future marketing strategies in energy efficient bulbs should therefore take into account these negative and positive attributes.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background

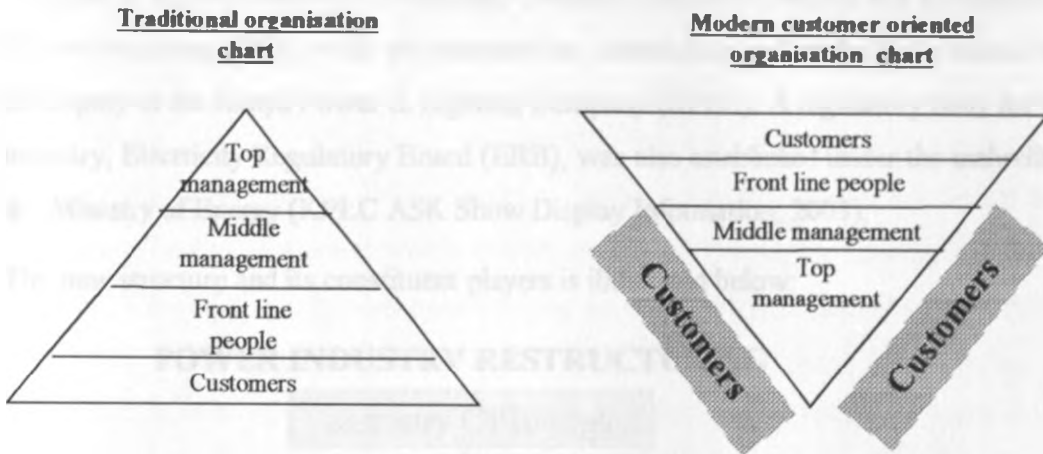
The Kenyan government in 1993 introduced far reaching structural reforms that entailed improving the efficiency and effectiveness of public sector investment, including the delivery of infrastructure services through improved efficiency and better management measures (The Eighth National Development Plan - 1997-2001). Public sector organisations in Kenya (government ministries, parastatals, regulatory bodies, public education institutions, etc.) have thus continued to be subjected to the same environmental changes and dynamics that affect their counterparts in the private sector, hence the need for strategy. They continue to operate in an ever-changing technological, economic, social-cultural and politico-legal environment that dictates their existence and survival. These changes require that public sector organisations be managed effectively and efficiently for them to succeed.

Following the liberalisation of the Kenyan economy in the 1990's many players have entered into the market resulting in stiff competition for customers. Unlike in the past, there are many goods and services available for customers to choose from. In view of the various changes taking place in the environment they operate, both public and private sector organisations are devising various response strategies to ensure their survival. Modern concepts in management are therefore advocating for organisations to focus more on their core business to ensure customer satisfaction and survival in business. In terms of providing measurable value to the customer, Hammer and Champy (1993), state that companies are striving to adopt the following response strategies in their processes and organisation structure; Quality, Speed and Efficiency. Their processes and organisation structure are therefore being designed around this aspiration goal. According to Hammer et. al. (1993), processes are being reengineered in order to render them efficient, faster and value adding to the customer.

Great emphasis is being placed on the need to focus on the customer. Kotler (2001), emphasises the importance of embracing the 'Marketing Concept' that focuses on the

customer. He argues that there is need for companies to focus their products and services on the customer by adopting a Customer-top-management-down approach as illustrated below:

### **Traditional organisation chart versus modern customer oriented company organization chart**



*Source: Kotler, P. (2001). "Marketing Management," Millennium Edition, Prentice Hall of India Private Ltd., New Delhi, pp. 23*

Educating the market is another response strategy companies are adopting. With today's business focus shifting to the customer, organisations are obliged to educate their market about their products particularly given that these may tend to be quite technical in nature. Lancaster and Massingham (1998), explain that effective planning of the promotional elements of the marketing mix requires an appreciation of how the communication process works. They summarise the process as incorporating the following questions: Who says what? In what channel? To whom? And with what effect?

Lancaster et. al. (1998), further argue that in terms of communication, a company's products are an important element. This is because for many consumers, products represent symbols denoting characteristics of lifestyles, personality and so on. The market is activated through information flows. The amount and kind of information customers have about the offering and their reaction to that information influence the way a buyer perceives the market offering of the seller.

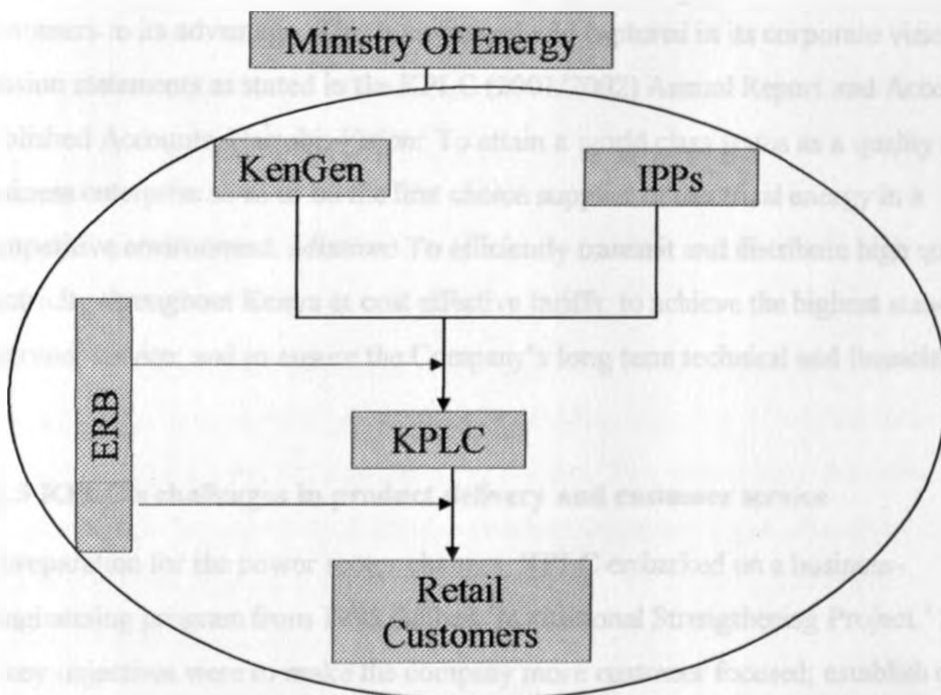
### 1.1.2 Reforms in the Energy Sector and implications for KPLC

The Kenyan government developed a broad energy sector reform strategy under its policy framework paper (1996-1998). This accompanied by the international demand for liberalisation ushered in structural adjustment programs for the sector from 1997.

Following the restructuring of the power sub sector, generation of electricity was assigned to Kenya Electricity Generating Company Limited (KenGen) and Independent Power Producers (IPPs) while the transmission, distribution and marketing remained the monopoly of the Kenya Power & Lighting Company (KPLC). A regulatory body for the industry, Electricity Regulatory Board (ERB), was also established under the umbrella of the Ministry of Energy (KPLC ASK Show Display Information, 2003).

The new structure and its constituent players is illustrated below:

#### POWER INDUSTRY RESTRUCTURING



*Source: KPLC ASK Show Display Information, 2003*

Like other public sector as well as private organisations, KPLC continues to be subjected to the same environmental changes and dynamics. To ensure its survival the company has to adopt modern operational, financial and marketing strategies. Its customers are becoming more demanding in terms of service delivery and information flow. This is exhibited by their increasing influx of complaints, queries and requests which are being channeled through various channels among them the Electricity Regulatory Board (ERB), KPLC Call Centres, letters to the company, print and electronic media (KPLC ASK Show Display Information, 2003).

According to a KPLC Policy Paper on Marketing Strategies For Customer Creation and Energy Sales Enhancement, the Company cannot therefore afford to be left behind in adopting a market-focused approach to doing business. The need to conduct market research is therefore paramount to understand its customers perception of its products, usage (e.g. energy efficiency) and corporate image, if it has to continue influencing customers to its advantage. This is envisaged and captured in its corporate vision and mission statements as stated in the KPLC (2001/2002) Annual Report and Accounts, Published Accounts, Nairobi: *Vision*: To attain a world class status as a quality service business enterprise so as to be the first choice supplier of electrical energy in a competitive environment. *Mission*: To efficiently transmit and distribute high quality electricity throughout Kenya at cost effective tariffs: to achieve the highest standards of customer service: and to ensure the Company's long term technical and financial viability

### **1.1.3 KPLC's challenges in product delivery and customer service**

In preparation for the power sector changes, KPLC embarked on a business-reengineering program from 1995 dubbed 'Institutional Strengthening Project.' Some of its key objectives were to make the company more customer focused; establish one-stop-customer service; enhance the billing process; refocus the company to its new mandate; establish fully-fledged business units; optimise use of resources; and review and realign the business processes (KPLC - 1996/1997 - Annual Report and Accounts, Published Accounts, Nairobi).

With its new mandate the company has focused on providing a world class utility service, with a view to offering Efficient, Affordable, Sustainable, Cost-effective, Reliable and high Quality Modern services. All these form the backbone of its vision and mission. KPLC has therefore been endeavouring to take advantage of modern business practices with the recognition and establishment of the Marketing function as an important step in this direction. Its Marketing Department has drawn marketing plans aimed at transforming the Company into a marketing oriented organisation that strives to meet the ever-increasing customer needs and wants (KPLC Marketing Plan, Financial Year 2001/2002 and 2002/2003).

In doing so, due consideration has been given to the new mandate of the Company in marketing electricity following the separation of the generation function from the old KPLC. Worth noting also is that the current corporate focus is on augmenting the market share and energy sales in order to enhance the revenue base and turn around the Company's business. As the electricity market share continues to register a six percent average growth rate, it is expected that it will continue to be an important source of energy in future (Refer to Appendix Aiii Fig. 1 and Fig. 2). This growth rate is expected to increase as KPLC targets to connect 150,000 new customers annually, as part of its strategic business recovery measures. (KPLC Policy Paper on Marketing Strategies for Customer Creation and Energy Sales Enhancement, 2004).

Of all 6.4 million Kenyan households, only about half a million are connected to electricity. Less than half the people living in urban centres (i.e. 45%) have access to electricity and only 3.8% have access in rural areas. This limited access is mainly attributed to the high up-front costs of expanding the national grid, and when accessible, the relatively high retail prices (KPLC Policy Paper on Marketing Strategies for Customer Creation and Energy Sales Enhancement, 2004).

KPLC now regards market intelligence as critical to understanding trends in the energy market and how to influence them to the advantage of the Company. Whereas it is mistakenly 'perceived' that KPLC enjoys a monopoly in this market, recent developments point towards increased competition from other energy sources. According to a KPLC/ESBI research on Demand Side Management (2004), KPLC has lost about

40% of its market share among existing customers to competition. These competitors include LPG cooking gas, solar, petroleum fuel, candles and wood fuel.

Besides gradually penetrating KPLC's potential market, these competitors are therefore steadily eroding the Company's existing market share. For instance, many customers who previously used electricity for cooking have now switched to LPG cooking gas, which is considered to be cheaper. LPG cooking gas such as Kobil's 'K-Gas' and 'Chloride Exide Solar' energy are being advertised quite aggressively in both print and electronic media. KPLC's future marketing strategy will therefore have to focus on the level of competition from other energy sources and devise strategic ways to counter it (KPLC Policy Paper on Marketing Strategies for Customer Creation and Energy Sales Enhancement, 2004).

Out of KPLC's 670,036 total customers countrywide, about 538,493 are Domestic; 125,666 Small and Medium commercial/industrial; and about 425 are Large commercial/industrial (KPLC billing database – February 2004). According to the KPLC Annual Report and Accounts (2001/2002), average annual growth in number of customers over the last five years has been six percent. Energy sales in the year 2001/2002 grew by 13.1%, i.e. from 3212 GWh to 3628 GWh (Refer to Refer to Appendix Aiii Fig. 3).

Besides proactively creating new customers, existing ones who support the Company's business at the moment are being regarded as equally important hence the need to design appropriate programs aimed at satisfying them to ensure that they remain loyal. To win new customers and retain existing ones, the marketing philosophy has been re-oriented towards customer satisfaction through provision of prompt and quality services in all fields such as new connections, meter reading, billing, disconnections/reconnections, service outlets, queries/complaint handling, response to breakdowns, customer education, etc. (KPLC Policy Paper on Marketing Strategies for Customer Creation and Energy Sales Enhancement, 2004).

Staff playing various roles in delivering service to customers are being re-oriented through training and sensitisation. The company is also intensifying efforts designed to add value to customers by establishing alternative and convenient service outlets such as banks and call centres. As part of the ongoing customer service improvement programs, it



is planned that the various tariff categories and the Company itself will be branded and the brand building sustained. A comprehensive brand identity system, value proposition and credibility will be developed to build a strong brand-customer-relationship. This will be undertaken with the services of Professional Consultants (KPLC Policy Paper on Marketing Strategies for Customer Creation and Energy Sales Enhancement, 2004).

KPLC appreciates that for this to work, it will have to be supported by quality delivery of customer service in order to fulfill the promises made by the branding. It is expected that this exercise will alongside other service improvement initiatives facilitate the transformation of KPLC from the traditional 'commodity selling orientation' to the modern 'marketing orientation' where products/services are designed from the customers' perspective in order to satisfy their needs and wants (KPLC Policy Paper on Marketing Strategies for Customer Creation and Energy Sales Enhancement, 2004).

In addition to improving customer services, KPLC plans to undertake an Energy Demand Management Programme that will assist customers to manage their power demands, increase efficiency of use, and hence reduce their electricity costs. The improvement on the customer side will facilitate reduction of the peak power demand on the KPLC system and enable the Company to enhance availability of electric energy. The programme is expected to educate customers on ways to reduce their energy costs and increase their comfort levels (KPLC/ESBI research on Demand Side Management, 2004).

#### **1.1.4 The role of energy efficiency**

According to a Ministry of Energy Study on Kenya's Energy Demand, Supply and Policy Strategy for Households, Small Scale Industries and Service Establishments (2001), electricity is a versatile, clean and environment friendly source of energy. Its cleanliness makes it attractive especially with regard to lighting and cooking. Electric energy efficiency involves deliberate and proactive energy conservation measures or behaviour by customers.

Bhagavan (1999), summarises the overall justification for energy efficiency or conservation, as; Sources of energy are limited; energy is a major portion of operating

costs; reduction of bills; short lead time for energy conservation versus long lead time for new power generation; energy conservation costs only a fraction compared to new power plants; and favorable environmental impact. Meanwhile some of the impediments to energy efficiency or conservation efforts especially in developing countries, according to Bhagavan (1999), include; lack of awareness about energy conservation techniques; lack of awareness about energy efficient equipment; managerial attitude towards energy conservation; inadequacy of fiscal and financial incentives, and lack of focal expertise. In addition, the *ERB News* (2004), cites barriers to energy efficiency in the Kenyan situation as; experience in identifying energy efficiency measures and information regarding the economic viability of the measures.

### **1.1.5 Energy efficiency perspective and challenges for KPLC and its customers**

Electricity, petroleum fuels, wood fuels and solar constitute the main sources of energy in Kenya. According to the Economic Survey (2001), electricity is the second most important source of commercial energy for the formal sector after petroleum fuels. The results indicated that commercial and industrial establishments, as well as institutions and households in the country use electricity.

With the new focus being on the customer, part of the marketing challenge for the company is to educate the customer about end-use practices such as energy efficiency and safety to ensure that they get value for money. With the projected two percent growth of the Kenyan economy, electricity is expected to continue to be a major source of energy. Notwithstanding the problem of high costs of connection and retail tariffs, which the government and KPLC are addressing, electricity has a competitive advantage over other sources of energy such as petroleum fuels and wood fuels. Such benefits include cleanliness, convenient access (at the flicker of a switch) and ability to run a variety of household and commercial appliances/equipment. Its availability, pricing and use will continue to be important factors as more customers get connected to the grid (KPLC Policy Paper on Marketing Strategies for Customer Creation and Energy Sales Enhancement, 2004).

Perhaps it is in the areas of affordability and use that challenges will continue to emanate from. Consequently, efficient use of electric energy will play a crucial role in both aspects, hence the need to understand and influence consumer behaviour in this regard. Whereas KPLC and few Non Governmental Agencies (such as UNEP) have occasionally carried out energy efficiency awareness education in the past, this remains a challenging area hence the need for more information about the impact. This understanding will therefore determine if there is need for additional campaigns and how to conduct them. Findings of a World Bank funded Market Research (2004) on efficient use of electricity will be used to design relevant campaigns aimed at sensitising customers (KPLC/ESBI research on Demand Side Management - 2004).

According to the *ERB News* (2004), it is strongly thought that many customers whose accounts get disconnected for non-payment and fraud do not use electricity efficiently, hence end up finding the cost unaffordable. It is therefore expected that intensive customer education on efficient use of energy will help reduce the level of fraud and disconnections for non-payment, as well as loss of existing customers associated with these reasons. Other initiatives will be pursued in collaboration with manufacturers/distributors of electrical appliances to ensure that energy efficient appliances are available in the market.

Over the years, KPLC's energy efficiency awareness programs have been undertaken using the following strategies:

**Above-the-line;** Radio advertisements; Company sponsored '*PowerTalk*' Radio programme (KBC and KISS stations); Television advertisements; Newspaper advertisements; Company sponsored '*PowerTalk*' column in *Daily Nation* and *EA Standard* newspapers; Factual Films documentary; and KPLC website.

**Below-the-line;** Demonstration centres in KPLC offices; Outreach programmes by KPLC Marketing staff through barazas, schools, etc.; Agricultural Society of Kenya (ASK) shows; Brochures distributed through KPLC offices and ASK shows; Fliers, attached to electricity bills and distributed through KPLC service outlets; Posters mounted in KPLC offices and public places such as markets and chief's office; Door-to-door-contacts by KPLC Marketing staff (especially during the 1998-2000 power-rationing programme)

Whereas these programs have been carried out intermittently and on a fairly moderate scale, this was intensified during the countrywide power-rationing programme instituted by KPLC from September 1998 to the second half of year 2000, as a result of prolonged drought. According to a draft report by National Economic Research Associates, Inc. and Gibb (Eastern Africa) Ltd. (2001), energy shortages arising from this drought led to higher generation costs which in turn resulted in higher tariffs. In addition, part of the thermal generated power had to be transmitted over longer distances, from the Coast to Nairobi and Western Kenya, leading to increased technical losses that could not be fully recovered by KPLC through existing tariffs. The report concludes that the current structure of end-user tariffs is such that changes in consumption patterns and load shedding led to under-recovery of revenues.

Other consequences of the rationing programme were a negative impact on the country's economic performance and increase in cost of electricity bills to consumers due to expensive thermal generation, states the Economic Survey (2001). Furthermore, electricity sales recorded a significant decline of 9.9 percent in year 2000, from 3,685 Gwhr in 1999 to 3,320 Gwhr in 2000. This was attributable to reduced consumption by all categories of consumers during the rationing as well as higher tariffs. The Survey further reports that in order to augment electricity output from the national grid and reduce the negative impact associated with power shortages, the government will facilitate private participation in power generation, transmission and distribution. Moreover, completion of ongoing publicly funded projects namely Kipevu II, Olkaria III and Sondu Miriu, will boost generation capacity by 318 MW. Related to this, the KPLC Annual Report and Accounts (2001/2002) states that the company in conjunction with the government, has been exploring prospects of importing power from the Southern Africa Power Pool through a planned interconnection via Arusha.

Energy efficiency also has the potential to influence the need for additional investment in the generation of electric energy in future. This is because many developed countries have resorted to trying to manage efficiently their existing energy resources, where possible, rather than investing in new ones (Bhagavan, 1999). This rationale and approach is also permeating in developing countries such as Kenya, as emphasised by the KPLC brochure (2002) 'Using Electricity Efficiently' which states that (Refer to

Appendix Biv): 'Our energy sources are not limitless. It therefore makes good sense for anyone who uses electricity to conserve it as much as possible.'

According to a 'National Energy Policy' draft report published by the Ministry of Energy (*Daily Nation* newspaper on 12<sup>th</sup> February 2004, pp.42) one of the major objectives of the new policy is to promote energy efficiency and conservation in Kenya. In the power sub-sector, this will entail the following policy responses: introducing demand and supply side management practices; strengthening awareness creation and efficiency improvements; and introducing energy efficient building design and construction

In KPLC, the function of creating awareness and promotion of efficient use of electric energy is vested in the Marketing and Communications departments. Whereas the large/medium power customers constitute the highest single consumers of electricity, they are few and easy to reach with energy efficiency messages. However, the number of domestic customers is higher and they are more challenging to reach with conservation messages, hence the focus on them in this study.

Lighting, which is the focus of this study, for both indoor and outdoor purposes constitutes a significant portion of electric energy usage for KPLC's domestic customers. A KPLC/ESBI research on Demand Side Management (2004) states that on average lighting forms 93% of all electric energy usage activities in homes. Majority of households (i.e. 59%) has between three and six lighting points. Among other residential electricity usage activities are cooking, ironing, water heating, laundering and refrigeration.

According to a project proposal on 'Energy Saving made in December 1998, by KPLC's Customer Relations & Marketing department and Specialised Electronics Ltd. (SEL), who are Philips Distributor in Kenya, substantial energy/monetary savings can be made in the area of lighting if a substantial number of customers were to convert to energy efficient lamps. With an estimated 52 million lamps currently installed countrywide, it was proposed that under the project one million lamps would be targeted for conversion during the first year.

Consequently, the total energy reduction would be as follows;

CONVENTIONAL LAMPS	ENERGY SAVING LAMPS	x	ECONOMY	= TOTAL REDUCTION
60w:	700,000	x	49w	= 34,300 KWHRS
75w:	200,000	x	60w	= 12,000 KWHRS
100w:	100,000	x	80w	= 8,000 KWHRS
<b>Total</b>	<b>54,300 KWHRS (54.3MW) pcr hr.</b>			
Daily Average Use	=	3 Hours		
Daily Economy	54.3 MW x 3	=	162.9 MW	

The project proposal further stated that despite the attendant potential benefits of electricity conservation to the customer and KPLC, energy efficient bulbs have been in the market for several years, alongside conventional bulbs, but they have not been popularised effectively to command a substantial market share. The former provides more light and last longer. The proposal also noted that if the projected energy savings were to be made, this would help to ease load management during the peak period when most of the lighting is done in residential premises (Refer to Appendix Bii).

This would engender significant optimisation and reduction in energy utilization. The effort would also go a long way to enable the energy sector and the country at large to manage available energy capacity efficiently by allowing more customers to use the same resources without necessarily investing in new plants. Significant gains would, therefore, be made in the demand/supply side management.

According to information displayed to the public by KPLC at the Agricultural Society of Kenya (ASK) shows in year 2003, use of energy efficient bulbs instead of ordinary ones would engender substantial savings in terms of bulb cost, retail tariffs and energy consumed. In a period of three years, someone using a 14W energy efficient bulb will

have spent Shs 453 in electricity bills compared to the Shs. 2,430 spent by a 75W ordinary bulb. The following is a summary of the analysis:

**Energy Saving Bulbs versus Ordinary Bulbs**

	<b>ORDINARY BULBS</b>	<b>ENERGY SAVING BULBS</b>
<b>RATING FOR EQUIVALENT ILLUMINATION</b>	<b>75W</b>	<b>14W</b>
<b>COST OF BULB</b>	<b>KSH. 30.00</b>	<b>KSH. 300.00</b>
<b>TYPICAL LIFE SPAN</b>	<b>9 MONTHS</b>	<b>3 YEARS</b>
<b>TOTAL COST OF BULBS IN 3 YEARS</b>	<b>Shs 120.00</b>	<b>Shs 300.00</b>
<b>TOTAL MONTHLY UNITS CONSUMED 5 HRS PER DAY</b>	<b>11.25 KWHRS</b>	<b>2.1 KWHRS</b>
<b>MONTHLY RUNNING COST @ Shs 6.00 PER UNIT</b>	<b>Shs 67.50</b>	<b>Shs 12.60</b>
<b>TOTAL RUNNING COST OVER 3 YEARS</b>	<b>Shs 2430.00</b>	<b>Shs 453.60</b>
<b>TOTAL COST IN 3 YEARS</b>	<b>Shs 2550.00</b>	<b>Shs 753.60</b>

*Source: Kenya Power & Lighting Company ASK Show Display Information, 2003*

## 1.2 Statement of the Problem

With today's business focus shifting to the customer, there is need to educate and help customers make good use of a service or product, particularly for organisations such as KPLC whose product may tend to be quite technical in nature. In this regard, Lancaster et. al. (1998), contends that the amount and kind of information customers have about the offering and their reaction to that information influence the way a buyer perceives the market offering of the seller. Hellen (1995), argues that by developing and delivering quality service, organisations with a reputation for consistently high quality can sustain an enviable competitive advantage in the service market place, that can have a direct impact on profitability, image and customer satisfaction. Consequently the focus on the customer will continue to be of paramount importance to KPLC as the market becomes increasingly demanding in terms of product information, quality of service and value for money.

There is need for promotion of efficient use of electricity in order to benefit various stakeholders such as customers, electricity companies and governments. Reasons for this according to Bhagavan (1999), are that; sources of energy are limited; energy is a major portion of operating costs; there is need to reduce bills; short lead time for energy conservation is advantageous compared to long lead time for new power generation; energy conservation costs are only a fraction compared to new power plants, and it ensures favorable environmental impact. In Canada it is estimated that 5,299 MW of generating capacity have been avoided due to effective and successful energy efficiency programs (World Energy Council Journal of Case Studies, 1998).

The recently published 'National Energy Policy' by the Ministry of Energy (draft report Daily Nation newspaper 12th February 2004, pp. 42) recognises promotion of energy efficiency and conservation as one of its key objectives. In Kenya, lighting for both indoor and outdoor purposes forms a significant portion of electric energy usage for KPLC's domestic customers. According to a KPLC/ESBI research on Demand Side Management (2004), on average lighting constitutes 93% of all electric energy usage activities in households and majority of homes (59%) have between three and six lighting points. A project proposal on 'Energy Saving' (1998), by KPLC's Customer Relations



and Marketing department and Specialised Electronics Ltd. (SEL), who are Philips Distributor in Kenya, states that upto 162.9 MW could be saved daily in the area of lighting if one million out of the over 52 million lamps currently installed countrywide, were to be converted to the energy efficient type.

Past energy efficiency promotional messages, occasionally disseminated by KPLC and a few NGOs, have targetted domestic customers and focused on energy efficiency in lighting, food refrigeration, cooking, water heating and laundering. These have been in the form of: *Above-the-line*: Radio advertisements, KPLC sponsored Radio programmes, Television advertisements and Newspaper advertisements, KPLC sponsored Newspaper columns, KPLC website and Factual Films documentary, and *Below-the-line*: Demonstration centres, Outreach programmes, Agricultural Society of Kenya (ASK) shows, Brochures, Fliers, Posters and Door-to-door-contacts. Implementation of a sustained electric energy management programme would assist customers to manage their power demand, increase efficiency of use, reduce their electricity costs and reduce peak power demand on the KPLC system thereby enhancing availability of electricity.

No research has been conducted to establish customer attitudes toward past energy efficiency promotional messages in Kenya. The only significant attempt made so far in conducting scientific investigation in electric energy efficiency was a KPLC/ESBI research on Demand Side Management (2004), whose focus was actual usage patterns, existing efficiency measures used, as well as level of energy efficiency awareness among electricity customers. The study did not address fully the area of lighting, which as already mentioned forms the bulk of electricity domestic usage. Bhagavan (1999), states that the concept and practice of efficient use of energy is quite strongly promoted and established more in developed countries of Europe and North America than in developing countries. He notes that many of the impediments to energy efficiency or conservation efforts especially in developing countries are associated with lack of promotion or communications thereby leading to lack of awareness.

In order to gauge the effectiveness of the messages disseminated by KPLC and a few NGOs, it is important to establish customer attitude towards such energy efficiency promotional messages. This will help in developing measures that may facilitate effective

use of electricity in lighting activities. This study was therefore in response to the above need. Specifically it addressed the following research question: *What are the attitudes towards electric energy efficiency messages in lighting activities among KPLC's domestic customers in Nairobi?*

### **1.3 Objectives of the study**

The general objective of this study was to determine the attitude of KPLC's domestic customers in Nairobi towards electric energy efficiency messages in lighting activities.

From this, the following specific objectives were derived;

- (i)** To establish awareness, comprehension and knowledge of domestic customers on efficient use of electricity in lighting
- (ii)** To ascertain the liking and preference for energy efficiency in lighting among domestic customers
- (iii)** To determine intentions, behaviour, trials and purchases by domestic customers on efficient use of electricity in lighting

### **1.4 Importance of the study**

The findings of this study are expected to be of use in the following ways:

- (i)** It will increase understanding of customer attitudes and behaviour towards past promotional messages on efficient use of electricity, specifically in the area of lighting.
- (ii)** It will provide practical solutions and facilitate the development of relevant policies by KPLC, Manufacturers/Suppliers of lighting appliances, Ministry of Energy, Electricity Regulatory Board (ERB) and relevant NGO's such as UNEP regarding energy efficiency in the area of lighting.
- (iii)** It will facilitate the development of marketing strategies and activities aimed at influencing customer behaviour in this regard by stakeholders listed in (ii) above.

**(iv) Other service providers particularly in related utility industry will find it useful in formulating policy and marketing programs on end-user information about their products/services.**

**(v) Other scholars and researchers will find it a useful source for reference.**

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

Efficient use of electricity requires customer education hence communication or promotion. Communication/promotion significantly influence the formation of attitude towards energy efficiency. According to Schiffman and Kanuk (1992), attitudes constitute a big component of consumer behaviour. Attitudes towards energy efficiency can therefore be largely studied and understood in the broad context of consumer behaviour concepts in the marketing discipline, which is a subset of the extensive field of human behaviour. Consumer behaviour itself refers to the behaviour that consumers display in searching for, purchasing, using, evaluating and disposing of products and services that they expect will satisfy their needs and wants.

Electricity customers go through this process as they seek to satisfy their energy needs. They make decisions related to acquiring connection to electricity, when to use it, why to use it, how to use it, how to buy it and when to stop using it. However, as Schiffman et al. (1992), argue, the person who makes a product purchase is not always the user or the only user of the product in question. Nor is the purchaser the person who makes the product decision.

This holds true for electricity, where on one hand account owners may be responsible for both payment of bills and management of electrical appliances within the household or small business organisation. On the other hand the account owner may be responsible for the former and not the latter. A typical illustration of this is a family situation where the husband may be responsible for paying the electricity bills whereas his wife, househelp and children largely handle the management of electrical appliances in the household.

Knowledge of internal and external influences that impel individuals to act in certain consumption related ways is therefore important in understanding electricity usage and efficiency patterns and hence how marketing can be used to influence the same.

According to Schiffman et. al. (1992), consumer behaviour is a relatively new field of study with no history or body of research, but which borrows heavily from concepts

developed in other scientific disciplines such as psychology, sociology, social psychology, cultural anthropology and economics. Consumer behaviour is linked to marketing through consumer research, which is a methodology used to study the former. Consumer behaviour research enables marketers to segment markets based on variables that emerge as important discriminators among consumers (Schiffman et. al. 1992).

## **2.2 Promotion/Communication**

Electric energy efficiency attitudes, the principal focus of this research, can be studied in the context of promotional strategy, given that the desired behaviour among customers is largely influenced through various conservation messages. Attitudes towards efficient use of electric energy particularly in the area of lighting are and can equally be significantly induced by promotion or communication.

### **2.2.1 Meaning of Promotion/Communication**

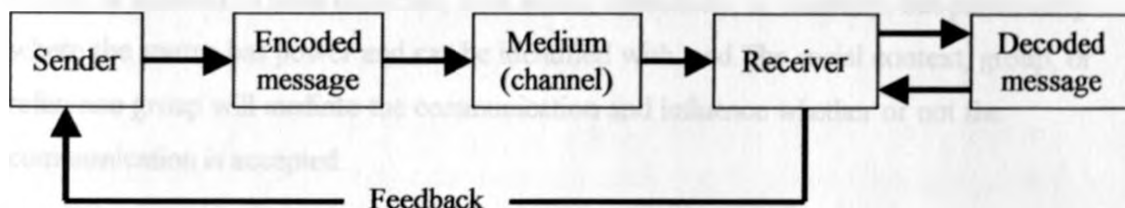
According to Kotler (2001), promotion is part of the four 'P' components of the marketing mix tools that a firm uses to pursue its marketing objectives in the target market. Whereas promotion represents the seller's view of the marketing tool available for influencing buyers, from the customer's point of view this represents communication. Lancaster et.al. (1998), also relate promotion to communication when they argue that what underpins a sound promotional strategy, and indeed the essence of promotion itself is the communication process. The tools of promotion used in marketing involve communicating with a predetermined audience in order to elicit the desired response. The promotional element of the marketing strategy is potentially one of the most potent elements of the marketing mix available to the marketer. Notwithstanding the various definitions of communication, most scholars (Gakuru et. al. 1997) agree that communication involves the transmission of a message from a sender to a receiver by means of a signal of some sort sent through a channel of some sort.

### 2.2.2 The Communication Process

According to Lancaster et. al. (1998), effective planning of the promotional elements of the marketing mix requires an appreciation of how the communication process works.

Gakuru and Wahome (1997), explain that the process of communicating involves the sender, encoding of the message, the medium (channel), the receiver, decoding, feedback, noise and distortion. The following Basic Communication Model depicts this:

#### Basic Communication Model:



*Source: Schiffman L.G. and Kanuk L.L. (1992). "Consumer Behaviour," New Delhi: Prentice Hall of India Private Ltd, pp 269*

Kotler (2001), emphasizes that to communicate effectively, marketers need to understand the fundamental elements underlying effective communication. These elements essentially comprise those shown in the 'Basic Communication Model' above. He further points out that effective company communication should not only focus on the traditional promotional tools but should also embrace the product's styling and price, the package's shape and colour, the salesperson's manner and dress, the place's décor and the company's stationery. All these communicate something to the buyers and every brand contact delivers an impression that can strengthen or weaken a customer's view of the company.

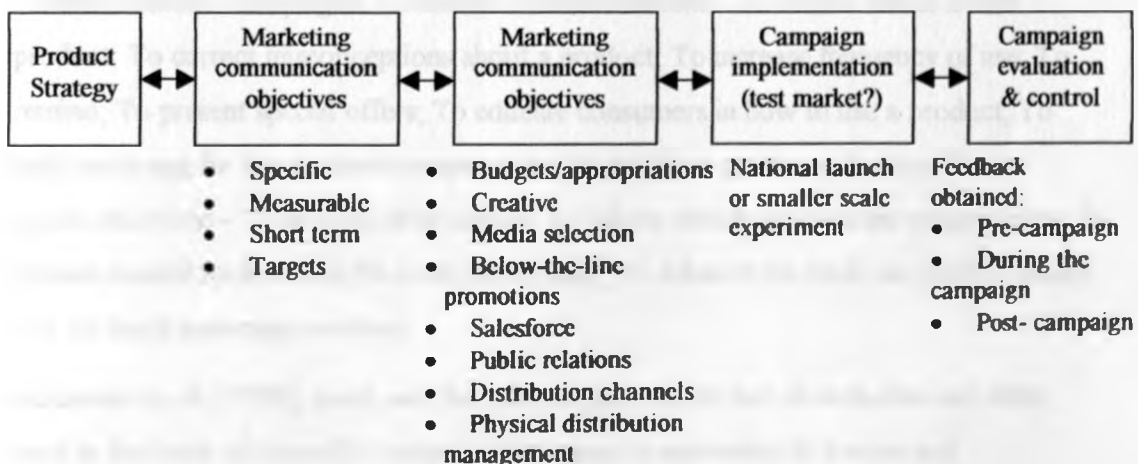
Some scholars (e.g. Schiffman et. al.1992) have identified two basic types of communication i.e. interpersonal and impersonal, and mass communication. Energy efficiency messages are and can be disseminated using both types of communication much as the two differ significantly.

Kotler (2001), outlines the following as some of the general factors that influence the effectiveness of communication: The greater the monopoly of the communication source over the recipient, the greater the recipient's change or effect in favour of the source; Communication effects are greatest where the message is in line with the receiver's existing opinions, beliefs and dispositions; Communication can produce the most effective shifts on unfamiliar, lightly felt, peripheral issues, which do not lie at the centre of the recipient's value system; Communication is more likely to be effective where the source is believed to have expertise, high status, objectivity, or likability, but particularly where the source has power and can be identified with; and The social context, group, or reference group will mediate the communication and influence whether or not the communication is accepted.

Consequently, to develop effective communications, Kotler (2001), suggests that the marketer must undertake the following steps: identify the target audience; determine the communication objectives; design the message; select the communication channels; establish the total communications budget; decide the communications mix; measure the communications' results; and manage the integrated marketing communication process. Similarly energy efficiency messages need to be planned and disseminated effectively in order to achieve the desired goals.

Lancaster and Massingham (1999), suggest the following framework to planning an effective communications program:

**A marketing communications campaign planning framework:**



Source: Lancaster G. and Massingham L. (1999). "Essentials of Marketing," 3rd Edition, McGraw-Hill Publishing Co. London, pp 292

### 2.2.3 Communications objectives

According to Lancaster et. al. (1999), marketing communications objectives, which are more specific and short term, must be in line with the overall product strategy. The determination of these objectives is a key area in the planning of campaigns. Lancaster et. al. (1999), further argue that if good objectives are developed and clearly stated at the beginning of the process, then all the planners involved in the marketing communications process can attack their particular problem areas with good purpose and with their tasks having been eased. For example copy selling, advertising and below-the-line promotional activities can all be coordinated effectively. Consequently, the setting of clear, precise and measurable objectives can help in the following ways: To integrate the marketing communications campaign with other marketing activities; To improve the liaison with external agencies; To determine communications budgets and appropriations; To secure appraisal of the plans by top management; and To measure the results of communications efforts.

Too often, communications objectives are set which are too general, are confused with overall marketing objectives, or are non-existent. Unless valid objectives are set, then the tendency will be for each manager in sales, advertising, sales promotions and public relations to set his or her own targets. Optimisation can only be sought when there is a common goal with all of the marketing communications activities being coordinated in pursuit of this. (Lancaster et. al. 1999)

Lancaster et. al. (1999), outline the following as the common objectives of communications' campaigns: *Consumer communications* - To inform about a new product; To correct misconceptions about a product; To increase frequency of use; To remind; To present special offers; To educate consumers in how to use a product; To build an image for the product/company, and To build up consumer loyalty. *Trade communications* - To provide information; To inform about promotional programmes; To present special trade offers; To avoid stockpiling; To educate the trade on product usage; and To build patronage motives.

Lancaster et. al. (1999), point out that these objectives are not all-inclusive and when used as the basis of a specific campaign they must be expressed in precise and



measurable terms. They also caution that the target audiences receive information from non-commercial sources such as editorial comments from the media and word of mouth, which presents major problems to the communications manager. They therefore suggest that marketers must recognise that even the most effective communications strategy is unlikely to lead to effective communications with all the prospects always. The recognition of these limitations puts marketers in a position to formulate a strategy adapted to their own needs, which requires identification of problems to be surmounted as the first step in formulating any strategy.

#### ***2.2.4 Response Hierarchy Models in communication***

According to Kotler (2001), once the target market and its perceptions are identified, the marketing communicator must decide on the desired audience response, which can be cognitive, affective or behavioural in nature. That is, the marketer might want to put something into the consumer's mind, change an attitude, or get the consumer to act. Consequently behavioural scientists (Lancaster et. al. 1999) have formulated a number of sequential models attempting to shed light on the process consumers pass through on their way to action or purchase. The different models of consumer response stages are summarised as the four best-known response hierarchy models as detailed by Kotler (2001).

**Response Hierarchy Models:**

**Models**

Stages/ Models	AIDA MODEL	HIERARCHY- OF-EFFECTS MODEL	INNOVATION -ADOPTION MODEL	COMMUNICATIONS MODEL
Cognitive Stage	Attention ↓	Awareness ↓ Knowledge ↓	Awareness ↓	Exposure ↓ Reception ↓ Cognitive response
Affective Stage	Interest ↓ Desire ↓	Liking ↓ Preference ↓ Conviction ↓	Interest ↓ Evaluation ↓	Attitude ↓ Intention ↓
Behaviour Stage	Action	Purchase	Trial ↓ Adoption	Behaviour

*Source: Kotler, P. (2001). "Marketing Management," Millennium Edition, Prentice Hall of India Private Ltd., New Delhi, pp. 555*

Kotler (2001), states that all these models assume that the buyer passes through a cognitive, affective or behavioural process, in that order. He argues that this 'learn-feel-do' sequence is appropriate when the audience has high involvement with a product

category perceived to have high differentiation, as in purchasing an automobile. An alternative sequence, 'do-feel-learn,' is relevant when the audience has high involvement but perceives little or no difference with the product category, as in purchasing aluminum sliding. A third sequence, 'learn-do-feel,' is relevant when the audience has low involvement and perceives little differentiation within the product category, as in purchasing salt. Kotler (2001), therefore concludes that by choosing the right sequence, the marketer can do a better job of planning communications.

However Lancaster et. al. (1999), points out that these sequential models have been used extensively by advertising researchers, but they are put forward not on the basis of empirical evidence but on the basis of common sense. For example the AIDA approach, which states that consumers pass through four successive stages (i.e. Attention, Interest, Desire and Action), has been criticised for not having an allowance for build up and emphasising too much on the message at the expense of the prospect. Lancaster et. al. (1999), therefore conclude that sequential models are more theoretical than practical, and work needs to be done in this area before actionable models can be put forward as active advertising tools.

### ***2.2.5 Tools of promotion***

Lancaster et. al. (1999), observe that having specified the objectives of a communications campaign, the next step facing the marketer is the selection of tools to disseminate the necessary information to the target audience. Kotler (2001), identifies the following marketing variables and tools that constitute the promotion component of the marketing mix:

### **i. Advertising**

Notwithstanding its various forms and uses, advertising has the following qualities:

**Public presentation:** Advertising's public nature confers a kind of legitimacy on the product and also suggests a standardised offering. Since many people receive the same message, buyers know that motives for purchasing the product will be publicly understood.

**Pervasiveness:** Advertising permits the seller to repeat a message many times and allows the buyer to receive and compare the messages of various competitors.

**Amplified expressiveness:** Advertising provides opportunities for dramatising the company and its products through the artful use of print, sound and colour.

**Impersonality:** The audience does not feel obligated to pay attention or respond to advertising, given that it is a monologue and not a dialogue.

### **ii. Sales promotion**

Although sales promotion tools (i.e. coupons, contests, premiums, etc.) are highly diverse, they offer three distinctive benefits: **Communication** - They gain attention and usually provide information that may lead the consumer to the product; **Incentive** - They incorporate some concession, inducement or contribution that gives value to the consumer; and **Invitation** - They include a distinct invitation to engage in the transaction now.

### **iii. Public relations and publicity**

The appeal of public relations and publicity is based on the following qualities: **High credibility** - News stories and features are more authentic and credible to readers than advertisements; **Ability to catch buyers off guard** - Public relations can reach prospects who prefer to avoid salespeople and advertisements; and **Dramatisation** - Public relations has the potential for dramatising a company or product.

#### iv. *Personal selling*

This is the most effective tool at later stages of the buying process, particularly in building up buyer preference, conviction, and action. Personal selling has the following distinct qualities: *Personal confrontation* - Personal selling involves an immediate and interactive relationship between two or more persons. Each party is able to observe the other's reactions at close hand; *Cultivation* - Personal selling permits all kinds of relationships to spring up, ranging from a matter-of-fact selling relationship to a deep personal friendship and *Response* - Personal selling makes the buyer feel under some obligation for having listened to the sales talk.

#### v. *Direct marketing*

Although there are many forms of direct marketing (e.g. direct mail, telemarketing, Internet marketing, etc.), they all share the following characteristics: *Non-public* - The message is normally addressed to a specific person; *Customised* - The message can be prepared to appeal to the addressed individual; *Up-to-date* - A message can be prepared very quickly; and *Interactive* - The message can be changed depending on the person's response.

### 2.3 Attitudes

Having been exposed to communication or promotion the process of attitude development toward an object begins (Schiffman et. al. 1992).

There is no general consensus about the definition of attitude. However from a consumer behaviour perspective, Schiffman et. al. (1992), describe an attitude as a learned predisposition to behave in a consistently favourable or unfavourable way with respect to a given object (e.g. a brand, a service or retail establishment). On the other hand, Kotler (2001), defines an attitude as a person's enduring favourable or unfavourable evaluations, emotional feelings, and action tendencies toward some object or idea. According to Batra, Myers and Aaker (2003), attitude is a central concept in the entire field of social psychology, and theories and methods associated with its explanation and measurement have largely evolved from the work of social psychologists and psychometricians.

Schiffman et. al. (1992), further explain that as an outcome of psychological processes, attitudes are not directly observable but are inferred from what people say or from their behaviour. Consumer researchers therefore, tend to assess attitudes by asking questions or making inferences from behaviour. A major point of convergence between the definitions by Schiffman et. al. (1992), and Kotler (2001), is the assiduous manner the individual displays favourable or unfavourable behaviour towards an object or idea in determining his/her attitude towards it.

### 2.3.1 Characteristics of attitudes

Scholars (Schiffman et. al. 1992) have identified the following main characteristics of attitudes:

a) **Attitudes are a learned predisposition:** There is a general consensus that attitudes are learned. Attitudes relevant to purchase behaviour are formed as a result of direct experience with the product, information acquired from others, and exposure to mass media such as advertising. Therefore attitudes have a motivational quality

(predisposition) that is, they might propel the consumer toward a given behaviour (Schiffman et. al. 1992).

b) **Attitudes have consistency:** An attitude is relatively consistent with the behaviour it reflects. However attitudes are not necessarily permanent as they do change. Normally we expect consumer attitudes to correspond with behaviour. Therefore when consumers are free to act as they wish, we anticipate that their actions will be consistent with their attitudes. However, circumstances often vary, hence it is important to consider the influence of the situation on consumer attitudes and behaviour (Schiffman et. al. 1992).

c) **Attitudes occur within a situation:** Situations are events or circumstances that, at a point in time, influence the relationship between attitudes and behaviour. A situation can cause consumers to behave in a manner seemingly inconsistent with their attitudes. For instance, let us assume that a consumer purchases a different brand of

coffee each time his inventory runs low. Although his brand switching may seem to reflect a negative attitude or dissatisfaction, it actually may have been influenced by a specific situation, such as the need to economise (Schiffman et. al. 1992).

Similarly, individuals can have different attitudes toward a particular behaviour, each corresponding to a particular situation. It is also important to understand how consumer attitudes vary from situation to situation. Consequently, it is important when measuring attitudes, to consider the situation in which behaviour takes place to avoid misinterpreting the relationship between attitudes and behaviour (Schiffman et. al. 1992).

### 2.3.2 Models of Attitude

#### i. **The ABC Model of Attitude/Tricomponent Attitude Model**

The commonly held view about the structure of an attitude is that it comprises three closely interrelated components, which have been referred to as the Tricomponent Attitude Model or the ABC Model of Attitude; affective, behaviour/conative and cognition (Batra et. al. 2003, Assael, 1998).

- a) ***The cognitive component:*** The cognitive component refers to awareness, comprehension, knowledge, belief or disbelief about an object, product or brand. The underlying assumption is that the overall liking component i.e. affective, is based on the cognitive component. However, recently there have been arguments that people generally develop overall attitudinal liking for objects without first cognitively evaluating them as good - with such overall attitudes being based purely on emotions and feelings rather than some rational, cognitive belief or benefit-based evaluation (Batra et. al. 2003).
- b) ***The affective component:*** The affective component refers to evaluation, liking or preference towards an object. Attention is usually focused on this component, which involves assessing the degree of positive or negative feelings for an object (Batra et. al. 2003).

c) **The conative component:** This refers to action tendencies such as intentions, behavioural, trial or purchases in respect of an object, product or brand. It therefore involves the consumer's tendency to act toward an object, which is often measured in terms of intention to buy (Assael, 1998). For purposes of this study the ABC Model of Attitude was used extensively. Attitudes among KPLC customers towards energy efficiency messages in lighting were measured in the context of affective, behavioural and cognition components.

## ii. Multi-attribute Attitude Models

Several models and theories are used to illustrate the relationship between perception and preference and attributes and attitudes.

**Evaluative Belief Models of Cognitive Structure:** According to Batra et. al. (2003), a cognitive structure model assumes that a person forms an attitude toward an object by developing beliefs about it and combining those beliefs into a general overall attitude toward the object. The most commonly used cognitive structure model in advertising is the evaluative belief model, in which the attitude is the sum of the evaluative beliefs about how well each brand scores on each attribute, weighted by the importance of that attribute.

This is denoted as:

$$A_o = \sum w_d a_{od}$$

where  $A_o$  = attitude of an individual or segment toward object  $o$

$a_{od}$  = evaluation of an individual or segment toward object  $o$  with respect to attribute or dimension  $d$ , the evaluate belief

$w_d$  = measure of the relative importance or weight of attribute  $d$  to the individual or segment

However the cognitive structure model has several assumptions that may not necessarily hold. Firstly, it assumes that there are a limited number of known attributes with known weights. In some circumstances, a consumer may not be aware of the attributes used.



Secondly, it assumes that a person first obtains belief information and then uses it to alter attitudes. On the contrary, the process could work the opposite way (Batra et. al. 2003).

**Ideal-Point Models:** These are elaborations of the basic evaluative belief model. Scholars (Batra et. al. 2003) state that ideal-point models rely on different approaches to data collection and assume that a particular combination of levels on each attribute can be found that represents a person's or total market's 'ideal' combination. These models involve perceptual mapping of and multi-dimensional scaling procedures. The message strategy of these models is to make the advertised brand seem perceptually closer to the ideal brand by using positioning tactics.

**Non-compensatory models:** Batra et. al. (2003), identify three such models; conjunctive, disjunctive and lexicographic.

The conjunctive model emphasizes low ratings on the various attributes. An object will be deemed acceptable if it meets a minimum standard on each attribute, a process that has been observed in supermarket buying decisions.

The disjunctive model stresses high ratings. It regards objects as positive only when they have been rated outstanding on one or more of the relevant attributes. On the other hand the lexicographic model assumes that an individual will evaluate the brand on the most salient attribute. Where two or more brands 'tie' on a certain attribute, the evaluation will shift to the second most salient attribute, and the process will continue until the brand is selected (Batra et. al. 2003).

According to Batra et. al. (2003), the non-compensatory models are often used when the consumer is not really very involved or is under time pressure to make a choice, so that choosing the very best is not a primary concern, just a brand that 'is good enough.' It is equally possible that an individual in some contexts may use more than one model, for instance a conjunctive one to determine a set of brands to consider and followed by compensatory model to make a final decision. The use of such a multi-model decision process makes model evaluation more difficult.

**Category Evaluation Models:** Scholars (Batra et. al. 2003) state that the category-based evaluation is based on the premise that people generally divide the world into categories.

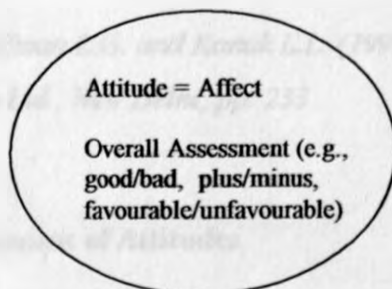
Consequently, when evaluating new stimulus, it is placed into a category, and the attitude toward that category is retrieved from memory and applied to the stimulus.

For the category-based evaluation approach to operate, consumers develop a set of expectations about the product category. This expectation, posit Batra et. al. (2003), can be represented by either a typical example of the category, a prototype, or by a good example of the category, an exemplar. Therefore, to implement an advertising strategy based on the category-based model, the advertising should focus on positioning the brand with respect to some category exemplar, whereby there would be no effort to communicate explicitly at the attribute level.

### iii. Single-Component Attitude Models

As a kind of distillation of the Tricomponent Attitude Model, some scholars subscribe to the idea that an attitude consists of entirely of the affective component, or overall assessment of the attitude-object. Therefore, Schiffman et. al. (1992), argue that a consumer's attitude toward several competing local banks would be equal to the individual's overall reaction to the comparative merit (e.g., good versus bad, positive versus negative, etc) of the banks being considered (i.e., the consumer's evoked set). Although it captures what many believe to be the essence of an attitude, the Single-Component Model fails to provide useful insights as to the 'why' behind an attitude. The marketer therefore cannot appreciate what influences or explains a consumer's overall assessment of an attitude object.

#### Single-Component Attitude Model:

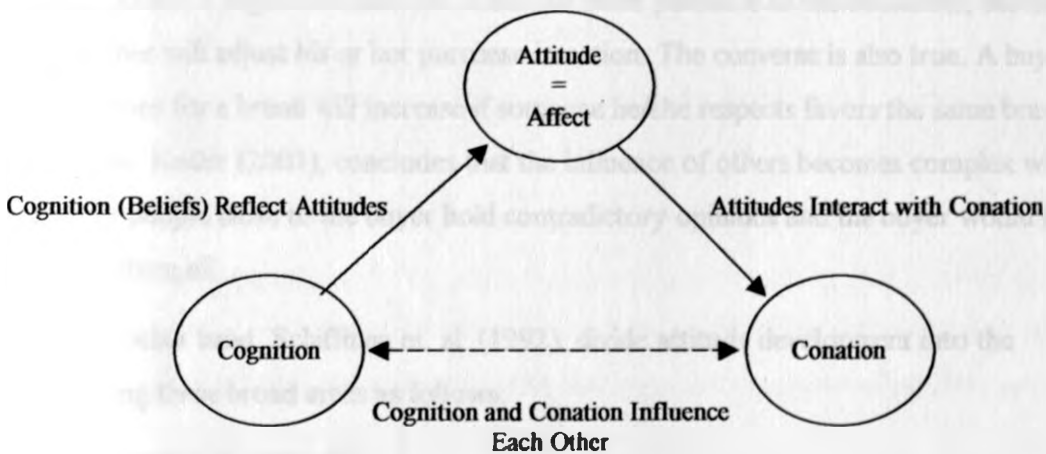


*Source: Schiffman L.G. and Kanuk L.L. (1992), "Consumer Behaviour," Prentice Hall of India Private Ltd., New Delhi, pp. 232*

#### iv. Modified Single-Component Attitude Model

To overcome some of the shortcomings of the Single-Component Attitude Model, some attitude researchers have compromised between the broadly conceived Tricomponent Attitude Model and the narrowly focused Single-Component Model. According to Schiffman et. al. (1992), the resulting *Modified Single-Component Attitude Model* still considers overall *affect* to be the attitude, but includes *cognition* and *conation* as interrelated and important factors that influence the *affective* component. In a sense, the modified model is a *rearrangement* of the Tricomponent Model – with the *affective* component treated as the attitude, and the two other components downgraded to supporting roles. Modified Single-Component Attitude Models are also consistent with Multi-attribute Attitude Models.

#### A Modified Single-Component Attitude Model:



*Source: Schiffman L.G. and Kanuk L.L. (1992), "Consumer Behaviour," Prentice Hall of India Private Ltd., New Delhi, pp. 233*

#### 2.3.3 Development of Attitudes

There are several ways in which attitudes are developed. According to Assael (1998), these include the following:

- a) **Personality:** Traits such as aggression, submissiveness, authoritarianism, or extroversion may influence attitudes towards products or brands.
- b) **Family Influences:** These also influence the purchase decision and there is a high correlation between children's attitudes and those of their parents.
- c) **Peer Group:** Studies have demonstrated that there is pervasive group influence on buying behaviour. Peer groups are much more likely to influence attitudes and purchase than advertising.
- d) **Information and Experience:** The past experience of consumers also influences their brand attitudes.

On Peer Group influence, Kotler (2001), argues that the extent to which another person's attitude reduces one's preferred alternative depends on two factors: i.e. the intensity of the other person's negative attitude towards the consumer's preferred alternative and the consumer's motivation to comply with the other person's wishes. The more intense the other person's negativism and the closer the other person is to the consumer, the more the consumer will adjust his or her purchase intention. The converse is also true. A buyer's preference for a brand will increase if someone he/she respects favors the same brand strongly. Kotler (2001), concludes that the influence of others becomes complex when several people close to the buyer hold contradictory opinions and the buyer would like to please them all.

On the other hand, Schiffman et. al. (1992), divide attitude development into the following three broad areas as follows:

**a) Learning of Attitudes**

Attitude development or formation refers to the shift from NO attitude toward a given object to having SOME attitude toward it. The basic learning processes as explained by the following learning theories therefore guide attitude formation:

**Classical conditioning:** An originally neutral stimulus, such as the brand name of a new product, can produce a favourable or unfavourable attitude if it is repeatedly followed by or associated with some kind of negative or positive reinforcement. For example, marketers who associate their new products with admired celebrities try to create a positive bond between the celebrity, who already enjoys a positive attitude, and the

'neutral' new product. In this way they expect to transfer recognition and goodwill from the celebrity to their product so that prospective customers will more quickly form a positive attitude toward the new product (Schiffman et. al. 1992).

**Instrumental conditioning:** This involves when sometimes customers buy a brand without necessarily having an attitude toward it. For example, they may purchase it because it is the only product of its kind left on a store shelf or to make a trial purchase. They are likely to develop a favorable attitude toward it, if they find the brand to be satisfactory (Schiffman et. al. 1992).

**Cognitive learning theory:** This refers to situations where consumers are quite involved in the purchase decision, and cognitions are likely to be a major input in the formation of attitudes. The more information an individual has about a product or service, the more likely he or she is to have an attitude toward it – either negative or positive (Schiffman et. al. 1992).

#### **b) Sources of influence on attitude formation**

Identification of the sources from which consumers obtain information, advice and influence is equally important. The principal sources include the following, according to Schiffman et. al. (1992):

**Direct and past experience:** The primary means by which attitudes about a brand are formed is through the direct experience of trying and evaluating them. If a brand proves satisfactory, it is likely that consumers will form positive attitudes and possibly purchase it when they again have the need for it.

**Personal influence:** Contact with other people especially family, close friends and admired individuals, attitudes that influence people's lives are formed. The family is particularly an important source of influence on the formation of attitudes given that it provides us with many of our basic values and a wide range of less central beliefs.

**Exposure to mass media:** This is an equally important source of information that influences attitudes particularly in a country where people have easy access to newspapers and an almost infinite variety of general and special-interest magazines and television channels.

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### c) **Personality factors**

Schiffman et. al. (1992), identify personality factors as the third stage of attitude development. For example, introverted people are likely to express their introversion in negative attitudes toward flashy cars, dancing classes and public activities. Similarly, attitudes toward new products and new consumption situations are strongly influenced by the personality characteristics of consumers.

### 2.3.4 Attitude Change

Related to attitude development, according to Schiffman et. al. (1992), is attitude change. Like in the case of attitude formation, attitude changes are *learned*, they are influenced by *personal experience* and other *sources of information*, and *personality* affects both the receptivity and the speed with which attitudes are likely to be altered. Consequently altering consumer attitudes is a key strategy consideration for most marketers.

### 2.3.5 Attitude Change Strategies

Schiffman et. al. (1992), classify attitude change strategies into the following categories:

- a) ***Changing the Basic Motivational Function:*** Making new needs prominent is one way of changing attitudes toward a product. The *functional approach* is one theory of attitude change that demonstrates how changing basic motivations can change attitudes. According to this *approach*, attitudes are classified in terms of the following four *functions*:

**The Utilitarian Function:** People hold certain brand attitudes partly because of a brand's utility. If a product has helped us in the past, even in a small way, our attitude toward it tends to be favourable. One way of changing attitudes in favour of a product is by showing people that it can serve a utilitarian purpose they may not have considered.

**The Ego Defensive Function:** This involves protecting people's self-image from inner feelings of doubt. For example, advertisements for cosmetics and personal hygiene products, by acknowledging this need,

increase both their relevance to the consumer and the likelihood of a favourable attitude by offering reassurance to the consumer's self-concept.

**The Value-Expressive Function:** Attitudes are one expression of general values, lifestyle and outlook. For example, if a consumer segment generally holds a high evaluation/attitude toward owning the latest electronic devices, then attitudes toward new electronic devices are likely to reflect that orientation.

**The Knowledge Function:** Individuals generally have a strong need to know and understand the people and things with whom they come into contact, especially when such people and things might influence behaviour. The 'need to know,' which is a cognitive need, is important to marketers concerned with product positioning. Most brand positioning are attempts to satisfy consumers' needs to know and to improve their attitudes toward the brand by clarifying its advantages over competitive brands.

- b) ***Associating the product with a Special Group, Event or Cause:*** Attitudes are related, at least in part, to certain groups or social events. It is possible to alter attitudes toward products by pointing out their relationships to particular social groups, events, or causes.
- c) ***Relating to Conflicting Attitudes:*** Attitude change strategies can also be designed to take advantage of actual potential conflict between attitudes. If consumers can be made to see that their attitude toward a brand is in conflict with another attitude, they may be induced to change their evaluation of the brand.
- d) ***Altering Components of the Multi-Attribute Model:*** Multi-Attribute Attitude Models have important implications for attitude-change strategies. Using the popular Fishbein attitude-toward-object model, Schiffman et. al. (1992), identify the following strategies for bringing about attitude change:

**Changing the relative evaluation of attributes:** The market for many product categories is structured so that different consumer segments are

attracted to brands that offer different beliefs or features. When a product category is naturally divided according to distinct product features or benefits that appear to a particular segment of consumers, marketers usually have an opportunity to attempt a 'crossover,' that is to convince consumers who prefer one version of the product (e.g. brewed regular coffee) to shift their favourable attitudes toward another version of the product (e.g. brewed decaffeinated coffee), and vice versa. Such a strategy is tantamount to altering the relative evaluation of conflicting product attributes.

**Changing brand beliefs:** This strategy concentrates on changing beliefs or perceptions about the brand itself. Advertisers constantly remind their audiences that their product has 'more' or is 'better' or 'best' in terms of some important product attribute.

**Adding an attribute:** This strategy consists of adding either an attribute that has previously been ignored or one that represents a technological improvement or innovation.

**Changing the overall brand rating:** This attempts to alter consumers' overall assessment of the brand directly without attempting to improve or change their evaluation of any single attribute.

- e) ***Changing beliefs about competitors' brands:*** This involves changing consumer beliefs about the attributes of competitive brands. It has become more heavily utilised as the popularity of comparative advertising grows. However, it is cautioned that the strategy can boomerang by giving visibility to competing brands and claims.
- f) ***Elaboration Likelihood Model (ELM):*** It proposes the more global view that two distinctly different routes change consumer attitudes to persuasion. The 'central route' is relevant when the consumer's motivation or ability to assess the attitude-object is high – that is, attitude change occurs because the consumer seeks information relevant to the attitude-object itself. On the other hand, the 'peripheral route' is pertinent to attitude change when a consumer's motivation or assessment skills are low – that is, attitude change occurs



without the consumer focusing on information relevant to the attitude-object itself.

### **2.3.6 Segmentation using Attitude structure**

A market can be segmented on the basis of varying degrees of attitude - positive, neutral and negative held by the potential consumers of an advertising media, making it necessary for the marketer to understand what attitudes, beliefs and benefits are most important in the market situation and in particular which of them are determinant in media choice (Batra et. al. 2003).

Batra, et. al. (2003), argue that attitudes, preferences and many related psychological constructs can be used to segment markets through the second empirical segmentation approach. This is because consumers differ in the 'need' for which they buy the same product, so the fact that buyers will tend to place different degrees of importance on the benefits obtained from that type of product leads logically to the fact that they represent different segments. Furthermore a strong relationship exists between attitude and purchase behaviour, and this gets stronger as the consumer gets more 'direct' information about the brand (such as that obtained through actual trial). Consequently the consumer feels more certain and confident about the attitude and is more likely to use it in making purchase decisions (Batra et. al. 2003).

Kotler (2001), identifies five attitude groups that can be found in a market i.e. enthusiastic, positive, indifferent, negative and hostile. For example door-to-door workers in a political campaign use the voter's attitude to determine how much time to spend with that voter.

### **2.3.7 Attitude and usage levels**

Alvin (1996), has demonstrated that attitude and usage levels are associated in several consumer product categories. He argues that there exists an attitude-usage relationship for a brand of cigarettes, deodorant, gasoline, laxative and dental product. For each of the four brands, the percentage using the brand is strongly related to the attitude toward it.

### **2.3.8 Attitude towards an advertisement and media**

According to Lucas (1963), there is a potential direct causal link between the 'attitude towards an advertising media' and 'attitude and behaviour' toward a brand. He demonstrated that the attitude towards an advertisement and the advertising media (i.e. liking for the media and advertisement) provide an impact on brand attitudes over and above any ability of the advertisement or the media to communicate attribute information.

Some researchers (e.g. Batra et. al. 2003) believe that attitude to the advertisement has two different components: An affective one – reflecting the direct effect of the feelings evoked by the advertisement and a cognitive one reflecting how well made and useful the advertisement (and the information in it) is considered to be.

Batra et. al. (2003), further state that attitude toward an advertisement affects brand choice as well. However they caution that it is not clear whether this direct effect of advertisement liking persists over time, or whether it is short lived, though both kinds of conclusions have been reported. In addition, if a likable advertisement draws so much attention to itself that brand attributes in it are not processed by the consumer, after a time lag, the advertisement liking would have decayed and the consumer would have weaker attitudes to the brand than if the advertisement had not taken way attention from brand attributes in the first place.

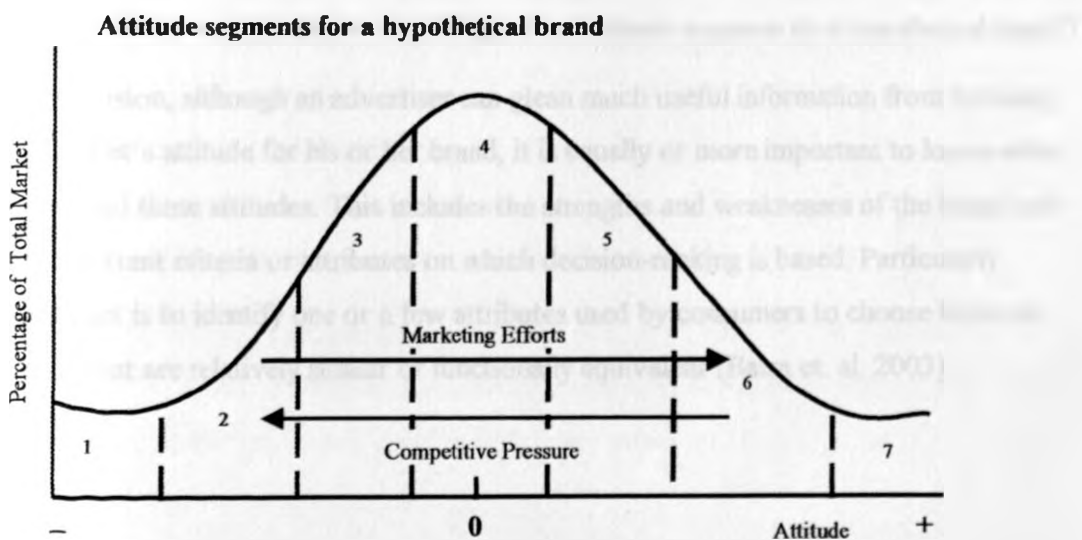
Researchers (e.g. Batra et. al. 2003) suggest that advertisement disliking has more of an effect than advertisement liking on brand liking and that the effects of advertisement liking are more important for mood advertisements than for hard-sell (i.e. information - based) advertisements. There is general consensus among scholars (Batra et. al. 2003)

that attitudes to the advertisement are higher if the advertisement has the following characteristics: Is more credible; evokes positive, likable feelings; uses humour; uses relevant or liked music, sex appeal, or other such executional devices; uses likable and attractive celebrities; uses endorsers of the same race as the target market, doesn't have an excessively high level of fear (if using fear appeals); is for a brand the consumer already likes; contains useful information, but not too much to make it boring; is interesting and (reasonably) complex; contains information that is itself liked (e.g. about a special deal); and is placed in a media environment that is itself liked.

Batra et. al. (2003), argue that a positive attitude toward an advertisement also improves the recall of the advertised material. But they point out that, both liked and disliked advertisements are supposed to be better on recall than are neutral advertisements.

### 2.3.9 Overall attitude as an objective

According to Batra et. al. (2003), overall attitudes are used for objective setting, strategic decision-making and evaluating performance in advertising. A range of attitudes can be identified for a brand that has been on the market for a short period. Seven attitude segments might be identified for the brand, ranging from segment 1, holding strong negative attitudes, through segment 4, holding neither positive nor negative attitude, to segment 7, holding strong positive attitudes. This can be illustrated in the figure below:



*Source: Batra R, Myers J.G. and Aaker DA (2003). "Advertising Management," 5<sup>th</sup> Edition, Prentice Hall of India Private Ltd., New Delhi, pp 254*

The tails of the distribution represent attitude extremes. The majority falls in the middle segments, holding slight tendencies in either direction or no predisposition one way or another with respect to the brand. These segments represent alternative targets for an advertising campaign. Segment 7, might represent a small group of relatively heavy users who have become satisfied with the brand and are strongly loyal to it. Attitude in this case could be a measure of brand loyalty. It is likely this group would express strong positive feelings to back up their behaviour and purchasing patterns (Batra et. al. 2003).

Segment 4, on the other hand, could hold no attitude for the brand because they do not know it exists (i.e. have not entered the awareness stage) or may be aware it exists but be so involved in purchasing with respect to the product class that no meaningful direction of predisposition exists. Segment 1, represents a small group of buyers who probably confine their purchases to competitive brands in the class and reject ours. Our brand is therefore not in their consideration class or evoked set of alternatives from which they make a choice, even though they are aware of it and their negative attitudes could be based on a host of reasons, many of which are sustained by our competitors (Batra et. al. 2003).

Batra et. al. (2003), argue that in any of these situations advertising can be engaged in to sustain or change attitudes. This is because attitudes decay over time and go below the threshold needed for active consideration. In addition in most marketing situations competitors are constantly attempting to create favourable attitudes for their brands at the expense of our own (as shown in the figure on 'Attitude segments for a hypothetical brand').

In conclusion, although an advertiser can glean much useful information from knowing the market's attitude for his or her brand, it is equally or more important to know what lies behind these attitudes. This includes the strengths and weaknesses of the brand and the important criteria or attributes on which decision-making is based. Particularly significant is to identify one or a few attributes used by consumers to choose between brands that are relatively similar or functionally equivalent (Batra et. al. 2003).

### 2.3.10 Attitude measurement

In consumer behaviour, attitude research has been used to study a wide range of critical marketing strategy questions. For example, according to Schiffman et. al. (1992), attitude research is undertaken to ascertain the likelihood that consumers will accept a proposed new product idea, to gauge why a firm's target audience has not reacted more favourably to its revised promotional theme or to learn how target customers are likely to react to a proposed change in the firm's packaging and label. Likewise, a researcher can, from interviewing an electricity consumer on if he has consistently practiced energy conservation, determine if he has a positive or negative attitude towards the practice.

A variety of techniques have been devised to measure attitudes. This diversity stems, in part, from lack of consensus about definition of the concept. According to Batra et. al. (2003), the simplest way to measure attitude toward an object (brand, store, product class or whatever) is to ask the respondent whether he or she likes or dislikes. There are no explicit attribute criteria given on which evaluation is made and respondents are simply asked to answer 'yes' or 'no' – and the responses are used to determine the brand attitude.

Given that attitudes are hypothetical constructs that are not directly observable their strength and direction can only be inferred. Much as determining the effect of say advertising and sales promotion on attitudes is important to a marketer, the measurement of the direct behavioural expression of an attitude (i.e. the action arising from the holding of the attitude) is usually extremely difficult. Attitude measurement techniques concentrate on what individuals describe as being their 'feeling' towards the attitude object concern. The most widely used approach to attitude measurement is the attitude scale. They are usually concerned with measuring the valence – i.e. the degree of positive or negative feelings (Williams 1997, Hawkins et. al. 1998).

If interest centres on attempting to capture the degree of attitude, the question can be put in the form of a scale. A respondent could, for example, be asked to express how much he or she liked a brand on a scale ranging from 'very much' (1) to 'very little' (7) (Batra et. al. 2003).

The following are the commonly used scaling techniques for measuring attitudes:

**a) Likert Scale**

It is probably the most commonly used technique for scaling, having been developed by Likert in 1932. Usually the individual is asked not only if they agree or disagree to the statement, but also to indicate the extent to which they agree by choosing one of the following five categories: Strongly agree; Agree; Neutral/Don't know; Disagree; and Strongly disagree.

This produces a numerical score and a value is given to each category. The item scores should have a common basis so that a high score on one item should not be neutralised by a low score on another item if attitude is in similar direction. A high overall score can be interpreted as a positive attitude to topic and a low overall score as a negative attitude. The pattern of responses is far more meaningful. However, the disadvantage is that the technique cannot produce equal intervals and thus score four (4) does not represent an attitude twice that of a score two (2) (Williams, 1997). The Likert Scale is one of the techniques used in this study to measure existing attitudes towards electric energy efficiency messages in lighting activities among KPLC domestic customers in Nairobi.

**b) Guttman's Scalogram Analysis**

This technique, designed by sociologist Louis Guttman in 1950, is based on the cumulative ordering of items. It aims at determining the underlying order within a series of questions by means of obtaining dichotomous responses i.e. the respondent is required to answer 'yes' or 'no' to each question. Scalogram Analysis is a very useful technique for examining small shifts or changes in attitudes and while such scales do not have equal-appearing intervals, they are generally reliable (Williams, 1997).

However, validity depends largely on the item content. The procedure involved in the construction of a scalogram is laborious and there is no guarantee that a useful scale will result. The results must be dichotomous but this is not always possible because of the wide variety of responses that may be produced by a particular question, hence

translating all possible responses into dichotomous results involves a considerable amount of extra work (Williams, 1997).

### c) *Thurstone Scale*

Thurstone and Chave designed this in 1929. The technique requires the collection of as many statements as possible about the issue towards which attitudes are to be measured. These statements must be simple and unambiguous and must distinguish between different attitudes that people may hold towards the issue. A large number of people preferably over 100 sort the statement into 11 piles, representing a scale from an extremely favourable to unfavourable attitude towards the issue. Each statement is assigned a value indicating the degree to which it represents a favourable or unfavourable attitude (Williams, 1997).

It has the advantage that statements are ascribed numerical values based on the responses given and the results are reliable. The scales are based on the social perceptions of the society in which the testing occurs. The disadvantage is that the scale deals with equal-appearing intervals that may or may not be equal. The use of a continuum of 11 units is arbitrary thus a score of four (4) is not necessarily twice as high as a score of two (2) (Williams, 1997).

Cooper and Schindler (2003), state that overall, the technique is no longer widely used in applied management research these days. The construction of the scale is cumbersome, costly and time consuming. Its importance of this historic method is therefore its influence on the Likert and Semantic Differential scales (Cooper et. al. 2003).

### d) *Osgood Semantic Differential Scale*

This technique was developed by Osgood et. al. in 1957. It comprises a number of semantic scales based on bipolar objectives (e.g. good/bad, hot/cold, etc.). The respondents are asked to rate a concept in terms of a positioning between +3 and -3. Proponents of the technique identified three main clusters of similar scales, which they labelled: Evaluation, Potency and Activity. This accounted for nearly 50% of the total

'meaning' of the concept - irrespective of the concept, the adjectives used or the respondents interviewed. (Williams, 1997)

The disadvantage with the scale is that, the evaluation of one dimension may affect the evaluations of other dimensions, a phenomenon known as the 'hallo effect.' However the technique has become one of the most popular attitude scaling used in market research (Williams, 1997). According to Schiffman et. al. (1992), semantic differential can be used to develop graphic consumer profiles of the concept under study. Semantic differential profiles are also used to compare consumer perceptions of competitive products, and to indicate areas for product improvement when perceptions of the existing product are measured against perceptions of the 'ideal' product.

#### e) *Kelly's Repertory Grid Technique*

The technique was designed as a means of 'mapping' the individual's 'personal constructs,' their interrelationships and changes over time. Kelly defined construct as 'a way in which two things are alike and in the same way different from a third.' Thus a construct is a dichotomy – it is either present or absent (Williams, 1997).

In applying the test the respondent is asked to consider three objects, persons, products, etc., and to state in which way two are alike and also different from the third. Successful application over time can be used to study changes in attitudes as a result of advertising or sales promotion. The technique is a powerful tool because it indicates individuals' subjective perceptions and has the advantage of being flexible since it can be used for various types of investigations (Williams, 1997).

#### f) *Rank Order Scales*

In this technique, subjects are asked to rank items such as products or retail stores in order of preference in terms of some criterion, such as overall quality or price/value for the money. Rank order scaling procedures provide important competitive information and enable marketers to identify needed areas of improvement in product design or product positioning (Schiffman et. al. 1992). Rank Order Scales were also used



extensively in this study to measure existing attitudes towards electric energy efficiency messages in lighting activities, among KPLC domestic customers in Nairobi.

Apart from using self-report attitude scales, attitudes are also measured by observation/inference and qualitative research methods, as outlined below.

**a) *Observation of behaviour***

Schiffman et. al. (1992), argue that since we cannot get inside consumers' heads and observe their attitudes directly, we must rely on indirect measures of attitudes. One such measurement approach is to observe consumers' behaviour and to infer their attitudes from their behaviour.

However, although observational research is a useful research technique, drawing conclusions about consumers' attitudes from their behaviour is often quite difficult and very likely to be subjective. It is difficult for an observer, even a highly trained one, to be confident about the attitudes inferred from a single action, in a single situation. Therefore, since researchers seldom have the opportunity to observe the same consumers repeatedly, it is common practice to employ observations as a supplement to other research approaches, rather than as the primary research method (Schiffman et. al. 1992).

**b) *Qualitative Research Methods***

Attitude researchers have found qualitative research methods, such as depth interviews, focus-group sessions and projective tests, to be very useful in understanding the nature of consumer attitudes. While these research methods may differ in composition, they all have roots in psychoanalytic and clinical aspects of psychology and stress open-ended and free-response types of questions to stimulate respondents to reveal their inner thoughts and beliefs (Schiffman et. al. 1992).

These techniques are regularly employed in the early stages of attitude research to pinpoint relevant product-related beliefs or attributes and to develop an initial picture of consumer attitudes. This is especially for the beliefs and attributes they associate with particular products and services (Schiffman et. al. 1992).

## **2.4 Electric energy efficiency**

### **2.4.1 Meaning**

There is no single definition of energy efficiency. However, Electric energy efficiency, which is the focus of this study, generally refers to deliberate and proactive energy conservation measures or behaviour by customers. In other words, it is about how effectively electric energy is being used, for example, for how long an appliance can be operated with a given amount of energy. In the electricity industry parlance this is commonly referred to as “Demand Side Management.” It can be contrasted with the “Supply Side Management,” which refers to deliberate and proactive reduction of losses that occur during generation, transmission and distribution of electric energy.

*ERB News* (2004), defines energy efficiency as the ability to use less energy to produce the same amount of lighting, heating, transportation and other energy services. According to a website (<http://www.yomari.com/oees/manage.html>) of “Office of Energy Efficiency Services (OEES),” energy conservation means more efficient use of energy without reducing production levels and without sacrificing product quality, safety or environmental standards. Energy conservation should be based on cost effectiveness, i.e. energy conservation should only be undertaken to the extent that it can be justified in normal commercial and financial terms, like any other investment.

Energy conservation does not mean having to do without energy, i.e. it does not mean rationing or curtailment or load shedding. It means identifying areas of wasteful use of energy and taking action to reduce the waste, i.e. an increased level of goods and services for the same amount of energy (OEES website). According to *ERB News* (2004), ‘energy management’ (which is also sometimes used interchangeably with the term ‘energy efficiency’) is the process of understanding and managing energy cost through energy efficiency.

### **2.4.2 Energy efficiency practices**

One of KPLC’s current brochures, ‘Using Electricity Efficiently,’ outlines the main domestic activities that constitute the practice of energy efficiency in the home. These

include food refrigeration, cooking, water heating, lighting and laundering. According to a website (<http://www.energywise.org.nz>) of New Zealand based "Energy Wise," a typical New Zealand household spends \$1200 each year on electricity – the main form of home energy. Homes consume nearly 35% of the electricity generated in New Zealand – costing close to \$1.4 billion a year.

Canada ranks sixth in the world in terms of installed electricity generating capacity with 116.9 gigawatts. According to the World Energy Council Journal of Case Studies (1998), it is estimated that approximately 5,299 MW of generating capacity have been avoided in Canada due to effective successful energy efficiency programs. A website report ([http://oee.nrcan.gc.ca/neud/dpa/data\\_e/Trends/chapter\\_2.cfm](http://oee.nrcan.gc.ca/neud/dpa/data_e/Trends/chapter_2.cfm)), states that households in Canada use energy primarily for space and water heating, the operation of appliances, lighting and space cooling. Between 1990 and 2001, residential energy use increased by four percent. The same can be said for the impact of energy efficiency, which almost completely offsets the impact of activity. The structure (which represents the choices people make when they buy appliances, equipment and houses) has had a growing impact on energy use.

According to a Publication on Summaries of Papers Presented to a World Energy Council meeting (1998), industrialised countries are struggling to conserve conventional energy resources. Power Electronics (PE) is an enabling infrastructure technology that can enhance the utilisation of efficiency of electric power in industrialised countries, thereby reducing the first cost of providing acceptable levels of electricity supply service. This technology, the Publication concludes, permits industrialised nations to continue their push for higher efficiency standards for electric motors, thereby saving a significant amount of conventional energy sources.

## **2.5 Promotion of energy efficiency**

The concept and practice of efficient use of energy is quite strongly promoted and established more in developed countries of Europe and North America than in developing countries. Unlike in developed countries, there have been no consistent and sustained measures to manage the efficient use of this resource by customers, despite the many

opportunities that exist. There is need therefore to address the low level of awareness about efficient use through enhanced promotion of the same (Bhagavan, 1999).

By extension, like is the case in developed countries such as Canada, conservation measures by customers would reduce the demand on the production side and hence save the country billions of shillings it would otherwise spend on investing in new generation plants (Bhagavan, 1999). Many of the impediments to energy efficiency or conservation efforts especially in developing countries, argues Bhagavan (1999), are associated with lack of promotion or communications thereby leading to lack of awareness. He summarises these as follows: Lack of awareness about energy conservation techniques; Lack of awareness about energy efficient equipment; Managerial attitude towards energy conservation; Inadequacy of fiscal and financial incentives; and Lack of focal expertise.

*ERB News* (2004) states that the ERB is finalising plans for an intensive consumer education programme to promote awareness on the importance and benefits of energy conservation. To this end, ERB has put in place cost reflective tariffs to promote the efficient use of electricity by all consumers.

### ***2.5.1 Objectives of promoting energy efficiency***

Most objectives of energy efficiency programs revolve around managing the use of energy, in order to realise benefits such as savings particularly in terms of reduction in total energy units consumed.

The “Energy Wise” website (<http://www.energywise.org.nz>) reports that New Zealand has introduced new regulations that prevent the sale of the least energy-efficient appliances. The objective is to raise the overall standard throughout the country. Minimum Energy Performance Standards were introduced in 2002, eliminating the worst performers from the market. In some cases, the best models of refrigerators and freezers use only half the energy of a model that just passes the Minimum Energy Performance Standard.

For many New Zealand small businesses, according to the “Energy Wise” website (<http://www.energywise.org.nz>), energy makes up a fair proportion of their running costs,

along with overheads such as rates, insurance and rental costs. The difference between these costs is that, with good management and smart advice, energy costs can be controlled and often reduced.

To control and reduce these energy costs it is necessary to put in place an energy management programme. Most businesses that have no energy efficiency measures in place could cut their energy costs by 10 to 20% through cost-effective improvements (<http://www.energywise.org.nz>).

Canada is another classic example of successful energy efficiency programs backed by a high level of sensitisation among customers. According to a 'Report To Parliament Under The Energy Efficiency Act 2000-2001 on Improving Energy Performance In Canada,' from 1990 to 2000, the country's energy efficiency improved by 9.4 percent, saving Canadians almost \$8.7 billion in energy costs per year and reduced greenhouse gas emissions by 38.3 megatonnes.

Another country in the forefront of energy efficiency is Norway. A Publication on Summaries of Papers Presented to a World Energy Council meeting (1998), reports that the country established the Norwegian Industrial Energy Network (IEEN) in 1989. It is a major program whose major objective is implementing national energy efficiency policies and measures in industry. Its main objective is improved energy efficiency in Small and Medium Enterprises and to provide a toolbox for various energy efficiency measures.

Bhagavan (1998), states that the experience of utilities in developed countries has shown that among other objectives, demand side management can improve financial performance, create customer satisfaction/retention, result in good corporate citizenship and improve power management. In this regard, it is estimated that in Zimbabwe 2,010 Gwhr could be saved on an annual basis. He further reports that the Regulatory in Chile has a full view of the entire power sector, with the objective of recommending investment in energy conservation, which has proved to be cheaper than the avoided cost of power generation. Bhagavan (1998), concludes that among the main issues that affect the power sector in sub-Saharan Africa is introducing incentives to encourage energy efficiency, conservation and environmental protection.

Besides individual countries, emerging interest and pressure groups are also addressing energy efficiency objectives. "Clean Power Campaign," according to its website (<http://www.cleanpower.org>), is a non-profit organization of environmental and public interest groups, renewable energy providers, green energy marketers and energy efficiency technology companies. It is based in Sacramento, USA and is funded exclusively from environmentalists and private sources interested in clean energy.

### **2.5.2 Media**

The conventional below-the-line and above-the-line channels are utilised to promote energy efficiency messages. These include electronic and print media as well as information materials. The use of information materials is cited as an important channel by the website of New Zealand based "Energy Wise," (<http://www.energywise.org.nz>) which states that energy labelling is now mandatory for refrigerators and freezers, dishwashers, clothes dryers, clothes washers and household-sized air conditioners. It allows consumers to compare the energy use of competing appliances. They can judge how much it will cost to run an appliance and therefore make more informed buying decisions to lower their ongoing energy costs. The KPLC Annual Report and Accounts (2001/2002) states that channels to promote energy efficiency awareness that year, included news and features programmes, print and electronic media as well as in brochures, fliers and at events such as Agricultural Society of Kenya (ASK) shows.

### **2.5.3 Messages**

Most messages on energy efficiency focus on economical use of energy as well as associated benefits such as savings - both financial and in terms of energy units consumed. According to the website of New Zealand based "Energy Wise" (<http://www.energywise.org.nz>), by implementing energy efficiency measures, there are significant savings to be made, which can reduce on household power bills and customers can still enjoy a warmer, drier, more comfortable home. It is easy to use energy, especially electricity, wastefully. Energy-use is so much a part of modern life that people

do not usually give it a moment's thought. As well as saving them money, using energy efficiently conserves our precious environment – for now, and for future generations, states the website.

Much of New Zealand's electricity comes from environment-friendly hydro-generated power, but there is not enough to supply all the country's needs, especially in winter when demand goes up. By saving on energy use in homes, New Zealanders help to delay the building of new fossil-fuel-fired power stations and avoid the need for big spending on strengthening the electricity networks to cater for increased demand (<http://www.energywise.org.nz>). The "Energy Wise" website argues that electrical appliances account for much of a household's energy consumption. They can waste energy – by poor design or by careless use, such as leaving them on stand-by (where display lights and clocks are on while the appliance is not in use).

Bhagavan (1998), argues that if energy efficiency messages were taken seriously, this would displace or delay the construction of additional capacity, thereby freeing scarce resources that can be applied elsewhere. In terms of cost, energy efficiency can offer cheaper alternatives to building additional capacity and the added advantage is that most energy efficiency measures can be implemented in modules – sometimes not requiring foreign currency, he concludes. Bhagavan (1998) further cites the Regulatory in Chile as a major energy efficiency initiative in a developing country. The commission has among other functions the responsibility of exploring ways of encouraging energy conservation. According to its website (<http://www.cleanpower.org>), "Clean Power Campaign," was founded in 1990 to promote increased electric system reliance on sustainable use of energy resources. It focuses on policies to increase renewable energy, encourage conservation and energy efficiency and make the most sustainable use of conventional power sources such as natural gas. It has worked on a broad range of legislative and regulatory initiatives in these areas.

## 2.6 Energy efficiency practice/awareness in Kenya

As mentioned earlier, little has been researched or documented about electric energy efficiency in Kenya. According to a Ministry of Energy Study on Kenya's Energy Demand, Supply and Policy Strategy for Households, Small Scale Industries and Service Establishments (2001), the majority of Kenyans currently rely on a narrow mix of largely non-conventional energy sources mainly wood fuel and charcoal. Over 90 percent of the total population do not have access to electricity, the Study states.

The Study also notes that the penetration of the major conventional energy sources and energy conversion technologies is quite limited in Kenya due to market prices that are well above the means of the majority of the people. It therefore recommends that there is urgent need for capacity building in the Ministry of Energy and other institutions to provide effective coordination and regulation of the activities of other actors, especially with regard to quality and prices of energy and associated technologies.

The Study also dwells on demand management and notes that initiatives mainly focus on energy conservation and several are already in place with regard to wood fuel. However, as conservation measures continue to be adopted as more people realise that it is easier to save a unit of energy than to produce one, energy conservation strategies are mainly concerned with production and end-use stages.

In cooking activities, the Study observes that for the same quantity of food, different households use different quantities of energy. Food preparation methods can reduce cooking time and the amount of energy used. Simple methods used include soaking and cutting food into smaller pieces. Only about 30 percent of the people covered by the Study, carried out food preparation. The Study points out that other energy saving methods are using wide-bottomed pots, covering pots while cooking and using the same fire to prepare two things at the same time.

The *ERB News* (2004), points out that for Kenyan industrialists, conserving energy means lower energy bills and therefore lower production costs. For the country as a whole, greater energy efficiency helps in making the most of energy resources, reduction of energy shortages, lowered reliance on energy imports, mitigating the impact of high energy prices and reducing pollution.



The *ERB News* (2004), cites the GEF-KAM Industrial Energy Efficiency Project that was launched in 2001 as an initiative made in recognition that Kenyan industry uses energy inefficiently. With current wastage levels of between 10% to 30%, the potential saving if Kenyan industry adopted energy efficient processes is estimated at Kshs 2.3 billion annually. Generally, barriers to energy efficiency in Kenya already identified and being addressed, states *ERB News* (2004), include the following: Experience in identifying energy efficiency measures and information regarding the economic viability of the measures.

As mentioned earlier, the only significant attempt made so far in conducting scientific inquiry in electric energy efficiency practices in Kenya was a KPLC/ESBI research on Demand Side Management (2004). Much as the study did not address fully the area of lighting - which forms the bulk of electricity usage – its overall objective was generally on demand side management as well as customer satisfaction. It indicated that there was generally a low level of awareness and practice of efficient use of electricity in Kenya, recommending that intensive customer education should be carried out.

The study, which was largely a business research, had some scholarly limitations that this study will also seek to address. No comprehensive literature review was carried out to establish the knowledge gap in the local electric energy efficiency situation and develop a conceptual framework. The study was thus denied these, among other requirements of a good literature review. Furthermore though the objectives of the study were enumerated, the statement of the problem was not clearly defined. This is related to the first limitation, which denied the research a state of the art in the problem of study by not undertaking a literature review.

In addition, the overall objective and hence methodology/research design was generally on demand side management as well as customer satisfaction. There was no special focus on lighting, which constitutes majority electricity use. Issues related to affordability, purchase decisions and distribution channels of energy efficient bulbs were not adequately probed. Also, patterns of electric usage for indoor and outdoor lighting were not adequately investigated given that the two can be considered to constitute two separate modes of usage with unique characteristics such as the length of time when lights remain switched on. The study recommended that further research should be

undertaken on an ongoing basis to monitor those areas that need to be actively improved. It is in line with this recommendation that this proposed research aims to provide supplementary insights and recommendations with regard to energy efficiency in lighting practices.

According to *ERB News* (2004), achieving energy efficiency and the necessary cost saving involves many aspects. From the technical point of view, there must be awareness of the possibilities. *ERB News* (2004), therefore prescribes the following seven steps that provide this awareness: 1. Maximise system efficiencies; 2. Compare oneself with similar facilities, industries, etc.; 3. Know when energy is used; 4. Optimise the energy supply; 5. Understand one's energy costs; 6. Know where energy is used; 7. Match usage to requirements.

### **2.6.1 KPLC's strategies in energy efficiency promotion**

As part of its customer education policy, KPLC creates awareness about efficient use of energy. According to the company's Annual Report and Accounts (2001/2002) information on billing and payments, fraud, safety and energy efficiency was effectively disseminated through public education and promotional campaigns. The Report states that channels used included news and features programmes, print and electronic media as well as in brochures, fliers and at events such as Agricultural Society of Kenya (ASK) shows.

One of the company's current brochures, 'Using Electricity Efficiently,' outlines easy-to-follow tips in the home. Some of the activities covered include food refrigeration, cooking, water heating, lighting and laundering. The company also uses its website (<http://www.kplc.co.ke/>) to promote energy efficiency where it advises on better management of domestic power consumption.

The focus of this study is Domestic customers in Nairobi, Kenya. According to the KPLC Schedule of Tariffs and Rates (2000), domestic customers fall under the Method AO tariff category that is applicable to residential consumers metered by the company at a pressure of 240 or 415 volts, whose consumption does not exceed 7,000 units per meter

reading period (which is usually monthly). Method AO can also be used in conjunction with Method DO, which is a water heating interruptible tariff arrangement (Refer to Appendix Biii).

The electrical energy supplied under Method DO is available at all times other than during peak periods. These are periods of high demand as may occur during each day not exceeding sixteen hours in the aggregate and during which the supply of electrical energy may be restricted. The time(s) of such restriction and the duration thereof is controlled by KPLC at its sole discretion. In most cases the peak period is usually in the evening (6pm to 10pm) and early morning (6am to 9am).

### **2.6.2 Integration of energy efficiency in new 'National Energy Policy'**

A Ministry of Energy Study on Kenya's Energy Demand, Supply and Policy Strategy for Households, Small Scale Industries and Service Establishments (2001), argues that given over 90 percent of the total population do not have access to electricity, there is need for policies to facilitate supply of reliable sources of energy at competitive prices. The new 'National Energy Policy' (draft report *Daily Nation* newspaper 12<sup>th</sup> February 2004, pp. 42), reaffirms the government's commitment through the Ministry of Energy to promote energy efficiency and conservation as part of its principal objectives. In the power sub-sector, this will specifically entail the following policy actions: Introducing demand and supply side management practices; strengthening awareness creation and efficiency improvements; and introducing energy efficient building design and construction.

## **2.7 Summary of Literature Review**

In studying the cognitive, affective and conative components of attitude of KPLC's domestic customers in Nairobi towards electric energy efficiency messages in lighting activities, this has been guided by reviewing what has been documented empirically and theoretically. The literature examined, therefore covered: the communication/promotion process which significantly influences the formation of attitude; characteristics of attitudes; models of attitude; development of attitudes; attitude change; overall attitude as

**an objective; electric energy efficiency, promotion of energy efficiency, and energy efficiency practice/awareness in Kenya, among other areas**

1. Introduction  
Energy efficiency is a primary objective of energy conservation. It involves the use of energy in a way that minimizes waste and maximizes productivity. This is achieved through the use of energy-efficient technologies and practices. The goal is to reduce energy consumption while maintaining the same level of service or output. This is important for several reasons. First, it helps to reduce greenhouse gas emissions, which are a major contributor to climate change. Second, it helps to reduce energy costs for businesses and households, which can improve their financial health. Finally, it helps to conserve natural resources, which are essential for a sustainable future.

2. Objectives  
The main objective of this study is to assess the current state of energy efficiency in Kenya. This includes identifying the key areas where energy is being wasted and the reasons for this. The study also aims to identify the barriers to energy efficiency and the opportunities for improvement. The specific objectives of the study are:  
- To determine the current level of energy efficiency in Kenya.  
- To identify the key areas where energy is being wasted.  
- To identify the reasons for energy waste.  
- To identify the barriers to energy efficiency.  
- To identify the opportunities for improvement.  
- To develop recommendations for improving energy efficiency in Kenya.

3. Methodology  
The study was conducted using a combination of primary and secondary data. Primary data was collected through a series of interviews with key stakeholders in the energy sector, including government officials, industry representatives, and consumers. Secondary data was collected from a review of the literature on energy efficiency in Kenya and other developing countries. The data was analyzed using a combination of qualitative and quantitative methods. The results of the study are presented in the following sections.

## CHAPTER 3

### METHODOLOGY

#### **3.1 Research Design**

This was a descriptive study that aimed at producing data regarding the key features of customers' attitudes towards electric energy efficiency in lighting and develop profiles of the same. Such a study aims at determining answers to the questions, who, what, when, and sometimes how (Cooper et. al. 2003) – which is in line with this research. Mwangi (2002), and Njoroge (2003), have also used descriptive design successfully in their studies.

#### **3.2 The Population**

The target group was KPLC domestic customers in Nairobi who have electricity accounts (i.e. 294,569) and are responsible for either or both payment of electricity bills and purchase/management of electrical lighting appliances within the household. This category of customers, which is largely homogeneous in terms of KPLC customer segmentation, was part of the target group by the KPLC/ESBI research on Demand Side Management (2004) which did not address fully the area of lighting – yet this forms the bulk of electricity usage. The group also constitutes 80.3% of KPLC's customers countrywide and by extension in Nairobi, hence its significance and importance (Billing database of KPLC customers, February 2004).

#### **3.3 Sample Frame**

From the KPLC billing data base, a list of all the company's customers for the month of February 2004 was obtained. The customers were stratified into the following categories; Domestic (538,493), Small and Medium commercial/industrial (125,666), Large commercial/industrial (425) and others i.e. Streetlighting, Staff, etc. (5,452), yielding a total of 670,036 customers countrywide.

Out of this list of all customers, the Domestic stratum which was of interest in this study, was further stratified into KPLC administrative Regions as follows, Nairobi – i.e. the city and its environs (294,569), Coast (74,296), West – i.e. Central Rift, North Rift & West Kenya (110,309), and Mt. Kenya – i.e. Mt. Kenya environs and Thika (59,319). Nairobi region itself was further stratified into three sub-regions with each having its designated Domestic customers as follows; North (113,638), South (87,460), and West (93,471). The representative sample was therefore drawn from the total of 294,569 Domestic customers in Nairobi.

### 3.4 Sample and Sampling Design

A sample of 200 KPLC customers was selected from the total population of 294,569 Domestic customers in Nairobi Region. Sample units were randomly selected from the customers' list in each of the three sub-regions (North, South and West) with a proportionate allocation as illustrated in Table 3.1.

**Table 3.1 Apportionment of Sample Units per Sub-region**

Sub-region	Population (N)		Sample Units (n)	
	No. of customers	Percentage (%) of total population	Percentage (%) of Sample Units	No. of customers in sample
Nairobi North	113,638	38.6	38.6	77
Nairobi South	87,460	29.7	29.7	59
Nairobi West	93,471	31.7	31.7	63
<b>Total</b>	<b>294,569</b>	<b>100.0</b>	<b>100.0</b>	<b>200</b>

Consequently, arising from the results obtained in **Table 3.1**, the Sample Units were distributed as follows: Nairobi North - 77 customers, Nairobi South - 59 customers and Nairobi West - 63 customers. In a related study that covered three categories of KPLC customers (i.e. domestic, small commercial and large commercial) in Nairobi and Nakuru, Njoroge (2003), used a targeted sample of 350 customers.

### **3.5 Data Collection Method**

Primary data was collected using a structured questionnaire. Research Assistants were used to collect data. They approached customers from each Sub-region randomly and requested them to fill the questionnaire. They also made any clarifications or provided any assistance the respondents required in order to enhance the response rate.

Respondents were randomly selected among customers who visit the following KPLC service outlets located in each of the three Sub-regions respectively: Nairobi North – Sarit Centre Office, Nairobi South – Makadara Office and Nairobi West – Adams Arcade Office. Majority of customers who frequent each of these offices are from the respective Sub-region due to their geographical convenience. Sample members were cross-checked with the KPLC computer system using their electricity account numbers to ensure that they belong to the appropriate Sub-region. The data collection was partially supplemented by randomly visiting a few respondents in their homes.

The questionnaire was divided into two parts:

**PART A:** Was designed to obtain general data of the interviewees such as personal details, other people they reside with, number of lighting points they have and how long they have their lights on.

**PART B:** This comprised the majority of the questions. It used a mixture of Likert Scale, Rank Order Scale and Dichotomous questions to measure various components of attitude towards electric energy efficiency messages in lighting. Likert Scale sought information regarding the affective component (i.e. liking, believability and/or preferences regarding energy efficiency messages). Rank Order Scale was widely used to measure the cognitive (i.e. awareness and knowledge), affective (i.e. liking and/or preferences) and behavioural

(i.e. action/trials) components of the respondent's attitude towards electric energy efficiency. Dichotomous questions were used to establish specific practices associated with various attitude components, such as willingness to learn more about energy efficiency, and switching-off-lights as a preferred alternative to using energy efficient bulbs.

### 3.6 Operational definitions

Three levels of attitude were measured namely, cognitive, affective and behavioural. The properties of each are elaborated as illustrated in the Table 3.2. The questions relevant to these properties are contained in the third column and were used to facilitate subsequent analysis. A combination of Likert Scale, Rank Order Scale and Dichotomous questions were used to measure attitude towards electric energy efficiency messages in lighting. Likert Scale is probably the most commonly used technique for scaling (Williams, 1997), whereas Rank Order scaling provides important information and enables marketers to identify needed areas of improvement in product design or product positioning (Schiffman et. al. 1992).

**Table 3.2: Operational definitions**

Broad generic component of attitude	Attitude dimension/properties To be measured	Relevant questions in Questionnaire
Cognitive	Knowledge/awareness about energy efficiency	15
	Communication channels used to get energy efficiency messages	16
	How recently exposure to energy efficiency messages occurred through various communication channels	17



	Sources used to get energy efficiency messages – institutional/personal	18
	Awareness/knowledge of various brands of energy efficient bulbs	19
<b>Affective</b>	Believability/credibility/positive influence of various communication channels used to disseminate past/current energy efficiency messages - leading to purchase of energy efficient bulbs	20
	Effectiveness/believability/credibility/positive influence of message content/design that resulted in purchase of energy efficient bulbs	21
	Reasons for positive attitude to energy efficiency practices	22
	Believability/credibility of past/current energy efficiency messages from various sources – institutional/personal	23
	Reasons for negative attitude to energy efficiency messages	24
	Preference for/credibility of various sources for future energy efficiency messages – institutional/personal	25
	Willingness to learn more about energy efficiency	26
	Level of interest in the possibility of using KPLC branded energy efficient bulbs. This may help to determine extent to which bulbs produced by KPLC would influence – believability, credibility and usage of energy efficient bulbs.	27, 28

	Level of interest in the prospects of purchasing energy efficient bulbs (whether KPLC branded or not) from a KPLC office/distribution outlet. This may help to determine extent to which bulbs retailed through KPLC offices would influence – purchase decisions, believability, credibility and usage of energy efficient bulbs.	29, 30
<b>Behavioural</b>	Decision-maker in purchase of energy efficient bulbs – relevant target audience for messages	31
	Actual buyer of energy efficient bulbs – relevant target audience for messages	32
	Switching-off-lights as a preferred alternative to using energy efficient bulbs	33
	Duration used energy efficient bulbs, hence positive attitude towards energy efficiency	34, 35
	Extent of brand switching behaviour between use of non-energy efficient to energy efficient bulbs	36, 37
	Period used non-energy efficient bulbs prior to brand switching to energy efficient type	38, 39
	Frequency of purchasing energy efficient bulbs. To some extent this may help determine positive attitude where frequency of purchase is highest between indoor and outdoor lighting.	40, 41
	Purchase volume of energy efficient bulbs. To some extent this may help to determine positive attitude where the rate is high.	42, 43

	Frequency/consistency of purchasing energy efficient bulbs from particular outlets/distribution points. To some extent this may help to determine positive attitude towards the outlets ranked high.	44
	Reasons underlying preference for/credibility of purchasing energy efficient bulbs from particular outlets/distribution point. To some extent this may help to determine positive attitude towards the outlets ranked high.	45
	Extent of realisation of benefits (i.e. energy and money savings) touted most frequently by energy efficiency messages	46, 47

### 3.7 Data analysis techniques

Given that the study was modelled on a descriptive framework, descriptive statistics were used to summarise and analyse the data. **Part A** of the questionnaire was analysed using frequency tables to array data by assigned numerical value. Pie charts and bar charts were also used to simplify and compare general data of the interviewees such as number of rooms they have and how long they have their lights switched on.

In **Part B**, cross tabulations were used to compare given classifications such as attitude dimensions observed under indoor lighting vis a viz outdoor lighting. In addition cross tabulations were used to reveal any meaningful relationship between given variables in **Part A** and **Part B** such as number of rooms and liking and/or preferences of the respondent's attitudes towards electric energy efficiency.

Means of the scores of the Likert Scale were used to determine the weighting factor of the importance attached to the attitude dimension/variable on believability/credibility of past/current energy efficiency messages. Coefficient of variation was used to assess the

extent of agreement by different categories of respondents on the rated importance of this dimension/variable. Using these variables, it was possible to assess, rate and rank this attitude dimension/variable in terms of its weighted importance. Pie charts, bar charts and frequency tables were used to simplify, categorise, show percentages and represent values of the attitude dimensions observed.

To eventually summarise and gauge attitude towards energy efficiency messages, the "Overall attitude as an objective" model was adapted (Batra et. al. 2003). According to this model a range of attitudes can be identified for a brand that has been on the market for a certain period (Batra et. al. 2003). Attitude segments were identified related to energy efficiency, ranging from those holding strong negative attitudes, through those holding neither positive nor negative attitude to those holding strong positive attitudes.

## CHAPTER 4

### DATA ANALYSIS AND FINDINGS

#### 4.1 Introduction

It was ensured that the targetted proportion distribution of the sample units in each Sub-region was achieved as follows: Nairobi North – 77 (38.6%), Nairobi South – 59 (29.7%) and Nairobi West – 63 (31.7%). This yielded the 200–target sample, thereby constituting a 100% response rate, from the respondents, randomly selected among customers who obtain services at the selected KPLC offices located in each of the three Sub-regions.

Research assistants were utilised for data gathering, data entry and analysis. Data entry and analysis was done using the Statistical Package on Social Sciences (SPSS) software. Descriptive statistics were used to summarise and analyse the data, given that the study is modelled on a descriptive framework. The questions that did not require ranking, were assigned codes in accordance with the arrangement of the choices, and their graphs and frequency tables extracted to summarize the data. The open-ended questions were checked for key points and assigned codes based on the key points. For questions that required ranking, the following formula was used to calculate the weighted score:

*Frequency x Valid Percentage*

The weighted scores were used to ascertain which response was ranked highest. Cross tabulation was used to compare how different categories of customers responded to different questions. Correlation coefficient was employed to measure the level and direction of association for selected variables. To determine the extent of agreement by different categories of respondents with respect to selected attitude variables, coefficient of variation was utilised and the following formula applied for its calculation:

*Standard Deviation / Mean x 100*

The findings are discussed in this chapter using the ABC/Tricomponent Model of Attitude. Results of measuring attitudes among KPLC customers towards energy efficiency messages in lighting, are presented in the context of cognitive, affective and behavioural components, in accordance with the objectives of this study.

## 4.2 Demographic profiles of respondents

In this section data on the general demographic characteristics of respondents such as marital status, number of people they reside with and duration of using electricity, are analysed and presented.

### 4.2.1 Marital status

The respondents comprised 56% married, 41.4% single, 1.6% divorced and 1% widowed as depicted in Table 4.1. It can be noted that whereas majority of electricity customers in Nairobi who participated in the study are married (56%), a sizeable number (41.4%) comprises people who are single.

**Table 4.1: Marital status of respondents**

Marital status	Per cent
Married	56.0%
Single	41.4%
Divorced	1.6%
Widowed	1.0%
<b>Total</b>	<b>100%</b>

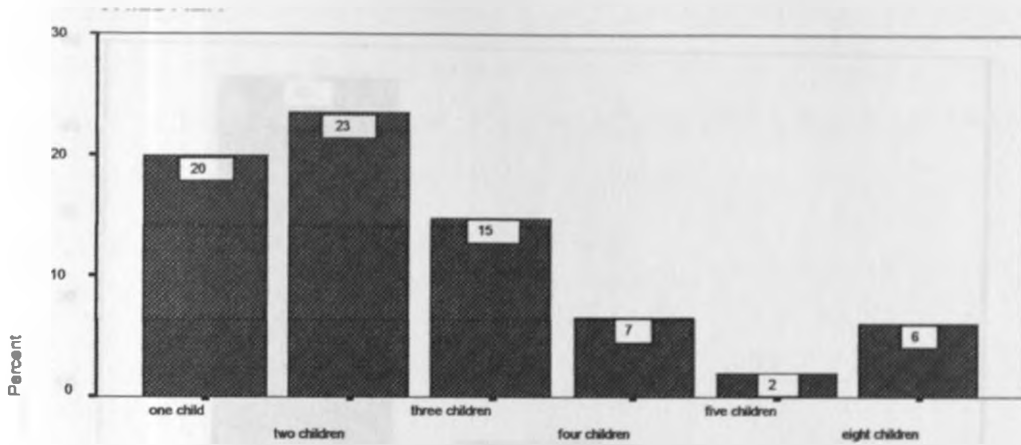
### 4.2.2 Current residential status of spouse

Among the respondents who are married, 58.2% live with their spouse in the house they currently reside in, whereas 41.8% do not (refer to Appendix C, Chart C.1).

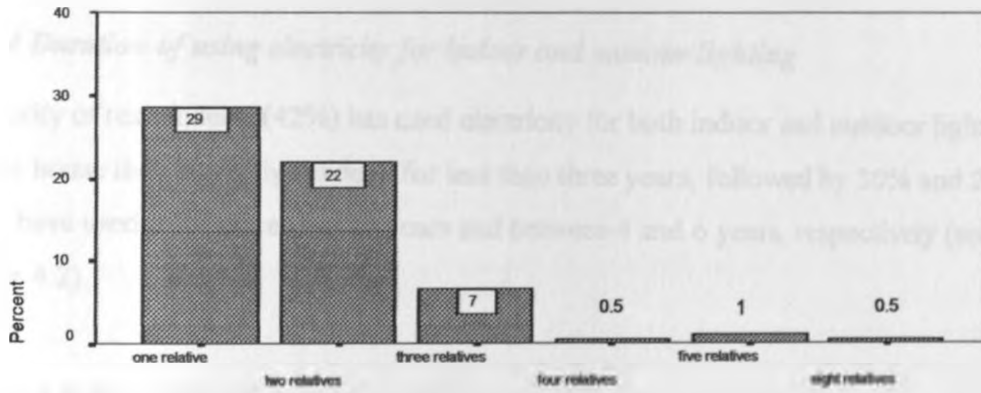
### 4.2.3 Number of people respondents live with continuously

The respondents were also asked to state how many people they normally live with continuously in the house they currently reside in. From Bar Graphs 4.1, 4.2 and 4.3, it can be observed that majority (23%) live with two children followed by one child (20%) and three children (15%). Majority of those who live with relatives stay with one relative (29%), followed by two relatives (22%) and three relatives (7%). For those who reside with friends, 10% live with one friend followed by two friends (7%). Majority of those who live with househelps/gardeners stay with one (46%), followed by those with two (4%).

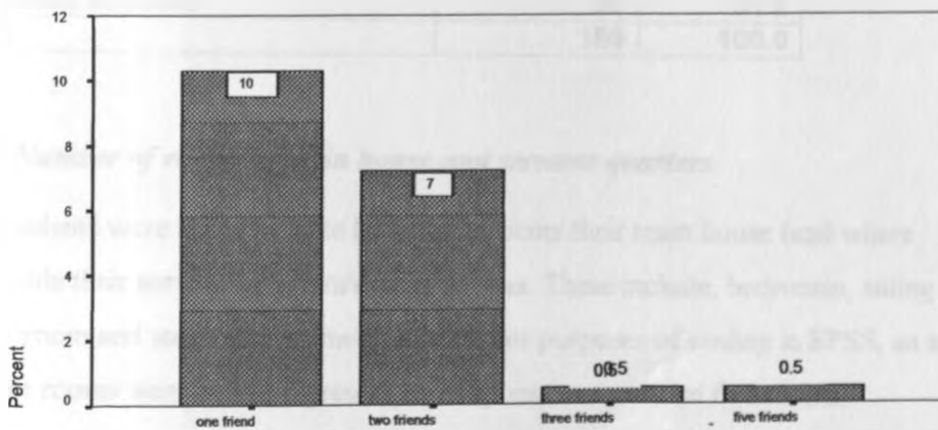
**Bar Graph 4.1: Number of children respondents live with**



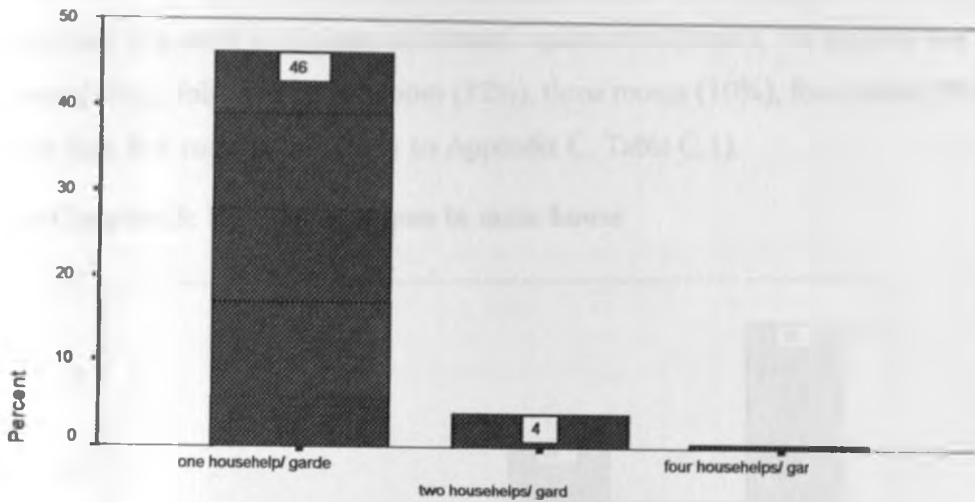
**Bar Graph 4.2: Number of relatives respondents live with**



**Bar Graph 4.3: Number of friends respondents live with**



**Bar Graph 4.4: Number of househelps/gardeners respondents stay with**



**4.2.4 Duration of using electricity for indoor and outdoor lighting**

Majority of respondents (42%) has used electricity for both indoor and outdoor lighting in the house they currently reside in for less than three years, followed by 30% and 21% who have used it for more than 10 years and between 4 and 6 years, respectively (see Table 4.2).

**Table 4.2: Duration of using electricity**

Duration	Frequency	Percent
Less than 3 years	84	42.2
Between 4 years and 6 years	42	21.1
Between 7 years and 9 years	11	5.5
More than 10 years	62	31.2
<b>Total</b>	<b>199</b>	<b>100.0</b>

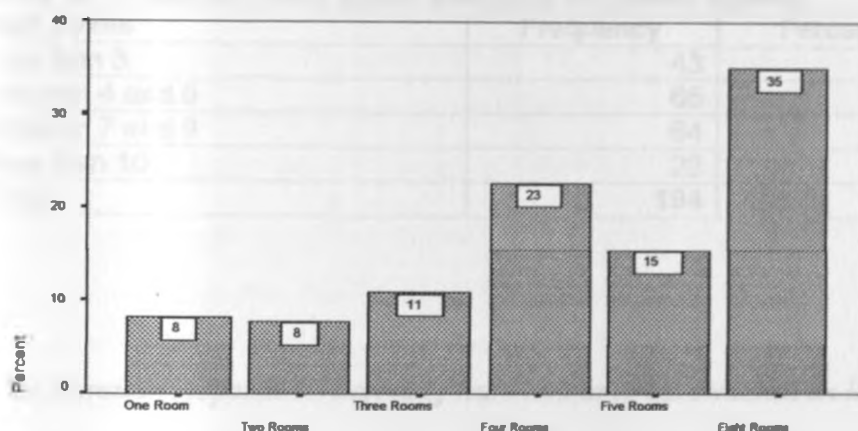
**4.2.5 Number of rooms in main house and servants quarters**

Respondents were asked to state how many rooms their main house (and where applicable their servants quarters/extension) has. These include, bedrooms, sitting room, dining room and study room, among others. For purposes of coding in SPSS, an average of eight rooms was used to represent the response - more than five rooms.



As shown in Bar Graph 4.5, 35% have more than five rooms, 23% four rooms, 15% five rooms and 11% three rooms in their main house. Those with two rooms and one room comprised 8% each. In the case of servant's quarters/extension, the majority has two rooms (44%), followed by one room (32%), three rooms (10%), four rooms (8%) and more than five rooms (6%) (refer to Appendix C, Table C.1).

**Bar Graph 4.5: Number of rooms in main house**



#### 4.2.6 Number of lighting points installed for indoor lighting in the house

Respondents were asked to indicate how many lighting points or bulb points are already installed for indoor lighting in their houses. Majority has between 4 and 6 bulb points (32.5%), whereas 29.9% have between 7 and 9 bulb points, 26.4% have more than 10 bulb points and 11.2% have less than 3 bulb points, as illustrated in Table 4.3.

**Table 4.3: Number of bulb points installed for indoor lighting in the house**

Bulb points	Frequency	Percent
Less than 3	22	11.2
Between 4 and 6	64	32.5
Between 7 and 9	59	29.9
More than 10	52	26.4
<b>Total</b>	<b>197</b>	<b>100.0</b>

#### **4.2.7 Number of lighting points used daily for indoor lighting**

From Table 4.4, it can be observed that the highest number of respondents (33.5%) use between 4 and 6 bulb points daily for indoor lighting in their houses, followed closely by those who use between 7 and 9 (33%). Those who use less than three bulb points comprise 22.2% followed by those who use more than 10 (11.3%).

**Table 4.4: Number of bulb points used daily for indoor lighting**

<b>Bulb points</b>	<b>Frequency</b>	<b>Percent</b>
Less than 3	43	22.2
Between 4 and 6	65	33.5
Between 7 and 9	64	33.0
More than 10	22	11.3
<b>Total</b>	<b>194</b>	<b>100.0</b>

#### **4.2.8 Duration respondents normally have indoor lights switched on in various rooms**

Respondents were also asked to state approximately, for how long they ordinarily have their indoor lights switched on daily in various rooms in their houses. It can be noted that, in the bedroom majority (36%) has their lights switched on for one hour; in the sitting room majority (38%) has their lights switched on for more than five hours; in the bathroom/toilet majority (27%) has their lights switched on for three hours; in the study room majority (25%) has their lights switched on for two hours; in the laundry room majority (74%) has their lights switched on for one hour; in other rooms majority (30%) has their lights switched on for more than five hours (see Appendix C). This implies that most indoor usage of electricity for lighting takes place in the sitting room where lights are switched on for more than five hours, hence its likely significance for installation of energy efficient bulbs given that high energy savings are likely to emanate from there.

#### ***4.2.9 Duration indoor lighting used for various domestic activities***

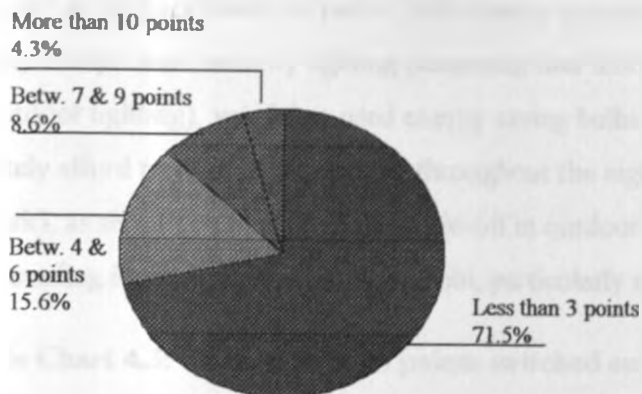
For selected and common domestic activities, respondents were requested to indicate the approximate period that they use indoor lighting. It was determined that majority (35%) use indoor lighting for reading/children's homework for two hours; majority (34%) use indoor lighting for cooking for two hours; majority (69%) use indoor lighting for eating supper for one hour; majority (70%) use indoor lighting for laundry for one hour; majority (26%) use indoor lighting for socialising/relaxing/entertainment for more than five hours; and majority (56%) use indoor lighting for other activities for one hour (refer to Appendix C). This suggests that among the various domestic activities indoor lighting is used for the longest duration on socialising/relaxing/entertainment.

For the same domestic activities respondents were further asked to rank the daily frequency of using indoor lighting. The results were in some respects consistent with those of the approximate duration that they use indoor lighting in a day. Majority (29%) ranked socialising/relaxing/entertainment as first; majority (16%) ranked eating supper as third; majority (15%) ranked cooking as third; majority (14%) ranked reading/children's homework as second; majority (7%) ranked laundry as third; and majority (4%) ranked other activities as sixth (see Appendix C).

#### ***4.2.10 Number of lighting points installed for outdoor lighting***

The interviewees also indicated how many lighting or bulb points they had already installed for outdoor lighting in their houses, which included the outside veranda and gate lights where applicable. As illustrated in Pie Chart 4.2, majority (71.5%) have less than 3 bulb points, followed by; between 4 and 6 (15.6%); between 7 and 9 (8.6%); and more than 10 (4.3%).

**Pie Chart 4.2: Number of bulb points installed for outdoor lighting**



#### **4.2.11 Number of bulb points switched on daily in outdoor lighting**

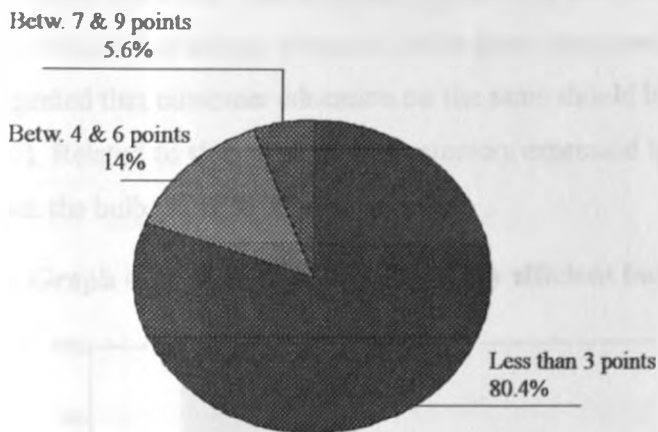
Again in terms of how many lighting points or bulb points are switched on daily for outdoor lighting in their houses, majority of respondents (80.4%) indicated less than 3 as shown in Pie Chart 4.3. They were followed by those who stated between 4 and 6 bulb points (14%) and between 7 and 9 bulb points (5.6). There is, therefore, apparent consistency in the number of bulb points installed and those that are switched on daily for outdoor lighting. It is also notable that none of the respondents indicated that they had more than 10 bulb points switched on daily in outdoor lighting much as 4.3% stated they have more than 10 bulb points already installed for outdoor lighting, as discussed earlier. This may imply that much as this small number of respondents (4.3%), who are likely to be affluent and residing in spacious homes, has more than 10 bulb points already installed for outdoor lighting, they do not switch on all of them daily – probably as part of their energy conservation measures.

#### **4.2.12 Duration normally have outdoor lights switched on daily**

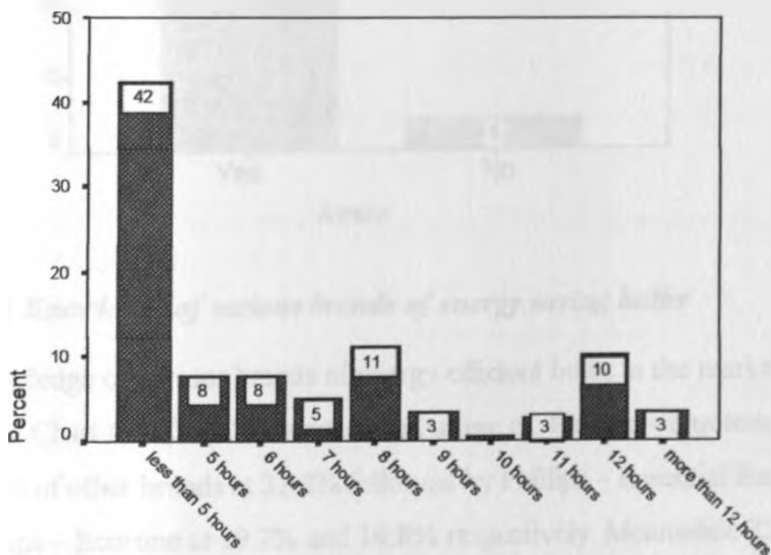
Respondents were also asked to state approximately, for how long they normally have their outdoor lights switched on in a day. It can be observed that, majority (42%) has their lights switched on for less than 5 hours as shown in Bar Graph 4.6. They are followed by 8 hours (11%); 12 hours (10%); 5 and 6 hours (8% each); and 7 hours (5%). This implies that most outdoor usage of electricity for lighting takes place for less than five hours, hence its likely significance for installation of energy efficient bulbs given that high energy savings are likely to emanate from there. It may also indicate that the

majority switch on their outdoor lights (which are likely to be ordinary bulbs) for a few hours at night, probably as part of their energy conservation measures. Consequently, they compromise security lighting (assuming that this is one of the main functions of outdoor lighting), yet if they used energy saving bulbs for this purpose they would most likely afford to have their lights on throughout the night (i.e. about 11 hours when it is dark), as should be the case. This trade-off in outdoor lighting is not prudent given the prevailing insecurity situation in Nairobi, particularly at night.

**Pie Chart 4.3: Number of bulb points switched on daily in outdoor lighting**



**Bar Graph 4.6: Duration outdoor lights switched on daily**



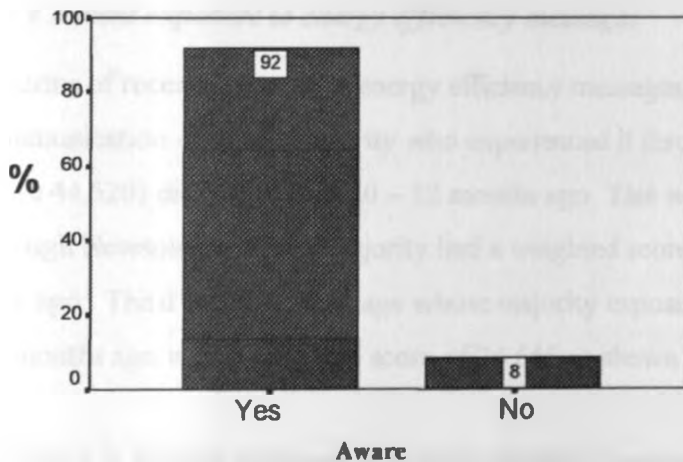
### 4.3 Cognitive component of attitude

The cognitive components measured included awareness, comprehension and knowledge of domestic customers on efficient use of electricity in lighting. The findings are presented here under.

#### 4.3.1 Knowledge/awareness about energy efficient bulbs

As shown in Bar Graph 4.7, the level of awareness about energy efficient bulbs was found to be high at 92%, with only 8% of customers responding as never having heard or read about the bulbs. However this high level of awareness does not necessarily suggest high detailed knowledge about the bulbs given that about 56% of the respondents suggested that customer education on the same should be enhanced (refer to Bar Graph 4.16). Related to this, 97% of the customers expressed their willingness to learn more about the bulbs (see Pie Chart 4.6).

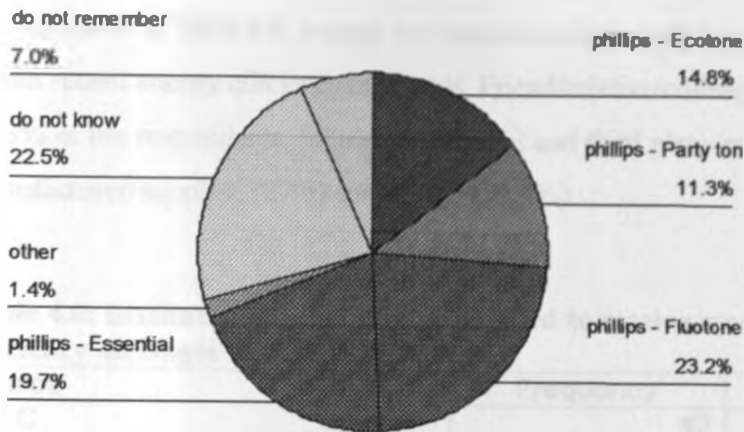
**Bar Graph 4.7: Awareness about energy efficient bulbs**



#### 4.3.2 Knowledge of various brands of energy saving bulbs

Knowledge of various brands of energy efficient bulbs in the market is varied as shown in Pie Chart 4.4. Brand awareness and usage of Phillips – Fluotone (standard tube) is ahead of other brands at 23.2% followed by Phillips – Essential Energy Saver and Phillips – Ecotone at 19.7% and 14.8% respectively. Meanwhile 22.5% of customers indicated lack of brand awareness about the energy efficient bulbs that they use.

**Pie Chart 4.4: Awareness about various brands of energy efficient bulbs**



#### 4.3.3 Communication channels used to get energy efficiency messages

Out of the Communication channels used to disseminate energy efficiency messages, Word-of-mouth was found to be the leading at 22.6%. Newspapers and Magazines followed it at 17.3% and 10.3% respectively (see Appendix C, Table C.20).

#### 4.3.4 Recent exposure to energy efficiency messages

In terms of recent exposure to energy efficiency messages through various communication channels, majority who experienced it through Word-of-mouth (weighted score 44.520) did so between 10 – 12 months ago. This was followed by exposure through Newspapers whose majority had a weighted score of 38.369 and did so over 1 year ago. Third was Bulb package whose majority exposure also occurred between 10 – 12 months ago with a weighted score of 24.645 as shown in Table 4.5.

**Table 4.5: Recent exposure to energy efficiency messages via various communications channels**

Duration	Newspaper	Magazine	Television	Radio	Pamphlets	Posters	Word of Mouth	Bulb Package	Electricity Bill Message	Salesman	Show	Private electrician	Other
1-3 months ago	0.093	0.64	0.484	0.25	0.291	0.003	0.448	0.731	1.716	0.19	0.042	0.048	
4-6 months ago	5.451	0.231	0.76	0.564	1.582	1.44	1.534	0.251	0.048	0.76	0.375	1.19	
7-9 months ago	0.372	0.003	0.484	0.003	14.217	0.36	1.778	0.102	0.19	0.19	1.5	0.048	
10-12 months ago	0.164	0.926	9.81	0.25		9	44.52	24.645	4.76	0.048	8.162	9.338	0.888
Over 1 year ago	38.369	14.76	0.122	4						6.852			2.888
Weighted score	44.449	16.56	11.66	5.067	16.09	10.803	48.28	25.229	6.714	8.84	18.879	18.824	1.334

#### 4.3.5 Sources used to obtain recent energy efficiency messages

As illustrated in Table 4.6, among the various institutional/personal sources used to obtain recent energy efficiency messages, Friend/relative/colleague was ranked first by 28.3% of the respondents, followed in second and third place respectively by Bulb manufacturer/supplier, (27.8) and KPLC (21.2%).

**Table 4.6: Institutional/personal sources used to receive recent energy efficiency messages**

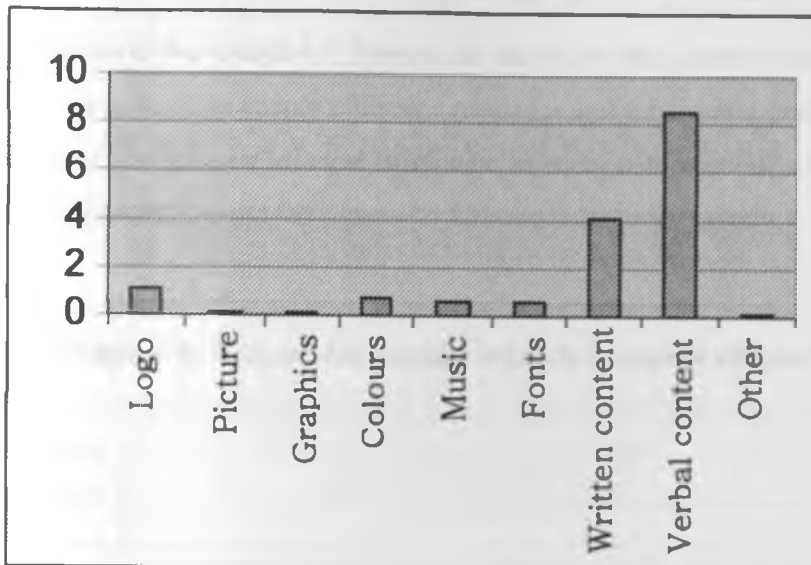
Source	Frequency	Percent
KPLC	42	21.2
Bulb manufacturer/supplier	55	27.8
UNEP	10	5.1
ERB	11	5.6
Ministry of Energy	6	3.0
Private Electrician	14	7.1
Friend/relative/colleague	56	28.3
Other	4	2.0
<b>Total</b>	<b>198</b>	<b>100.0</b>

#### 4.3. Effectiveness/positive influence of message content/design that resulted in purchase of energy efficient bulbs

In terms of effectiveness, believability, credibility and positive influence of message content/design that resulted in positive attitudes hence purchase of energy efficient bulbs, it was established that Verbal content was the leading variable in the most influential energy efficiency messages disseminated. As illustrated in Bar Graph 4.8, it recorded a weighted score of 8.5413 followed by Written content (weighted score 4.0518) and Logo (weighted score 1.0534). The finding that Verbal content was ranked the leading variable followed by Written content and Logo is quite consistent with the finding discussed earlier that Word-of-mouth, Newspapers/Magazines, and Bulb package are the leading channels in communication, believability and recent exposure, and hence impact positively on shaping customer attitudes towards energy efficiency messages in lighting. This is because the three 'message content variables' are contained in messages conveyed through the 'three channels' respectively.



**Bar Graph 4.8: Effectiveness/believability/credibility/positive influence of message content/design that resulted in purchase of energy efficient bulbs**



#### **4.4 Affective component of attitude**

The affective components gauged comprised liking and preference for energy efficiency in lighting among domestic customers. The results are presented below.

##### ***4.4.1 Believability of various communication channels used to disseminate energy efficiency messages***

Among various communication channels used to disseminate past/current energy efficiency messages, the most influential in terms of believability/credibility/positive influence – thus leading to purchase decisions of energy efficient bulbs, was Word-of-mouth which recorded a weighted score of 3.729. Newspapers and Bulb Package were ranked second and third with a weighted score of 3.222 and 0.908 respectively (refer to Appendix C, Table C.21).

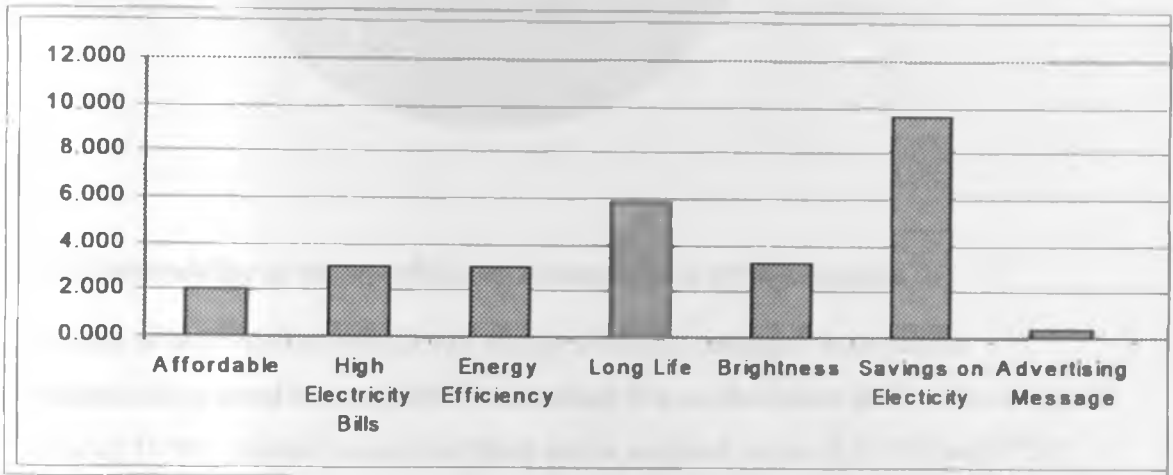
##### ***4.4.2 Message/design content ranked most credible***

As discussed earlier, the message/design content ranked most effective/believable/credible and consequently induced positive decisions in purchase of energy efficient bulbs was found to be Verbal Content with a weighted score of 8.541. It was followed in second and third position by Written Content and Logo with a weighted score of 4.051 and 1.053 (refer to Bar Graph 4.8).

#### 4.4.3 Reasons for positive attitude to energy efficiency messages

As shown in Bar Graph 4.9, Savings on electricity bills ranked first among reasons for positive attitude to energy efficiency messages and subsequent practices, with a weighted score of 9.557. Long Life and Brightness of energy efficient bulbs were ranked second and third with a weighted score of 5.855 and 3.209 respectively.

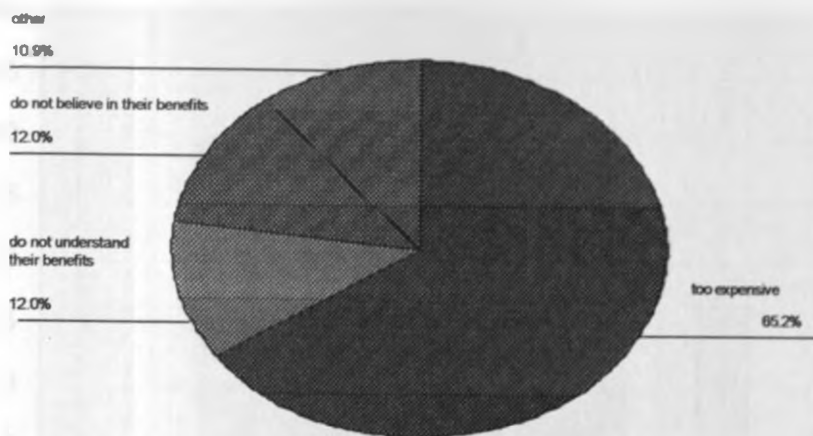
**Bar Graph 4.9: Reasons for positive attitude to energy efficient bulbs**



#### 4.4.4 Reasons for negative attitude to energy efficiency messages

On the other hand, the leading reason for negative attitude to energy efficiency messages and hence lack of positive response or non-usage of energy efficient bulbs by customers, was the high cost of the bulbs. As illustrated in Pie Chart 4.5, 65.2% of the respondents indicated that they found the pricing of the energy saving bulbs too expensive. Other reasons accounting for negative attitude towards messages in energy efficient bulbs are Lack of understanding about their benefits and Lack of believability in their benefits, which scored 12% each among the customers.

**Pie Chart 4.5: Reasons for negative attitude to messages/non-usage of energy efficient bulbs**



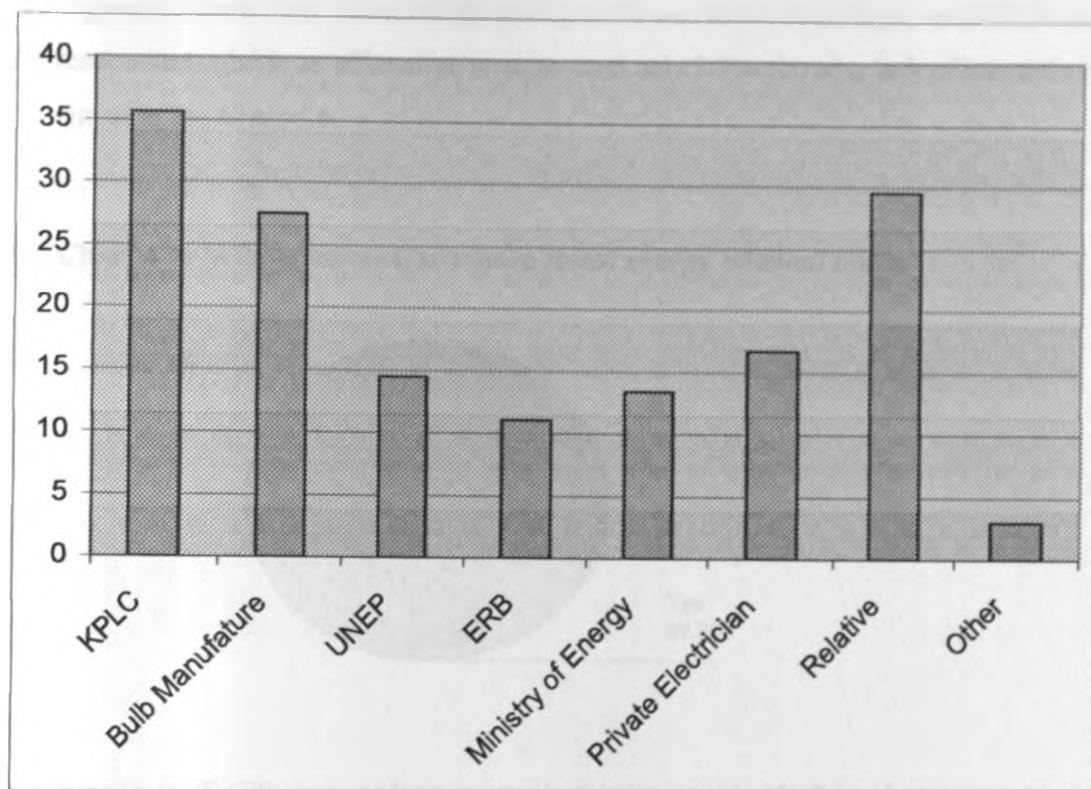
**4.4.5 Believability of energy efficiency messages from various sources**

In terms of believability/credibility of energy efficiency messages from various institutional/personal sources, KPLC was ranked first on the Likert Scale with a weighted score of 35.601. Ranked second and third with a weighted score of 29.655 and 27.575 respectively, were Friend/relative/colleague and Bulb manufacturer, as shown in Bar Graph 4.10.

**4.4.6 Preference for various sources in dissemination of future energy efficiency messages**

Again KPLC was ranked the most preferred and hence most believable source for dissemination of future energy efficiency messages among institutional and personal sources as shown in Table 4.7. KPLC recorded a weighted score of 16.787 followed by Ministry of Energy and Friend/relative/colleague in second and third position with a weighted score of 7.819 and 7.509, respectively.

**Bar Graph 4.10: Believability of energy efficiency messages from various sources**



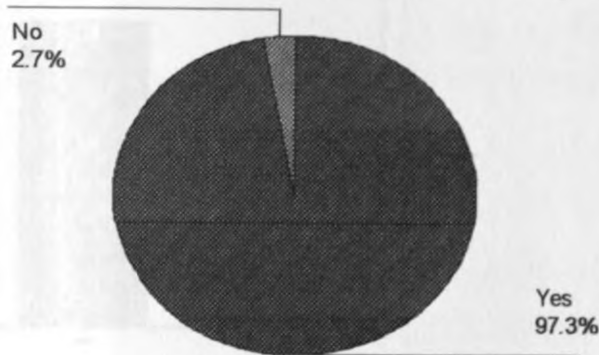
**Table 4.7: Preference for various sources in dissemination of future energy efficiency messages**

RANKING	KPLC	Bulb Manufacturer	UNEP	ERB	Ministry of Energy	Private Electrician	Friend/Relative/Colleague	Other
First	13.317	2.0840	0.720	1.898	1.120	0.176	0.810	0.003
Second	1.898	1.8980	0.720	1.608	2.349	0.408	2.349	0.003
Third	1.120	1.4720	1.898	1.007	1.608	0.900	1.608	0.003
Fourth	0.140	0.0440	0.630	0.341	0.468	1.007	0.468	0.003
Fifth	0.070	0.2250	0.140	0.408	1.782	0.176	1.782	0.003
Sixth	0.102	0.1400	0.176	0.024	0.468	0.012	0.468	1.342
Seventh	0.070	0.6300	0.280		0.024		0.024	0.003
Eighth	0.070		0.003					
<b>WEIGHTED SCORE</b>	<b>16.787</b>	<b>4.409</b>	<b>4.567</b>	<b>5.286</b>	<b>7.819</b>	<b>2.679</b>	<b>7.509</b>	<b>1.36</b>

#### 4.4.7 Willingness to learn more about energy saving bulbs

Willingness to learn more about energy saving bulbs was found to be high, with 97.3% of the respondents giving an affirmative response and only 2.7% showing lack of interest as illustrated in Pie Chart 4.6.

**Pie Chart 4.6: Willingness to learn more about energy efficient bulbs**



A comparison of willingness to learn more about energy saving bulbs and awareness about them, revealed that 168 out of 177 respondents who are aware would also like to learn more about them. This implies favourable or positive feelings towards them as indicated in Table 4.8.

**Table 4.8: Awareness versus willingness to learn more about energy saving bulbs**

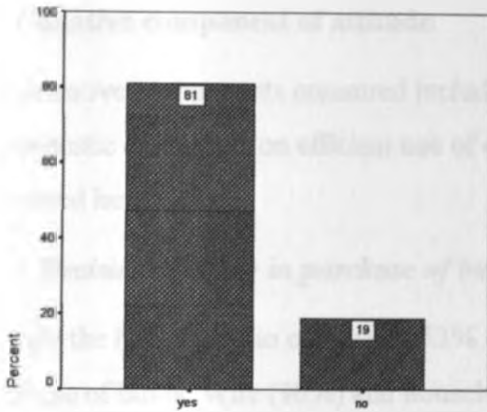
Aware	Learn more		Total
	Yes	No	
Yes	168	5	173
No	9		9
Total	177	5	182

#### 4.4.8 Interest in possibility of using KPLC branded energy efficient bulbs and buying them from KPLC service outlets

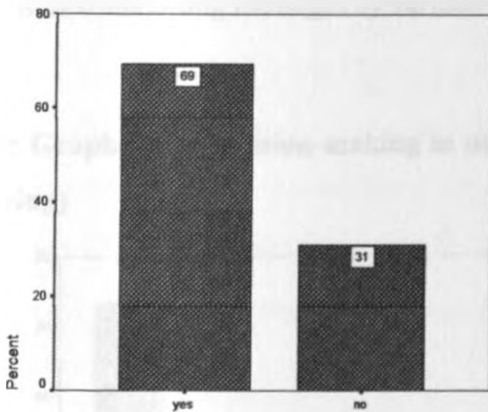
Respondents demonstrated a high level of interest in the possibility of using KPLC branded energy efficient bulbs. As shown in Bar Graph 4.11, 81% responded affirmatively while only 19% declined. This positive attitude was replicated in prospects

of purchasing the bulbs (whether KPLC branded or not) from KPLC offices/distribution outlets, with a 69% endorsement and a 39% disapproval rate, as shown in Bar Graph 4.12.

**Bar Graph 4.11: Interest in buying energy efficient bulbs branded by KPLC**



**Bar Graph 4.12: Interest in buying energy saving bulbs from KPLC service outlets**



Results of comparing willingness to buy energy efficient bulbs branded by KPLC against willingness to buy the same from KPLC customer service office, showed favourable dispensation towards KPLC. As shown in Table 4.9, 114 out of 170 customers responded favourably.

**Table 4.9: Willingness to buy energy efficient bulbs branded by KPLC versus willingness to buy from KPLC customer service office**

Branded KPLC	Buy from KPLC Office		Total
	Yes	No	
Yes	114	25	13
No	3	28	31
<b>Total</b>	<b>117</b>	<b>53</b>	<b>170</b>

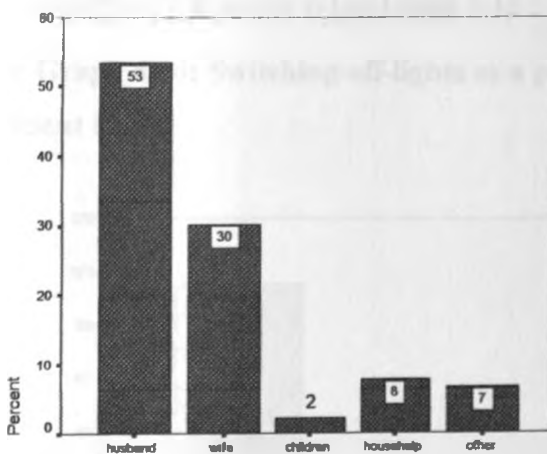
#### 4.5 Conative component of attitude

The conative components measured included intentions, behaviour, trials and purchases by domestic customers on efficient use of electricity in lighting. The findings are presented here under.

##### 4.5.1 Decision-making in purchase of bulbs

Largely the husband who comprised 53% of the respondents handles decision-making in purchase of bulbs. Wife (30%) and househelp (8%) were second and third respectively, as depicted in Bar Graph 4.13. The question on this was deliberately designed to be answered by all respondents irrespective of whether they use energy efficient bulbs or not, to help in determining present decision makers as well as relevant target audiences for future marketing messages by various stakeholders.

**Bar Graph 4.13: Decision-making in purchase of bulbs (ordinary and energy saving)**



#### 4.5.2 Actual buyers of bulbs

Again majority actual buyers of bulbs was found to be husband who ranked first with a weighted score of 31.006 followed by Wife (23.205) and children (3.114) in second and third place respectively, as depicted in Table 4.10. The question on this was also intentionally designed to be answered by all respondents irrespective of whether they use energy efficient bulbs or not, to help in determining actual buyers as well as relevant target audiences for future marketing campaigns.

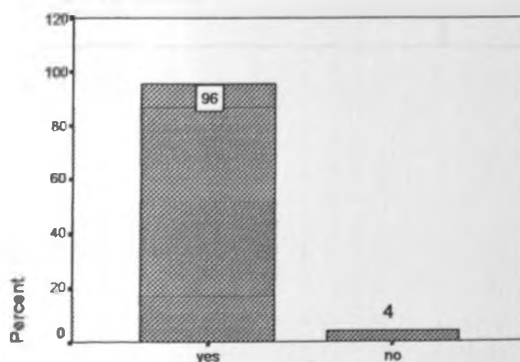
**Table 4.10: Actual buyers of bulbs (ordinary and energy saving)**

	HUSBAND	WIFE	CHILDREN	HOUSEHELP	OTHER
First	27.9	10.27	0.07	0.012	0.799
Second	3.036	12.92	0.012	0.225	0.003
Third	0.07	0.012	2.025	1.12	0.102
Fourth			1.007	0.341	
Fifth		0.003			
<b>WEIGHTED SCORE</b>	<b>31.006</b>	<b>23.205</b>	<b>3.114</b>	<b>1.698</b>	<b>0.904</b>

#### 4.5.3 Switching-off-lights as a preferred alternative to using energy efficient bulbs

The practice of switching-off-lights as a preferred alternative to using energy efficient bulbs was found high among the customers who do not use the bulbs. About 96% indicated that they practice this form of conservation as opposed to only 4% who said they do not, as illustrated in Bar Graph 4.14.

**Bar Graph 4.14: Switching-off-lights as a preferred alternative to using energy efficient bulbs**





#### **4.5.4 Duration used energy efficient bulbs for indoor lighting**

Majority of respondents (68.1%) has used energy efficient bulbs for indoor lighting for less than three years. They are followed by the categories between 4 and 6 years and more than 10 years in second and third position with 21.6% and 6.9% respectively as indicated in Table 4.11. This was designed to indicate the overall period of usage since one became a KPLC customer.

**Table 4.11: Period used energy efficient bulbs for indoor lighting**

<b>Duration</b>	<b>Frequency</b>	<b>Percent</b>
Less than 3 years	79	68.1
Between 4 years and 6 years	25	21.6
Between 7 years and 9 years	4	3.4
More than 10 years	8	6.9
<b>Total</b>	<b>116</b>	<b>100.0</b>

#### **4.5.5 Duration used energy efficient bulbs for outdoor lighting**

Again, in outdoor lighting majority of respondents (71%) have used energy efficient bulbs for less than three years. The categories between 4 and 6 years and more than 10 years in second and third position with 13% and 9% follow them respectively as indicated in Table 4.12. Again, this was designed to show the overall period of usage since one became a KPLC customer.

**Table 4.12: Period used energy efficient bulbs for outdoor lighting**

<b>Duration</b>	<b>Frequency</b>	<b>Percent</b>
Less than 3 years	71	71.0
Between 4 years and 6 years	13	13.0
Between 7 years and 9 years	7	7.0
More than 10 years	9	9.0
<b>Total</b>	<b>100</b>	<b>100.0</b>

**4.5.6 Duration used ordinary bulbs prior to switching to energy saving bulbs for outdoor lighting**

On the other hand in outdoor lighting 40.5% of respondents have used non-energy efficient/ordinary bulbs, prior to switching to energy saving bulbs, in the houses they currently reside for less than three years. They are followed by the categories more than 10 years and between 4 and 6 years in second and third position with 25.4% and 23.8% respectively as indicated in Table 4.13.

**Table 4.13: Duration of using ordinary bulbs for outdoor lighting, prior to brand switching to energy efficient type**

Duration	Frequency	Percent
Less than 3 years	51	40.5
Between 4 years and 6 years	30	23.8
Between 7 years and 9 years	13	10.3
More than 10 years	32	25.4
Total	126	100.0

**4.5.7 Duration used ordinary bulbs prior to switching to energy saving bulbs for indoor lighting**

Meanwhile in indoor lighting 48.1% of respondents have used non-energy efficient/ordinary bulbs, prior to switching to energy saving bulbs, in the houses they currently reside for less than three years. They are followed by the categories more than 10 years and between 4 and 6 years in second and third position with 25.6% and 18.6% respectively as indicated in Table 4.14.

**Table 4.14: Duration of using ordinary bulbs for indoor lighting, prior to brand switching to energy efficient type**

Duration	Frequency	Percent
Less than 3 years	62	48.1
Between 4 years and 6 years	24	18.6
Between 7 years and 9 years	10	7.8
More than 10 years	33	25.6
<b>Total</b>	<b>129</b>	<b>100.0</b>

#### ***4.5.8 Brand-switching behaviour from ordinary bulbs to energy saving bulbs for indoor lighting***

For indoor lighting, brand-switching behaviour from use of non-energy efficient/ordinary bulbs to energy saving bulbs had occurred among 91.3% of the respondents who presently use energy efficient bulbs. On the other hand this did not occur in 8.7% of them as shown in Table 4.15. This was designed to determine to what extent customers use non-energy efficient/ordinary bulbs before switching to the energy saving type.

**Table 4.15: Brand-switching behaviour from use of ordinary bulbs to energy saving bulbs for indoor lighting**

Switched	Frequency	Percent
Yes	126	91.3
No	12	8.7
<b>Total</b>	<b>138</b>	<b>100.0</b>

#### ***4.5.9 Brand-switching behaviour from ordinary bulbs to energy saving bulbs for outdoor lighting***

In outdoor lighting, brand-switching behaviour from use of non-energy efficient/ordinary bulbs to energy saving bulbs was experienced in 87.1% of the customers. Meanwhile this did not occur in 12.9% of them as shown in Table 4.16. Again, this was intended to

indicate to what extent customers experiment with non-energy efficient/ordinary bulbs before switching to the energy saving ones.

**Table 4.16: Brand-switching behaviour from use of ordinary bulbs to energy saving bulbs for outdoor lighting**

Switched	Frequency	Percent
Yes	115	87.1
No	17	12.9
<b>Total</b>	<b>132</b>	<b>100.0</b>

**4.5.10 Comparison of period of using ordinary bulbs before switching to energy efficient bulbs for indoor versus outdoor lighting**

As depicted in Table 4.17, 49 respondents used ordinary bulbs for less than three years before brand switching, followed by 24 who used them for more than 10 years – in both indoor and outdoor lighting. Significant also is the 20 who have used ordinary bulbs for between 4 and 6 years prior to brand switching.

**Table 4.17: Duration of using ordinary bulbs before switching to energy efficient bulbs for indoor versus outdoor lighting**

PERIOD	INDOOR				Total
	less than 3 years	between 4 and 6 years	between 7 and 9 years	more than 10 years	
OUTDOOR less than 3 years	49				49
between 4 and 6 years	5	20			25
between 7 and 9 years		3	9	1	13
more than 10 years	4			24	28
<b>Total</b>	<b>58</b>	<b>23</b>	<b>9</b>	<b>25</b>	<b>115</b>

It is evident from Table 4.18, that 52 fall in the category - less than three years - followed by 11 in the between 4 and 6 years bracket. Notable here also is that, it seems there are fewer customers who have used energy saving bulbs for more than 7 years.

**Table 4.18: Duration of using energy efficient bulbs for indoor lighting versus outdoor**

PERIOD		OUTDOOR				Total
		less than 3 years	between 4 and 6 years	between 7 and 9 years	more than 10 years	
INDOOR	less than 3 years	52	2		3	57
	between 4 and 6 years	7	11	3		21
	between 7 and 9 years			4		4
	more than 10 years	4			4	8
Total		63	13	7	7	90

**4.5.11 Frequency of purchasing energy efficient bulbs for indoor and outdoor lighting**

On frequency of purchasing energy efficient bulbs, 35.5% of customers indicated they undertake this once per year for indoor lighting. 12.1% said they did so every 6 months while another 12.1% purchased under other periods apart from those listed, as shown in Table 4.19.

Similarly, in outdoor lighting most customers (29.1%) responded that they purchased energy efficient bulbs once per year, compared with 12.8% and 9.3% who bought them every 3 months and once a month, respectively (see Table 4.20).

**Table 4.19: Frequency of purchasing energy efficient bulbs for indoor lighting**

Purchase	Frequency	Percent
Once a month	6	5.6
Every 2 months	9	8.4
Every 3 months	10	9.3
Every 4 months	1	0.9
Every 5 months	6	5.6
Every 6 months	13	12.1
Every 7 months	5	4.7
Every 10 months	6	5.6
Once per year	38	35.5
Other	13	12.1
<b>Total</b>	<b>107</b>	<b>100.0</b>

**Table 4.20: Frequency of purchasing energy efficient bulbs for outdoor lighting**

Purchase	Frequency	Percent
Once a month	8	9.3
Every 2 months	6	7.0
Every 3 months	11	12.8
Every 4 months	4	4.7
Every 5 months	3	3.5
Every 6 months	6	7.0
Every 7 months	4	4.7
Every 8 months	4	4.7
Every 9 months	4	4.7
Every 10 months	4	4.7
Every 11 months	3	3.5
Once per year	25	29.1
Other	4	4.7
<b>Total</b>	<b>86</b>	<b>100.0</b>

#### 4.5.12 Purchase volume of energy efficient bulbs for outdoor and indoor lighting

Regarding the purchase volume of energy efficient bulbs, 38.5% of customers indicated they buy 1 bulb in a single purchase for outdoor lighting. This compares with 29.7% and 9.9% who buy 2 bulbs and 3 bulbs, respectively in a single purchase as illustrated in Table 4.21.

On the other hand, for indoor lighting, 31.9% of customers indicated they buy 2 bulbs in a single purchase for outdoor lighting. This compares with 24.8% and 10.6% who buy 1 bulb and 4 bulbs, respectively in a single purchase as illustrated in Table 4.22.

**Table 4.21: Purchase volume of energy efficient bulbs for outdoor lighting**

Volume	Frequency	Percent
1 bulb	35	38.5
2 bulbs	27	29.7
3 bulbs	9	9.9
4 bulbs	8	8.8
5 bulbs	1	1.1
9 bulbs	1	1.1
10 bulbs	6	6.6
More than 10 bulbs	4	4.4
<b>Total</b>	<b>91</b>	<b>100.0</b>

**Table 4.22: Purchase volume of energy efficient bulbs for indoor lighting**

Volume	Frequency	Percent
1 bulb	28	24.8
2 bulbs	36	31.9
3 bulbs	11	9.7
4 bulbs	12	10.6
5 bulbs	10	8.8
6 bulbs	3	2.7
7 bulbs	4	3.5
10 bulbs	8	7.1
More than 10 bulbs	1	0.9
<b>Total</b>	<b>113</b>	<b>100.0</b>

**4.5.13 Comparison of purchase volume of energy saving bulbs and frequency of purchase**

Compared with the volume of purchase, the frequency of purchase is highest under once per year, in the order; 10 customers (1 bulb), 9 customers (4 bulbs) and 8 customers (2 bulbs) as shown in Table 4.23.

**Table 4.23: Frequency of purchase of energy efficient bulbs versus volume of purchase**

FREQUENCY OF PURCHASE	VOLUME OF PURCHASE							
	1 bulb	2 bulbs	3 bulbs	4 bulbs	5 bulbs	6 bulbs	7 bulbs	10 bulbs
once a month			1			2		3
every 2 months		8	1					
every 3 months	4	3						
every 4 months	1							
every 5 months		4	1		1			
every 6 months		6			3	1	3	
every 7 months			1	3	1			
every 10 months		1						5
once per year	10	8	5	9	5		1	
other	6	6						
<b>Total</b>	<b>21</b>	<b>36</b>	<b>9</b>	<b>12</b>	<b>10</b>	<b>3</b>	<b>4</b>	<b>8</b>

#### 4.5.14 Consistency of purchasing energy efficiency bulbs from particular outlets

Among the various shopping outlets, majority of respondents bought energy efficient bulbs from the Supermarket, which had a weighted score of 23.746. Electronics shop and Retail shop/duka were ranked second and third with a weighted score of 5.378 and 4.123 respectively as shown in Table 4.24.

**Table 4.24: Frequency/consistency of purchasing energy efficiency bulbs from particular outlets**

Ranking	Supermarket	Retail Shop	Electronics Shop	Kiosk	Other
First	22.59	0.024	2.184	0.044	
Second	1.12	2.349	2.52	0.07	
Third	0.024	1.75	0.63	0.72	
Fourth	0.012		0.044		
Fifth					0.044
<b>WEIGHTED SCORE</b>	<b>23.746</b>	<b>4.123</b>	<b>5.378</b>	<b>0.834</b>	<b>0.044</b>

#### 4.5.15 Reasons underlying preference for purchasing energy efficient bulbs from particular outlets

Among the reasons underlying preference for or credibility of purchasing energy efficient bulbs from particular outlets, Availability of other goods/services in/near the same outlet ranked first with a weighted score of 9.578. It was followed by Proximity to home and Moderate pricing which had a weighted score of 2.750 and 1.807 respectively as illustrated in Table 4.25.



**Table 4.25: Reasons underlying preference for purchasing energy efficient bulbs from particular outlets**

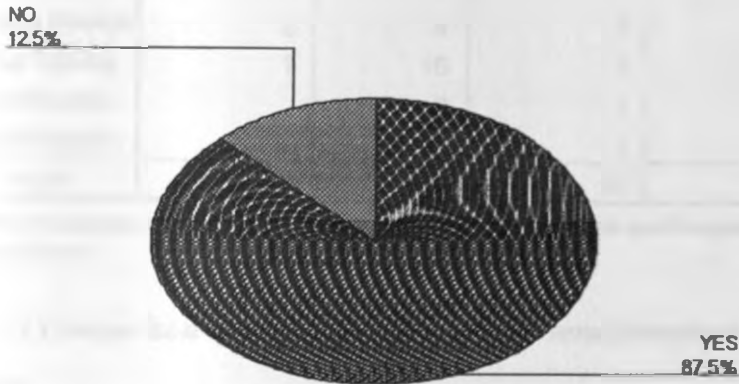
Reason	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth	Eleventh	WEIGH- TED SCORE
Proximity to Home	1.342	0.900	0.341	0.102	0.024	0.012	0.029					2.750
Proximity to Work	0.720	0.280	0.176	0.102	0.044	0.003	0.003		0.003			1.331
Availability of other goods/ services	6.157	3.230	0.176	0.012	0.003							9.578
Up market Status	0.044	0.176	0.176	0.102	0.044	0.012	0.024	0.003	0.003			0.584
High Pricing of Goods in the Outlet		0.012	0.044	0.024	0.003	0.003	0.003	0.024		0.044		0.157
Moderate Pricing	0.799	0.225	0.630	0.012	0.102	0.024	0.012	0.003				1.807
Low Pricing	1.007	0.012	0.225	0.024	0.070	0.024	0.012	0.024				1.398
Tidiness of the Outlet	0.012	0.044	0.176	0.070	0.003	0.012	0.012	0.024	0.003			0.356
Internal Decor		0.003		0.044		0.003	0.003		0.003	0.009	0.003	0.068
Courtesy		0.044	0.176	0.012	0.012		0.176		0.003	0.003		0.426
Other	0.012	0.003	0.003			0.003					0.012	0.033

**4.5.16 Extent of realisation of benefits from using energy efficient bulbs**

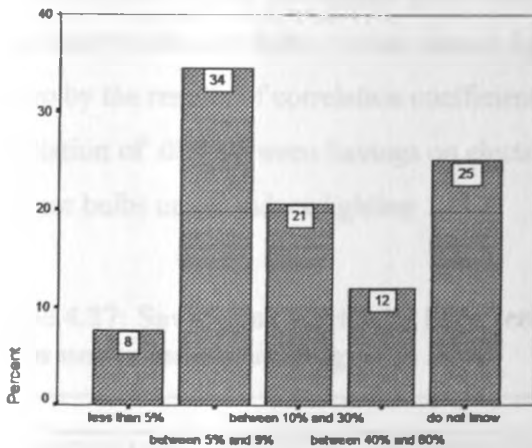
Regarding realisation of benefits (i.e. energy and money savings) touted most frequently by energy efficiency messages, a high majority of customers (87.5%) showed that they have realised savings in their electricity bills by using energy efficient bulbs. As depicted in Pie Chart 4.7, this compares with the small number (12.5%) who said they had not realised any savings at all. On the other hand, when prodded further to try and estimate

the amount of savings they had realised in their monthly electricity bills by using energy efficient bulbs, majority (34%) indicated that they have achieved Between 5% and 9%. As illustrated in Bar Graph 4.15, 25% said they did not know if they had achieved any savings while 21% had realised savings of Between 10% and 30%.

**Pie Chart 4.7: Extent of realisation of benefits**



**Bar Graph 4.15: Amount of savings realised by using energy efficient bulbs**



**4.5.17 Comparison of number of rooms in main house versus level of savings realised**

A comparison of the number of rooms the respondents' main houses had and the level of savings realised on electricity bills shows that the latter tended to increase with the number of rooms. As illustrated in Table 4.26, among those who achieved savings of Between 5% and 9%, 16 had Four rooms, while 12 had Eight rooms. Furthermore, among

those who achieved savings of Between 10% and 30%, 7 had Eight rooms, whereas 6 had Four rooms.

**Table 4.26: Number of rooms versus percentage savings realised**

ROOMS IN MAIN HOUSE	SAVINGS				
	less than 5%	between 5% and 9%	between 10% and 30%	between 40% and 60%	do not know
One Room	3	1	3		
Two Rooms	1	4		4	5
Three Rooms	2	4	4		
Four Rooms	1	16	6	3	9
Five Rooms		3	4		3
Eight Rooms	2	12	7	4	12
Total	9	40	24	11	29

NB: For purposes of coding in SPSS, an average of "Eight Rooms" was used to represent the response "More than Five Rooms"

#### 4.5.18 Comparison of level of savings realised versus duration of using energy efficient bulbs

While still using the Savings on electricity bills attribute, a comparison was undertaken to establish if there is any meaningful relationship between this variable and Duration of using energy efficient bulbs – under indoor lighting and under outdoor lighting. As shown by the results of correlation coefficient in Table 4.27, there is a positive but weak correlation of .089 between Savings on electricity bills and duration of using energy efficient bulbs under indoor lighting.

**Table 4.27: Savings on electricity bills versus duration of using energy efficient bulbs under indoor lighting**

		DURATION	SAVINGS
Spearman's rho	DURATION	Correlation Coefficient	1.000
		Sig. (2-tailed)	.089
		N	116
	SAVINGS	Correlation Coefficient	.089
		Sig. (2-tailed)	.368
		N	105

Further results of correlation coefficient, reveal that there is a negatively weak correlation of  $-.012$  between Savings on electricity bills and Duration of using energy efficient bulbs under outdoor lighting (see Table 4.28).

**Table 4.28: Savings on electricity bills versus duration of using energy efficient bulbs under outdoor lighting**

		SAVINGS	DURATION
Spearman's rho	SAVINGS	Correlation Coefficient	1.000
		Sig. (2-tailed)	.911
		N	120
	DURATION	Correlation Coefficient	-.012
		Sig. (2-tailed)	.911
		N	90

When taken further, the positive but weak correlation established between Savings on electricity bills and Duration of using energy efficient bulbs under indoor lighting, shows that more customers tend to have realised savings of between 5% and 30% in less than three years of using energy efficient bulbs as shown in Table 4.29.

**Table 4.29: Percentage savings realised versus duration of using energy efficient bulbs in indoor lighting**

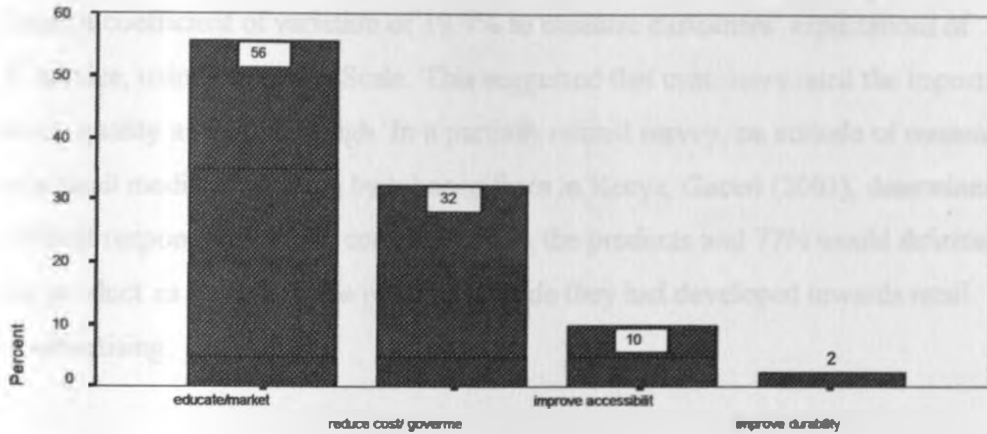
PERCENT SAVING	DURATION				Total
	less than 3 years	between 4 and 6 years	between 7 and 9 years	more than 10 years	
less than 5%	7	1	1		9
between 5% and 9%	22	7	2	6	37
between 10% and 30%	12	10		1	23
between 40% and 60%	10	4			14
do not know	18	2			20
Total	69	24	3	7	103

#### **4.6 Suggestions, opinions and comments on energy saving bulbs**

From the open-ended questions, which sought suggestions, opinions or comments regarding energy saving bulbs - irrespective of whether one uses them or not - the need to educate customers about their benefits as well as marketing of energy saving bulbs was cited by 56% of the respondents. The need to reduce the cost of the bulbs or have it subsidized by the government was also suggested by 32% of the customers. Other

suggestions made were the need to improve accessibility to and availability of the bulbs in distribution outlets (10%) and the need to improve their durability (2%) (see Bar Graph 4.16).

**Bar Graph 4.16: Suggestions, opinions and comments on energy saving bulbs**



#### ***4.7 Overall attitude in believability/credibility of energy efficiency messages in lighting***

To determine the overall attitude towards energy efficiency messages in lighting, the ‘Overall attitude as an objective’ model was adapted. According to this hypothetical model a range of attitudes can be identified for a brand that has been on the market for a certain period (Batra et. al. 2003). In this case, the Likert Scale was used to measure the combined effect of past/current energy efficiency messages from institutional/personal sources on the overall attitude of KPLC customers in Nairobi. The focus was believability and credibility of the messages. Means of the scores of the Likert Scale were used to determine the weighting factor of the importance attached to the attitude dimension/variable on believability/credibility of past energy efficiency messages.

As illustrated in Bar Graph 4.17, five attitude segments were identified related to energy efficiency, ranging from those holding strong negative attitudes, through those holding neither positive nor negative attitude to those holding strong positive attitudes. A standard deviation of 1.03 and a grand mean of 3.9 were established, implying that customers rate as significantly high the attitude dimension/variable on believability/credibility of past/current energy efficiency messages. This was confirmed by the relatively low coefficient of variation of 26.4%, which implies that the extent of

agreement by different categories of respondents with respect to the attitude variable on believability/credibility of energy efficiency messages, was ranked as relatively high.

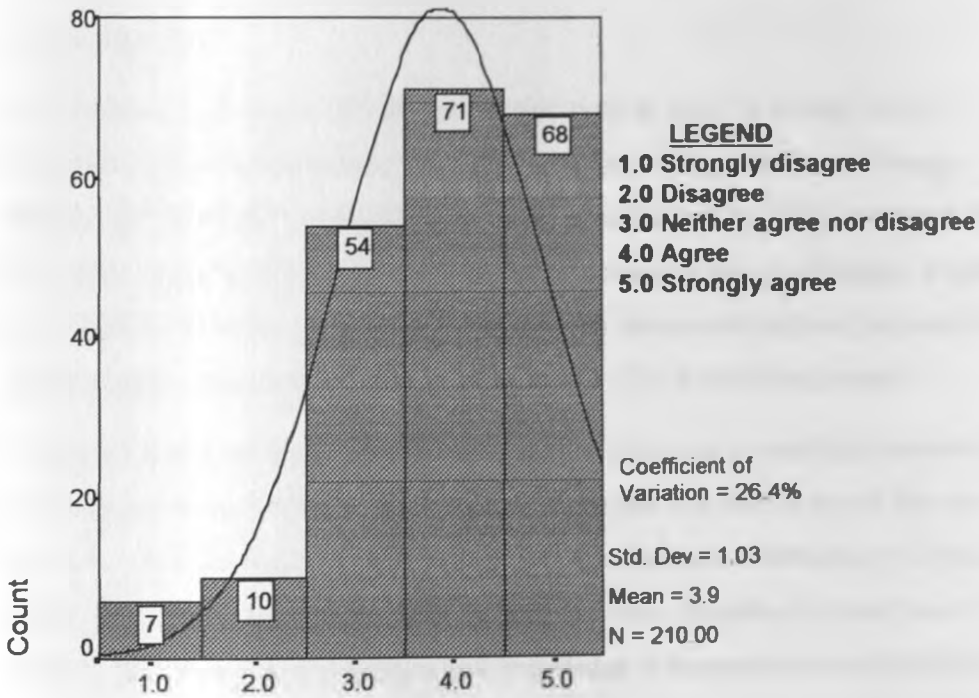
In a partially related study on customers perception of service quality in a decentralised system in the public utility sector in Kenya, Njoroge (2003), obtained a grand mean of 4.332 and a coefficient of variation of 19.4% to measure customers' expectations of KPLC service, using the Likert Scale. This suggested that customers rated the importance of service quality as relatively high. In a partially related survey, on attitude of consumers towards retail media advertising by tobacco firms in Kenya, Gaceri (2003), determined that 95% of respondents would consider buying the products and 77% would definitely buy the product as a result of the positive attitude they had developed towards retail media advertising.

#### ***4.8 Summary of findings***

The results of measuring attitudes among KPLC customers towards energy efficiency messages in lighting, have been presented in the context of cognitive, affective and behavioural components (ABC/Tricomponent Model of Attitude), in accordance with the objectives of this study. Key among the findings, is that on overall attitude, customers rate as positive and significantly high the attitude variable on believability/credibility of past/current energy efficiency messages as indicated by the standard deviation, grand mean and coefficient of variation. Significant also is that 92% of customers in Nairobi have heard about energy saving bulbs and 97% of them are willing to learn more about the bulbs.

It was also ascertained that the primary attributes influencing positive attitudes towards energy efficiency messages as well as subsequent positive behaviour, are Savings on electricity bills followed by Long Life and Brightness of energy efficient bulbs. On the contrary, the leading attributes associated with negative attitudes on the same are that the bulbs are Too expensive followed by Lack of understanding about their benefits and Lack of believability in their benefits.

**Bar Graph 4.17: Overall attitude in believability/credibility of energy efficiency messages in lighting**



## CHAPTER 5

### DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Introduction

It is necessary to promote efficient use of electricity in order to benefit various stakeholders such as customers, electricity companies and governments. Energy efficiency promotional messages, occasionally disseminated by KPLC and a few NGOs in the past, targeting domestic customers have focused on energy efficiency in lighting, among other activities. In Kenya, lighting for both indoor and outdoor purposes forms a significant portion of electric energy usage for KPLC's domestic customers.

To gauge the effectiveness of these messages it is important to establish customer attitude towards such energy efficiency promotional messages. The overall aim of this study therefore was to determine the attitude of KPLC's domestic customers in Nairobi towards electric energy efficiency messages in lighting activities. Specific objectives were: To establish awareness, comprehension and knowledge of domestic customers on efficient use of electricity in lighting (i.e. cognitive component); to ascertain the liking and preference for energy efficiency in lighting among domestic customers (i.e. affective component); and to determine intentions, behaviour, trials and purchases by domestic customers on efficient use of electricity in lighting (i.e. conative component). Discussions arising from the findings derived under these objectives are presented in this chapter, using the ABC/Tricomponent Model of Attitude.

#### 5.2 Discussions

##### 5.2.1 *Cognitive component of attitude*

It can be argued that the 92% level of awareness about energy efficient bulbs among domestic customers in Nairobi suggests that this variable of the cognitive component of attitude is significantly high. As pointed out earlier, this does not necessarily imply a high detailed knowledge about the bulbs given that about 56% of the respondents suggested that education and marketing of the bulbs should be increased. This is fairly consistent



with the findings of a KPLC/ESBI research on Demand Side Management (2004), which suggested that 83% of domestic customers felt they did not have enough information about energy saving. In addition, in this particular study, 22.5% of customers who use energy efficient bulbs displayed lack of brand awareness about them.

The results on level of awareness, are comparable to the KPLC/ESBI research on Demand Side Management (2004), whose focus was actual usage patterns, overall energy efficiency measures used, as well as general level of energy efficiency awareness among electricity customers countrywide, which found that 49% of domestic customers had heard of energy efficiency practices whereas 51% had not. This awareness level applied to all domestic activities and the study did not address fully the area of lighting, which as already mentioned forms the bulk of electricity domestic usage. A further comparison can be drawn with a partially related survey conducted by Gaceri (2003), on attitude of consumers towards retail media advertising by tobacco firms in Kenya. The survey established that majority of respondents (90%) are aware and recognise the presence of this form of advertising in the outlets studied, while only 10% did not.

It should also be noted that, in this particular study, the awareness variable of the cognitive component can be further boosted by the high willingness (97%) to learn more about energy saving bulbs. This suggests favourable or positive feelings towards them as already indicated that 168 out of 177 respondents who are aware would also like to learn more about the bulbs. This implies that related marketing strategies in future should take into account such positive aspects of present attitude. The research questionnaire sought to measure each of the two variables (Awareness and willingness to learn more) among all the respondents irrespective of if they use energy saving bulbs or not, hence the likelihood of a high degree of reliability in making inferences related to both variables.

For those who use energy efficient bulbs, it can be argued that there is a reasonably high brand recall and awareness – when combined for all the brands – at approximately 70%. Meanwhile the remaining 30% who do not know or do not remember the brands they use should still be an area of concern in future marketing initiatives.

Communication or promotion, as is generally the practice in marketing, was found to have influenced attitude to energy efficiency in lighting in various ways. Out of the

Communication channels used to disseminate energy efficiency messages, Word-of-mouth consistently plays a leading role in terms of instilling positive attitude in customers thus positively influencing purchase decisions of energy saving bulbs. As mentioned earlier, as a channel of communication it is ranked first by 22.6% of respondents while in believability/credibility it leads with a weighted score of 3.729. Newspapers and Magazines followed it with 17.3% and 10.3% respectively in leading communication channels, whilst in believability/credibility Newspapers and Bulb Package followed it with a weighted score of 3.222 and 0.908 respectively.

Again in terms of recent exposure to energy efficiency messages through various communication channels, majority experienced it through Word-of-mouth (weighted score 44.520) between 10 – 12 months ago. This was followed by Newspapers whose majority (weighted score 38.369) had exposure over 1 year ago and Bulb package whose majority (weighted score 24.645) exposure occurred between 10 – 12 months ago. Gaceri (2003), also ascertained that packaging of the product ranked foremost (62.9%) among other advertising media tools that customers considered as extremely important and therefore influenced their attitudes. According to Lucas (1963), there is a potential direct causal link between the 'attitude towards an advertising media' and 'attitude and behaviour' toward a brand. It can, therefore be argued that customer attitude towards Word-of-mouth, Newspapers, Magazines, and Bulb package as the leading channels in communication, believability and recent exposure, impact positively on shaping customer attitudes towards energy efficiency messages in lighting.

A further comparison using the KPLC/ESBI research on Demand Side Management (2004), indicated that leading channels of energy efficiency messages for domestic customers are; Friends/family/relative – combined and equivalent of word of mouth (22%), Newspaper/magazine/books (19%) and Radio (19%). The study cautioned that it did not include an examination of communication channels used by KPLC and the effect of the same hence, no conclusion could be drawn. There is apparent consistency between the findings of the KPLC/ESBI research and this particular study on the leading importance of Word of mouth, Newspapers and Magazines. Similarly, notwithstanding the ranking for TV in both studies (third in the KPLC/ESBI research and fifth in this study), the percentage of respondents who learnt about energy efficiency through it was

about 7% in both studies. However there is apparent inconsistency in Radio which in this study was ranked seventh. As mentioned earlier, the scope and objectives of both studies were different in some aspects, hence the similarities and dissimilarities.

### ***5.2.2 Affective component of attitude***

According to Schiffman et. al. (1992), attitude formation and changes are influenced by sources of information, among other factors. In terms of believability/credibility of energy efficiency messages from various institutional/personal sources, KPLC was ranked first on the Likert Scale with a weighted score of 35.601, followed in second and third place by Friend/relative/colleague and Bulb manufacturer, (with a weighted score of 29.655 and 27.575 respectively). When probed further with an unstructured question, it was revealed that this strong endorsement of KPLC was because many customers view the organisation as the 'expert' in electricity matters and also expect it as the supplier of electricity to be the source of most energy efficiency messages.

For probably the same reasons, KPLC was ranked the most preferred and most believable source for dissemination of future energy efficiency messages among institutional and personal sources, followed by Ministry of Energy and Friend/relative/colleague, as shown earlier. This favourable dispensation towards KPLC is also reflected in willingness to buy energy saving bulbs branded by KPLC and from KPLC customer service offices. As shown in Table 4.9, 114 out of 170 customers responded favourably.

Furthermore, this high level of interest in the possibility of using KPLC branded energy efficient bulbs indicates the extent to which bulbs produced with KPLC involvement would influence believability, credibility and usage of energy efficient bulbs. Similarly, the substantial level of interest in the prospects of purchasing energy efficient bulbs (whether KPLC branded or not) from a KPLC office/distribution outlet demonstrates the extent to which bulbs retailed through KPLC offices would influence purchase decisions, believability, credibility and usage of energy efficient bulbs. However this should also be viewed against the finding that the current practice is to purchase the bulbs from Supermarket, Electronics shop and Retail shop in this ranking order.

Batra et. al. (2003), argue that there is a relationship between attitude toward an advertising message and attitude toward the brand, in such a way that attitude toward an advertisement affects brand choice as well and a positive attitude toward an advertisement also improves the recall of the advertised material. In this regard, Gaceri (2003), ascertained that, attractiveness (57%) and colours used (22%), are the leading factors customers considered in retail media advertising hence influencing positive attitudes in them. In an attempt to determine the effectiveness, believability, credibility and positive influence of message content/design that resulted in positive attitudes hence purchase of energy efficient bulbs, this study established that Verbal content was the leading variable in the most influential energy efficiency messages disseminated. As illustrated in Bar Graph 4.8, it recorded the highest weighted score followed by Written content and Logo. The fact that Verbal content was ranked the leading variable followed by Written content and Logo is quite consistent with the finding discussed earlier that Word-of-mouth, Newspapers/Magazines, and Bulb package are the leading channels in communication, believability and recent exposure, and hence impact positively on shaping customer attitudes towards energy efficiency messages in lighting. The three 'message content variables' are contained in messages relayed via the 'three channels' respectively.

The Classical conditioning theory posits that an originally neutral stimulus, such as the brand name of a new product, can produce a favourable or unfavourable attitude if it is repeatedly followed by or associated with some kind of negative or positive reinforcement (Schiffman et. al. 1992). Related to this, Gaceri (2003), determined that; names used (37%), colours used (34%) and symbol used (25%), are the retail media advertising factors customers closely associate with the brand thus inducing positive attitudes in them. In this particular study, in terms of reinforcing positive attitudes towards energy efficiency messages as well as subsequent positive behaviour, Savings on electricity bills followed by Long Life and Brightness of energy efficient bulbs are the leading attributes as discussed earlier. The three can therefore be considered as powerful attributes that have been associated with positive attitudes towards energy efficiency messages and subsequent practices. Conversely, and as discussed earlier, strong attributes that have been associated with negative attitudes to energy efficiency messages and hence

lack of positive response or non-usage of energy efficient bulbs by customers, is the pricing of the bulbs which is Too expensive followed by Lack of understanding about their benefits and Lack of believability in their benefits. To be effective, future marketing strategies in energy efficient bulbs should therefore take into account these negative and positive attributes.

The fact that Savings on electricity bills is a leading attribute that induces positive attitudes in energy efficiency messages, was corroborated by the high majority of customers (87.5%) who indicated that they had realised savings in their monthly electricity bills by using energy efficient bulbs. When compared with the number of rooms the respondents' main houses had, the level of savings tended to increase with the number of rooms. As illustrated in Table 4.26, among those who achieved savings of Between 5% and 9%, 16 had Four rooms, while 12 had Eight rooms. Furthermore, among those who achieved savings of Between 10% and 30%, 7 had Eight rooms, whereas 6 had Four rooms. It can be speculated that customers with more rooms consume more electricity and are therefore more likely to be induced by energy saving messages in order to reduce related costs. But this argument is invalidated to some extent by the results of Table 4.26, which also indicate that the leading in the band of those who Do not know if they have realised any savings at all, are those with more rooms – 12 with Eight rooms and 9 with Four rooms.

The positive but weak correlation established between Savings on electricity bills and Duration of using energy efficient bulbs under indoor lighting, shows that more customers tend to have realised savings of between 5% and 30% in less than three years of using energy efficient bulbs as shown in Table 4.29. It can therefore be argued that to some extent this intimates positive attitude towards energy efficiency messages and use of the bulbs and that these customers do not experience cognitive dissonance in the initial stages of using the product. This is validated by the earlier finding that majority of customers (87.5%) have realised savings in their electricity bills by using energy efficient bulbs.

### *5.2.3 Conative component of attitude*

According to Schiffman et. al. (1992), the primary means by which attitudes about a brand are formed is through the direct experience of trying and evaluating it. The conative component of attitude therefore involves the consumer's tendency to act toward an object, which is often measured in terms of intention to buy (Assael, 1998). A comparison of brand-switching behaviour from non-energy efficient/ordinary bulbs to energy saving bulbs between indoor and outdoor lighting shows that most customers use ordinary bulbs for less than three years, prior to switching to energy saving bulbs. As depicted in Table 4.17, 49 respondents used ordinary bulbs for less than three years before switching, followed by 24 who used them for more than 10 years— in both indoor and outdoor lighting. Significant also is the 20 who have used ordinary bulbs for between 4 and 6 years.

On the other hand a comparison of duration of using energy saving bulbs between indoor and outdoor lighting reveals that most customers have used the bulbs in both activities for less than three years. It is evident from Table 4.18, that 52 fall in this category followed by 11 in the between 4 and 6 years bracket. Worth noting also is that, it seems there are fewer customers who have used energy saving bulbs for more than 7 years. Possible reasons for this are; the bulbs have been in the market for a shorter period; previous awareness creation has been low as mentioned earlier, and unlike in the period upto the mid-1990s when electricity tariffs were comparatively cheaper, rising costs in recent years may have induced customers to respond more proactively and positively towards energy efficiency measures. According to the KPLC Schedule of Tariffs and Rates (2000), the last tariff increase was effected in May 2000. Besides the fixed tariffs, fuel cost adjustment, foreign exchange rate fluctuation adjustment, taxes and levies, have been factored in the bill, thereby escalating the pricing even further.

The customer brand usage periods established in this study are comparable with those of respondents in the survey conducted by Gaceri (2003), which found that 43% had used the brand between 1 to 5 years, 30% between 11 to 15 years and 11% between 21 to 30 years. In both studies it is apparent that majority of brand users fall in the period between 1 to 5 years and there is a tendency for the number of users to decrease in subsequent

years. This may imply that the brands in both studies are mainly used by relatively younger people (probably 25 to 49 years old) who constitute the majority in the Kenyan market, while the older people (50 years and above) are comparatively fewer, hence comprising a smaller market segment – with a longer brand usage period.

The results of Table 4.17 and Table 4.18 imply that brand-switching behaviour from ordinary to energy saving bulbs (in indoor and outdoor lighting) for most KPLC customers occurs within less than three years after recruitment. There is also a sizeable number who fall in the more than 10 years bracket. This suggests that most customers only adapt to energy saving bulbs after going through the experience of using the ordinary type for about three years or less. This change in behaviour/attitude is probably engendered by the excruciating experience of paying high power bills that is associated with the ordinary bulbs. The savings attribute in energy efficient bulbs therefore acts as a stimulus for the change. Meanwhile the sizeable number who have taken more than 10 years to change may be explained by the comparatively cheaper electricity tariffs that prevailed 10 years ago, hence lack of a strong stimulus for brand-switching then.

Schiffman et. al. (1992), argue that an attitude is relatively consistent with the behaviour it reflects. Consequently, the frequency of consistently displaying a particular behaviour towards energy efficiency messages and related practices, may to some extent help to determine positive attitude where frequency is high. Viewed against volume of purchase, the frequency of purchase is highest under once per year, in the order; 10 customers (1 bulb), 9 customers (4 bulbs) and 8 customers (2 bulbs) as shown in Table 4.23. This finding is fairly consistent with the attribute Long Life of energy saving bulbs, which as already seen was ranked second among reasons for positive attitude to energy efficiency messages and subsequent practices. Furthermore, as discussed earlier, owing to the long durability of energy saving bulbs, their replacement periods and hence purchase intervals are generally likely to be yearly rather than shorter periods.

The high frequency of and preference for purchasing energy efficient bulbs from Supermarket, Electronics shop and Retail shop in this ranking order, as already established, suggests the positive attitudinal feelings associated with these outlets. Batra et. al. 2003, explain that brand personality associations create a composite image of a

brand that defines its personality. In her study, Gaceri (2003), concluded that the leading reasons why customers visit retail outlets are atmosphere and image (45%), convenience (28%) and location (27%). This conforms in some respects with the findings of this study where it can be argued that Supermarket as a brand has transferred its positive associations to energy saving bulbs, explaining why it is their leading distribution outlet. The positive association transferred to energy saving bulbs from Supermarket is - Availability of other goods/services in/near the same outlet - which as seen earlier, is the foremost reason for purchasing the bulbs from this distribution point. Future marketing strategies for energy saving bulbs should therefore take these factors into account, particularly the possibility of cluster marketing given the high preference for customers to buy the bulbs in retail outlets where other goods and services exist. Similarly, retail media advertising for the bulbs as well as advertising concepts aligned with a setting in such outlets would be effective promotional strategies.

### **5.3 Conclusions**

As already discussed, in assessing the overall attitude towards energy efficiency messages in lighting, the 'Overall attitude as an objective' model was adapted. The standard deviation and a grand mean obtained, implied that customers rate as significantly high the attitude dimension/variable on believability/credibility of past/current energy efficiency messages. This was further confirmed by the relatively low coefficient of variation derived.

As is evident from the findings discussed, the majority of customers who have been exposed to energy efficiency messages Agree that the message is convincing, followed by those who Strongly agree, Neither agree nor disagree, Disagree and Strongly disagree. These results conform to some extent with the Overall attitude as an objective model (Batra et. al. 2003), with respect to the proportion of those holding 'very strong' and 'strong' negative attitudes as well as those holding slight tendencies in 'either direction' or 'no predisposition one way or another.' However there is apparent discordance in those holding 'very strong' and 'strong' positive attitudes.



This notwithstanding, it can be concluded that the majority who fall under those with 'very strong' and 'strong' positive attitudes represent relatively heavy users who have become satisfied with the energy efficiency messages in lighting and are strongly loyal to them as well as energy saving bulbs. Attitude in this case is a measure of brand loyalty and this group expressed strong positive feelings to back up their behaviour and purchasing patterns. Also significant to some extent is those holding slight tendencies in 'either direction' with respect to energy efficiency messages. Some in this segment may be aware about the existence of energy efficiency bulbs but be so involved in purchasing with respect to the product class that no meaningful direction of predisposition exists, hence the need to target them for future marketing campaigns. For the few who hold 'very strong' and 'strong' negative attitudes it can be argued that they represent a small group of buyers who probably confine their purchases to competitive brands in the product class and reject energy saving bulbs. These bulbs therefore are not in their consideration class or evoked set of alternatives from which they make a choice, even though they are aware about them. Their lighting needs are sustained by competitors (i.e. ordinary bulbs) and their negative attitudes are based on a host of reasons, chief among them the high cost of energy efficient bulbs as observed earlier. However, they still represent a relevant target for future marketing campaigns.

Related to this segment are those who may or may not have been exposed to energy efficiency messages, and likewise do not use energy saving bulbs. Whereas they may or may not be maintaining negative attitudes towards energy saving bulbs, they demonstrated strong positive attitudes in their high preference towards alternative energy efficiency messages in the form of switching-off-lights instead of using energy efficient bulbs. The high majority who said that they practice this form of conservation as opposed to only a few who said they do not, is fairly consistent with the findings of a KPLC/ESBI research on Demand Side Management (2004), which established that of those who had heard of energy efficiency, the highest scoring practice was switching-off-lights and appliances. The study partly attributed this to the frequent messages disseminated by KPLC emphasizing that customers conserve energy by switching off lights not in use, during the 1998-2000 power-rationing programme. It therefore recommended that customers should be well educated on a continuous basis by providing positive messages

on good energy efficiency practice and the use of energy saving products, with less emphasis on switching off.

It can be speculated in this particular study that, as already confirmed by its findings, other possible reasons for the behaviour of switching-off-lights as opposed to using energy efficient bulbs are the high cost of the bulbs and lack of detailed knowledge about their benefits. The high preference for switching-off-lights and reasons behind the behaviour should also be factored in future marketing campaigns.

#### **5.4 Recommendations**

The following key recommendations pertaining to this study can be made:

Whereas the concept and practice of efficient use of energy is quite strongly promoted and established more in developed countries of Europe and North America, there is need to address many of the impediments to energy efficiency in developing countries associated with lack of promotion or communications, cost of energy efficient appliances and attitude towards the concept, among others. In the case of lighting activities in Nairobi, the positive customer attitude components demonstrated, such as the high willingness to learn more about energy saving bulbs, should be used as a solid basis for future marketing initiatives about the concept.

In addition to improving customer services, as KPLC, ERB and other stakeholders plan to undertake Energy Demand Management Programmes that will assist customers to manage their power demands, increase efficiency of use, and hence reduce their electricity costs, related customer attitudes and perceptions established in this study will need to be taken into account. Key among these, are the reasons cited for negative attitude to energy efficiency messages and hence lack of positive response or non-usage of energy efficient bulbs, leading among them, the pricing of the bulbs which is Too expensive followed by Lack of understanding about their benefits and Lack of believability in their benefits.

Related to this, an integrated strategy by the various stakeholders in carrying out energy efficiency promotions would be desirable unlike the present situation where there seems

to be a disjointed approach. Marketing issues raised in this study, such as pricing of energy saving bulbs, distribution outlets and channels of communication, require a joint approach by the electricity supplier, government, the power sector regulator, NGOs, bulb manufacturers and bulb retailers among others, in order to address them effectively.

For KPLC, the finding that brand-switching behaviour from ordinary to energy saving bulbs (in indoor and outdoor lighting) for most customers occurs within less than three years after recruitment, has important implications for its current market share expansion strategy to connect 150,000 new customers annually. To avoid new customers initially going through the painful and expensive experience of using ordinary bulbs - thereby suffering cognitive dissonance, a strong component of promoting energy efficiency practice should be incorporated in the customer creation drive. Energy saving bulbs can in this case be positioned as a 'recruiting brand' for new KPLC domestic customers.

When designing future marketing messages on energy efficiency bulbs in the home, priority and relevant target audiences should be the husband and wife. As discussed earlier, it was established that decision-making and subsequent purchase of all types of bulbs (ordinary and energy saving), was made in this ranking order.

## **LIMITATIONS OF THE STUDY**

The effect of those who did not respond to certain sections of the questions in the questionnaire is ignored, for instance when discussing the frequency tables.

The results of some questions should first be viewed independently given that some were applicable to users of energy efficient bulbs only, non-users or both. The effect of this is that the statistical proportion of responses would be higher for those answered by both groups compared to those relevant to a single group.

Some findings, such as savings on monthly electricity bills, may be subjective, perceptual and based on approximations done by the respondents. They are not to be taken as highly reliable and would require to be subjected to further technical measurements, probably using meter readings, to ascertain the correct amount. The likelihood of respondents having been subjective in the overall results cannot be ignored.

The study did not consider demographic factors such as income levels, employment and education, which may also have an effect on the results. As mentioned earlier, the target population of domestic customers was taken to be homogeneous in terms of KPLC's customer segmentation.

## **SUGGESTIONS FOR FURTHER RESEARCH**

Given that the overall objective of this study was to determine the attitude of KPLC's domestic customers in Nairobi towards electric energy efficiency messages in lighting activities, the limitations already pointed out present knowledge gaps that can be filled by future studies in the following areas:

Further research can be done using the same objectives but covering other electricity domestic usage activities such as food refrigeration, cooking, water heating, ironing and laundering. These have also been targetted by past energy efficiency promotions.

Similarly, by employing the same objectives, additional studies can be undertaken to cover other KPLC geographic regions such as Coast, West Kenya and Central Rift, to compare customer attitude patterns towards electric energy efficiency messages in lighting.

In addition, the same approach can be adopted to study other KPLC customer categories such as Small Commercial; Medium Commercial and Industrial; and Large Commercial and Industrial.

Using the same target population and objectives in this particular study, further research could be conducted based on classification of customers by their demographic factors such as income levels, employment and education.

The issue of cost of energy saving bulbs impacting negatively on customer attitudes towards energy efficiency messages can be subjected to further studies with a view to determining a suitable pricing structure that will induce positive attitudes and improve usage.

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## APPENDIX A (i): INTRODUCTION LETTER

James Njuguna  
P.O. Box 30099,  
Nairobi

8 June, 2004

Dear Sir/Madam,

**RE: Study on "Attitude of electricity customers towards energy efficiency messages in lighting activities: The case of KPLC's domestic customers in Nairobi."**

Good morning/afternoon/evening.

My name is James Njuguna. I am an MBA student at the University of Nairobi. I am undertaking a study, for my MBA course on "Attitude of electricity customers towards energy efficiency messages in lighting activities: The case of KPLC's domestic customers in Nairobi."

The research is intended to generate information that will be used in understanding customer attitude towards energy efficiency in both indoor and outdoor lighting. It will offer practical solutions to developing relevant policies by KPLC, Manufacturers/Suppliers of lighting appliances, Government and relevant NGO's regarding energy efficiency in the area of lighting.

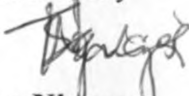
You have been selected to be part of the sample for the study by virtue of being an electricity customer. Kindly find time and answer the following questions to the best of your knowledge. The information you provide shall be treated in STRICT CONFIDENCE and shall be used for statistical purposes only in this research.

Should you require to contact me please do so using the address below.

**James Njuguna**  
**P.O. Box 30099,**  
**Nairobi**  
**Stima Plaza 4<sup>th</sup> Floor, Kolobot Rd, Parklands.**  
**Telephone: 243366 Ext. 5478, 0733601344**  
**Email: [ijnuguna@kplc.co.ke](mailto:ijnuguna@kplc.co.ke)**

Thank you in advance.

Yours sincerely



**James Njuguna**

## APPENDIX A (II): QUESTIONNAIRE

### PART A

Customer /Respondent Name (in full) <i>(optional)</i>	
KPLC Account No. <i>(optional)</i>	
Telephone No. <i>(optional)</i>	
Postal Address <i>(optional)</i>	
Physical Address: <i>(optional)</i>	Residential Estate: Road:

1. Marital Status (tick one) *(optional)*:

Married	
Single	
Divorced	
Widowed	

2. Are you currently living with your spouse in the house you reside in? (tick where applicable)

**Yes** **No**

3. How many people do you normally live with continuously in your house? (tick where applicable)

**Children:**

1	
2	
3	
4	
5	
More than 5	

**Relatives (exclude spouse):**

1	
2	
3	
4	
5	
More than 5	

**Friends:**

1	
2	
3	
4	
5	
More than 5	

**Househelps/gardeners:**

1	
2	
3	
More than 3	

4. How long have you used electricity for both indoor and outdoor lighting in the house you are currently residing? (tick one)

Less than 3 years	
Between 4 years and 6 years	
Between 7 years and 9 years	
More than 10 years	

5. How many rooms does your main house have? (these include, bedrooms, sitting room, dining room, study, etc)

1	
2	
3	
4	
5	
More than 5	

6. How many rooms does your servants quarters/any other extension have? (answer only if applicable)

1	
2	
3	
4	
5	
More than 5	

7. How many lighting points or bulb points do you have already installed for indoor lighting in your house?

Less than 3	
Between 4 and 6	
Between 7 and 9	
More than 10	

8. How many lighting points or bulb points do you use daily for indoor lighting in your house?

Less than 3	
Between 4 and 6	
Between 7 and 9	
More than 10	

9. Approximately, for how long do you ordinarily have your indoor lights switched on daily in the following rooms? (tick where applicable)

	Bedrooms	Sitting Room	Kitchen	Bathroom/toilet	Study Room	Laundry Room	Other (specify)
1 hour							
2 hours							
3 hours							
4 hours							
5 hours							
More than 5 hours							

10. For each of the following activities indicate the approximate period you use indoor lighting (tick where applicable)

	Reading/Children's Homework	Cooking	Eating Supper	Laundry	Socialising/Relaxing/Entertainment	Other (specify)
1 hour						
2 hours						
3 hours						
4 hours						
5 hours						
More than 5 hours						

11. For which of the following activities do you use indoor lighting most frequently in a day? (rank 1,2,3,.. starting from the highest)

	Reading/Children's Homework	Cooking	Eating Supper	Laundry	Socialising/Relaxing/Entertainment	Other (specify)
Ranking						

12. How many lighting points or bulb points do you have already installed in outdoor lighting for your house? (include outside veranda and gate lights if any)

Less than 3	
Between 4 and 6	
Between 7 and 9	
More than 10	

13. How many lighting points or bulb points are switched on daily in outdoor lighting for your house?

Less than 3	
Between 4 and 6	
Between 7 and 9	
More than 10	

14. Approximately for how long do you ordinarily have your outdoor lights switched on in a day?

Less than 5 hours	
5 hours	
6 hours	
7 hours	
8 hours	

9 hours	
10 hours	
11 hours	
12 hours	
More than 12 hours	

**PART B**

15. Have you ever read or heard about energy efficient/saving bulbs? (these include the florescent tube)

**Yes**

**No**

16. If your answer is **Yes** to *Question 15* above, through which of the following communication channels did you learn about energy efficient/saving bulbs? (tick where applicable, if necessary more than one)

Newspapers	
Magazines	
Television	
Radio	
Pamphlets	
Posters	
Word-of-mouth	

Electricity bill message	
Bulb Package	
Salesman	
Private Electrician	
Exhibition/show	
Other (specify)	

17. If your answer is **Yes** to *Question 15* above, how recently did you learn about the energy efficient/saving bulbs message from the following communication channels? (tick where applicable, and if necessary more than one)

	1 - 3 months ago	4 - 6 months ago	7 - 9 months ago	10 - 12 months ago	Over 1 year ago
Newspapers					
Magazines					
Television					
Radio					
Pamphlets					
Posters					
Word-of-mouth					
Bulb Package					
Electricity bill message					
Salesman					
Exhibition/show					
Private Electrician					
Other (specify)					

18. For the communication channels you stated in *Question 17* above, which among the following were the sources of the energy efficient lighting message? (tick where applicable, and if necessary more than one)

KPLC	
Bulb manufacturer/supplier (specify if you know the firm)	
United Nations Environmental Programme (UNEP)	
Electricity Regulatory Board (ERB)	
Ministry of Energy	
Private Electrician	
Friend/relative/colleague	
Other (specify)....	

19. If you use energy efficient bulbs at all, which brand do you use? (tick where applicable, if necessary more than one)

Phillips – Ecotone (Lasts 6 years)	
Phillips – Party Tone (Economy)	
Phillips – Fluotone (standard tube)	
Phillips – Essential Energy Saver	
Status	
Other (specify)	
Do not know	
Do not remember	

20. If you use energy efficient bulbs, which of the following communication channels influenced you the most in making your purchase decision (tick where applicable and rank 1,2,3,.. starting from the highest)

Newspapers	
Magazines	
Television	
Radio	
Pamphlets	
Posters	
Word-of-mouth	

Electricity bill message	
Bulb Package	
Salesman	
Private Electrician	
Exhibition/show	
Other (specify)	

21. For the item you ranked 1<sup>st</sup> in Question 20 above, what influenced your purchase decision the most about the message? (rank 1,2,3,.. starting from the highest where applicable)

	Rank
Logo	
Picture	
Graphics/drawing/symbols	
Colours	
Music	
Fonts	
Written content	
Verbal content	
Other (specify)....	

22. If you use energy efficient bulbs, which of the following influenced your decision the most to start using them? (rank 1,2,3,.. starting from the highest)

	Rank
They are affordable	
High electricity bills	
Energy efficiency	
Long life	
Brightness (they give more light)	
Savings on electricity bills	
Advertising message	
Other (specify)....	

23. For each of the following sources of the energy efficient lighting messages that you have ever received, indicate your level of agreement or disagreement with this statement – “the message was quite convincing”

	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
KPLC					
Bulb manufacturer/supplier (specify if you know the firm).....					
United Nations Environmental Programme (UNEP)					
Electricity Regulatory Board (ERB)					
Ministry of Energy					
Private Electrician					
Friend/relative/colleague					
Other (specify).....					

24. If you have heard about energy efficient bulbs and you do not use them, which of the following are your reasons for not using them? (tick where applicable, and if necessary more than one)

They are too expensive	
Do not understand their benefits	
Do not believe in their benefits	
Other (specify)	

25. Notwithstanding if you use energy efficient bulbs or not, which of the following sources would you find the most believable in disseminating information about energy efficient bulbs/lighting? (rank 1,2,3... starting from the highest)

	Rank
KPLC	
Bulb manufacturer (specify if you know the firm)...	
United Nations Environmental Programme (UNEP)	
Private Electrician	
Electricity Regulatory Board (ERB)	
Ministry of Energy	
Friend/relative/colleague	
Other (specify)	

26. Notwithstanding if you use efficient bulbs/lighting or not, would you like to learn more about them?

Yes ( )

No ( )

27. Notwithstanding if you use energy efficient bulbs or not, would you be interested in buying energy efficient bulbs branded by KPLC (i.e. logo, colours, packaging, etc)?

Yes ( )

No ( )

28. Please briefly state your reasons for your answer to *Question 27* above

.....

.....

.....



29. Notwithstanding if you use energy efficient bulbs or not, would you be interested in buying them from a KPLC customer service office?

Yes ( )

No ( )

30. Please state briefly your reasons for your answer to *Question 29* above

.....

.....

31. Notwithstanding if you use energy efficient bulbs or not, who makes decisions related to purchase of bulbs (e.g. where to buy, when to buy, purchase price, frequency of purchase, number of bulbs to buy, etc.) in your home? (tick where applicable, and if necessary more than one)

Husband	
Wife	
Children	
Househelp	
Other (specify)	

32. Notwithstanding if you use energy efficient bulbs or not, who conducts the actual purchase of bulbs for your home? (rank 1,2,3,.. starting from the highest, etc.)

	Rank
Husband	
Wife	
Children	
Househelp	
Other (specify)	

33. If you do not use energy efficient bulbs, do you and other residents in your home switch off lights not in use?

Yes ( )

No ( )

34. If you use energy efficient bulbs for indoor purposes, approximately how long have you used them?

Less than 3 years	
Between 4 years and 6 years	
Between 7 years and 9 years	
More than 10 years	

35. If you use energy efficient bulbs for outdoor or security purposes, approximately how long have you used them?

Less than 3 years	
Between 4 years and 6 years	
Between 7 years and 9 years	
More than 10 years	

36. Prior to making your decision to start using energy efficient bulbs for indoor purposes, did you use the ordinary/non-efficient type?

Yes ( )

No ( )

37. Prior to making your decision to start using energy efficient bulbs for outdoor purposes, did you use the ordinary/non-efficient type?

Yes ( )

No ( )

38. Prior to switching to energy efficient bulbs for outdoor lighting in the house you are currently residing, approximately for how long did you use the ordinary/non-efficient type? (tick one)

Less than 3 years	
Between 4 years and 6 years	
Between 7 years and 9 years	
More than 10 years	

39. Prior to switching to energy efficient bulbs for indoor lighting in the house you are currently residing, approximately for how long did you use the ordinary/non-efficient type? (tick one)

Less than 3 years	
Between 4 years and 6 years	
Between 7 years and 9 years	
More than 10 years	

40. If you use energy efficient bulbs for indoor lighting, approximately how frequently do you purchase them? (tick one)

Once a month	
Every 2 months	
Every 3 months	
Every 4 months	
Every 5 months	
Every 6 months	
Every 7 months	

Every 8 months	
Every 9 months	
Every 10 months	
Every 11 months	
Once per year	
Other (specify)	

41. If you use energy efficient bulbs for outdoor lighting, approximately how frequently do you purchase them? (tick one)

Once a month	
Every 2 months	
Every 3 months	
Every 4 months	
Every 5 months	
Every 6 months	
Every 7 months	

Every 8 months	
Every 9 months	
Every 10 months	
Every 11 months	
Once per year	
Other (specify)...	

42. If you use energy efficient bulbs for indoor lighting, approximately how many do you buy in a single purchase?

1	
2	
3	
4	
5	
6	

7	
8	
9	
10	
More than 10	

43. If you use energy efficient bulbs for outdoor lighting, approximately how many do you buy in a single purchase?

1	
2	
3	
4	
5	
6	

7	
8	
9	
10	
More than 10	

44. If you use energy efficient bulbs for either indoor or outdoor lighting, where do you most frequently purchase them? (rank 1,2,3,.. starting from the highest where applicable)

Supermarket	
Retail shop/duka	
Electronics shop	
Kiosk	
Other (specify)	

45. In your answer to *Question 44* above, what influences your choice of where you purchase energy efficient bulbs? (rank 1,2,3,.. starting from the highest where applicable)

	Rank
Proximity to my home	
Proximity to my work place	
Availability of other goods/services in/near the same outlet (e.g. supermarket in a mall)	
Upmarket status of the outlet	
High pricing of goods in the outlet	
Moderate pricing of goods in the outlet	
Low pricing of goods in the outlet	
Tidiness of the outlet	
Internal décor	
Friendliness/courtesy of staff	
Other (specify)	

46. If you use energy efficient bulbs for either indoor or outdoor lighting, have you realised savings in your electricity bills?

Yes ( )

No ( )

47. If you use energy efficient bulbs for either indoor or outdoor lighting, approximately how much savings have you realised in your electricity bills every month? (Tick one)

Less than 5%	
Between 5 and 9%	
Between 10 and 30%	
Between 40 and 60%	
More than 60%	
Do not know	

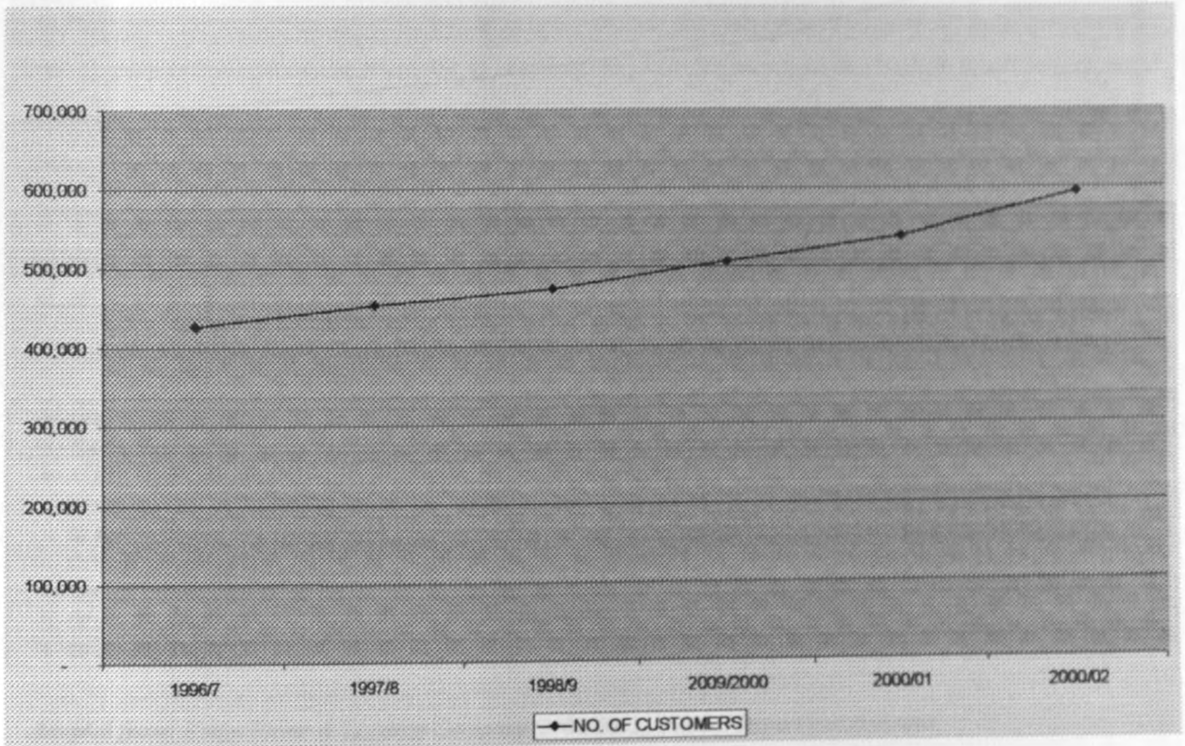
48. Please give any other suggestions, opinions or comments that you may have regarding energy efficient lighting/bulbs

.....  
.....  
.....  
.....

Once again, thank you very much for your time, patience, understanding and cooperation.

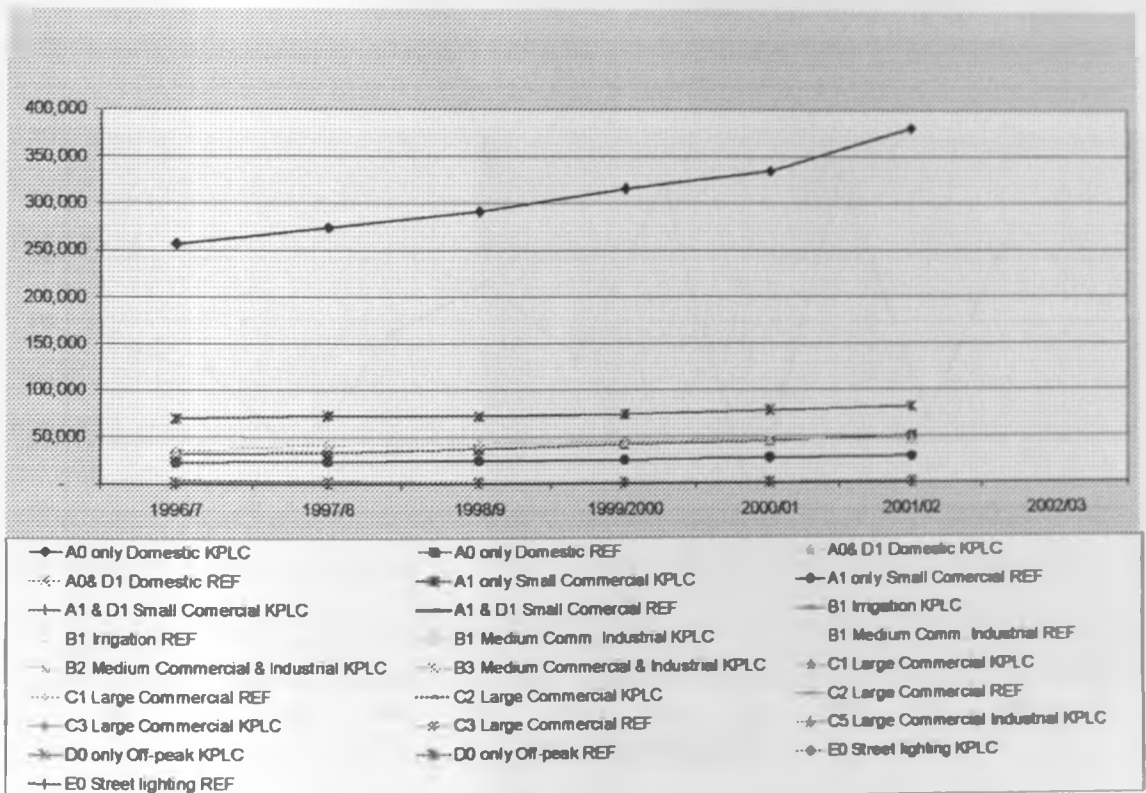
## APPENDIX A (iii): SELECTED ELECTRICITY CUSTOMERS' STATISTICS

Figure 1: CUSTOMER GROWTH TRENDS



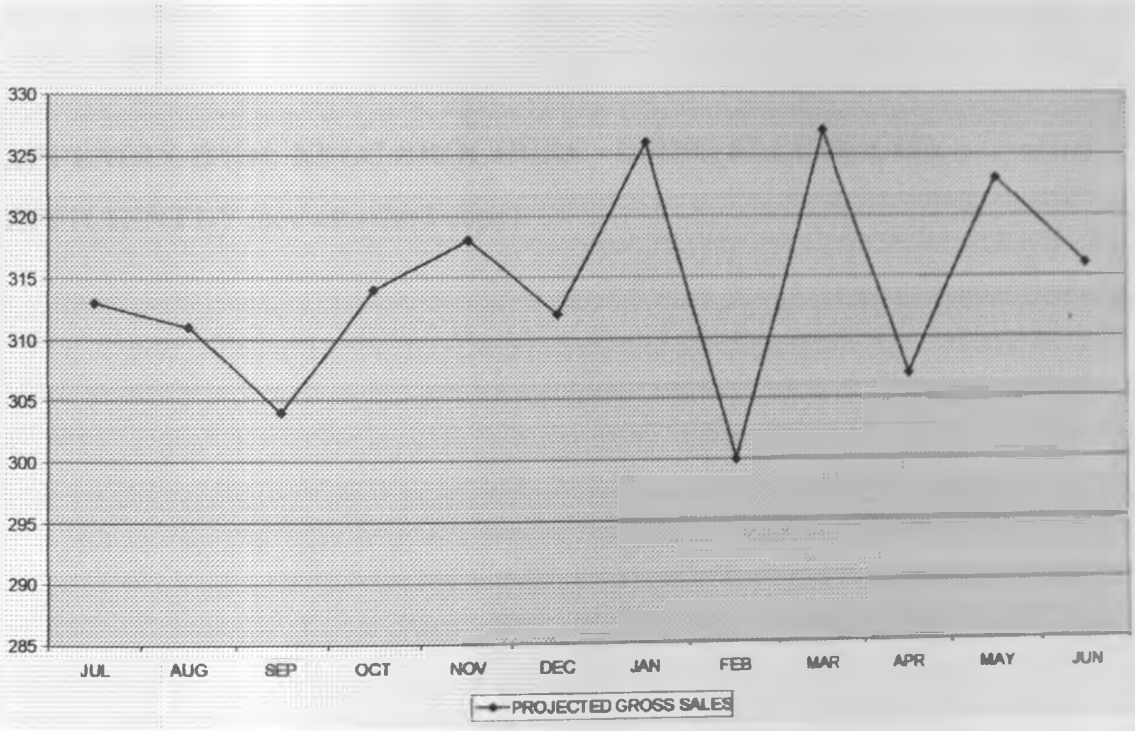
*Adapted from: Kenya Power & Lighting Company (2001/2002). Annual Report and Accounts, Published Accounts, Nairobi, pp. 49*

Figure 2: CUSTOMER GROWTH BY TARIFF CATEGORY



Adapted from: Kenya Power & Lighting Company (2001/2002). Annual Report and Accounts, Published Accounts, Nairobi, pp. 50

Figure 3: PROJECTED GROSS SALES IN GWhr - 2003/04



Source: Kenya Power & Lighting Company Corporate Planning Dept.

**APPENDIX B (iii): KPLC BOOKLET - SCHEDULE OF TARIFFS  
AND RATES (see attached copy)**

**APPENDIX B (iv): KPLC BROCHURE - USING ELECTRICITY  
EFFICIENTLY (see attached copy)**





**APPENDIX B (i):**

**The Kenya Power & Lighting  
Co. Ltd.**

---

*The Kenya Power & Lighting Co. Ltd.  
Central Office - P.O. Box 30099 Nairobi, Kenya  
Telephone - 254-02-243366-Telegrams 'ELECTRIC'  
Telex No. 22253 Fax No. 254-02-33735;  
Stima Plaza, Kolobot Road*

Our Ref:

**STAFF/42/DWM/fom**

Your Ref:

23<sup>rd</sup> March, 2004

Dean of Students  
Faculty of Commerce  
University of Nairobi  
P. O. Box 30197  
**NAIROBI**

Dear Sir/Madam,

**RE: RESEARCH PROJECT BY JAMES N. NJUGUNA, MBA STUDENT**

Mr. James Njuguna who is an employee of this Company and an MBA student at the University of Nairobi has informed us that he intends to undertake a Research Project on: "Attitudes Towards Energy Efficiency Messages, in Lighting Activities Among Electricity Customers: A Case of KPLC Domestic Customers in Nairobi."

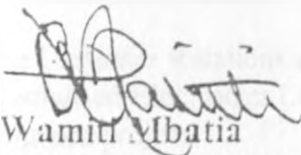
The study will be of use in the following ways:

- It will increase understanding of customer attitudes and behaviour towards past promotional messages on efficient use of electricity, specifically in the area of lighting.
- It will provide practical solutions and facilitate the development of relevant policies by KPLC regarding energy efficiency in the area of lighting.
- It will facilitate the development of marketing strategies and activities aimed at influencing customer behaviour in this regard.

The proposed project is, therefore, relevant to our business and will add value to our marketing and customer education strategies. This is therefore to confirm that we support his proposal.

Yours faithfully.

For: THE KENYA POWER & LIGHTING CO. LTD.



Wamiti Mbatia

For: CHIEF MANAGER, HUMAN RESOURCES & ADMINISTRATION

**Kenya Power & Lighting Company/ Specialised Electronics Ltd.**

**ENERGY SAVING PROJECT**

Draft Proposal

11th December 1998

**INTRODUCTION**

The Customer Relations and Marketing Sub-division has held preliminary discussions with Specialised Electronics Ltd. (SEL), who are Philips Distributor in Kenya, on the above proposed project.

The entire concept revolves around electricity conservation and the attendant benefits to the customer and the Company. This relates specifically, to potential conservation in the use of lighting in homes, hotels and offices, among other premises.

Energy efficient bulbs have been in the market for the last ..... years, alongside conventional bulbs, but they have not been popularised effectively to command a substantial market share. The former provide more light and last longer than the latter as illustrated below;

Normal Lamps	Energy Saving Lamps	Economy
• 60w	11w	49w
• 75w	15w	60w
• 100w	20w	80w
• 1,000 Hours Avg	10,000 Hours Avg	

**ENERGY SAVING PROJECTIONS**

Projections made indicate that substantial energy/monetary savings can be made if the targeted number of customers were to convert to energy efficient lamps. With an estimated 52 million lamps currently installed countrywide, it is proposed that under the project 1 million lamps would be targeted for conversion during the first year.

Consequently, the total energy reduction would be as follows;

CONVENTIONAL LAMPS	ENERGY SAVING LAMPS	x	ECONOMY =	TOTAL REDUCTION
60w:	700,000	x	49w	= 34,300 Kwh
75w:	200,000	x	60w	= 12,000 Kwh
100w:	100,000	x	80w	= 8,000 Kwh
Total	54,300 Kwh (54.3MW) per hr			

Daily Average Use = 3 Hours

Daily Economy  $54.3 \text{ MW} \times 3 = 162.9 \text{ MW}$

### KPLC/SEL BUSINESS PARTNERSHIP

It is proposed that KPLC & SEL would undertake the project as a joint venture with each playing a specific role.

SEL would, on one hand, manufacture and supply to KPLC the energy efficient lamps as per terms and conditions to be agreed on. KPLC would on the other hand retail the bulbs to customers through its Commercial Offices.

While the retail pricing of the bulbs would be structured to recover investment costs, it is proposed that the profit margin would be kept to a minimum in order to make the lamps affordable and attract many buyers

The production costs for the initial 1 million lamps is estimated to be under 10 million US dollars and the return on this investment is projected to be within ..... years

Finer details of the business/investment plans will be worked out between KPLC and SEL

### BENEFITS

If the projected energy savings were to be made, this would help to ease load management during the peak period when most of the lighting is done in residential premises. This would engender significant optimisation and reduction in energy utilization.

The effort would also go a long way to enable the energy sector and the country at large to manage available energy capacity efficiently by allowing more customers to use the same

resources without necessarily investing in new plants. Significant gains would, therefore, be made in the demand/supply side management.

The project would also augment the Company's existing energy conservation sensitisation efforts by providing an in-house designed concept and product. The lamps would bear KPLC's corporate identity and this would enhance the Company's corporate image as a caring entity by being directly involved in assisting its customers to make energy/monetary savings in the use of electricity.

### CONCLUSIONS/RECOMMENDATIONS

It is recommended that other relevant divisions such as Business Development, Corporate Planning, Customer Service, R & D, Finance and Communications make further deliberations on the project in order to come up with a firm plan of action. Please find attached a detailed report on the project proposals.

Encl.

**Table C.2: Duration of time indoor lights are switched on daily in Bedroom**

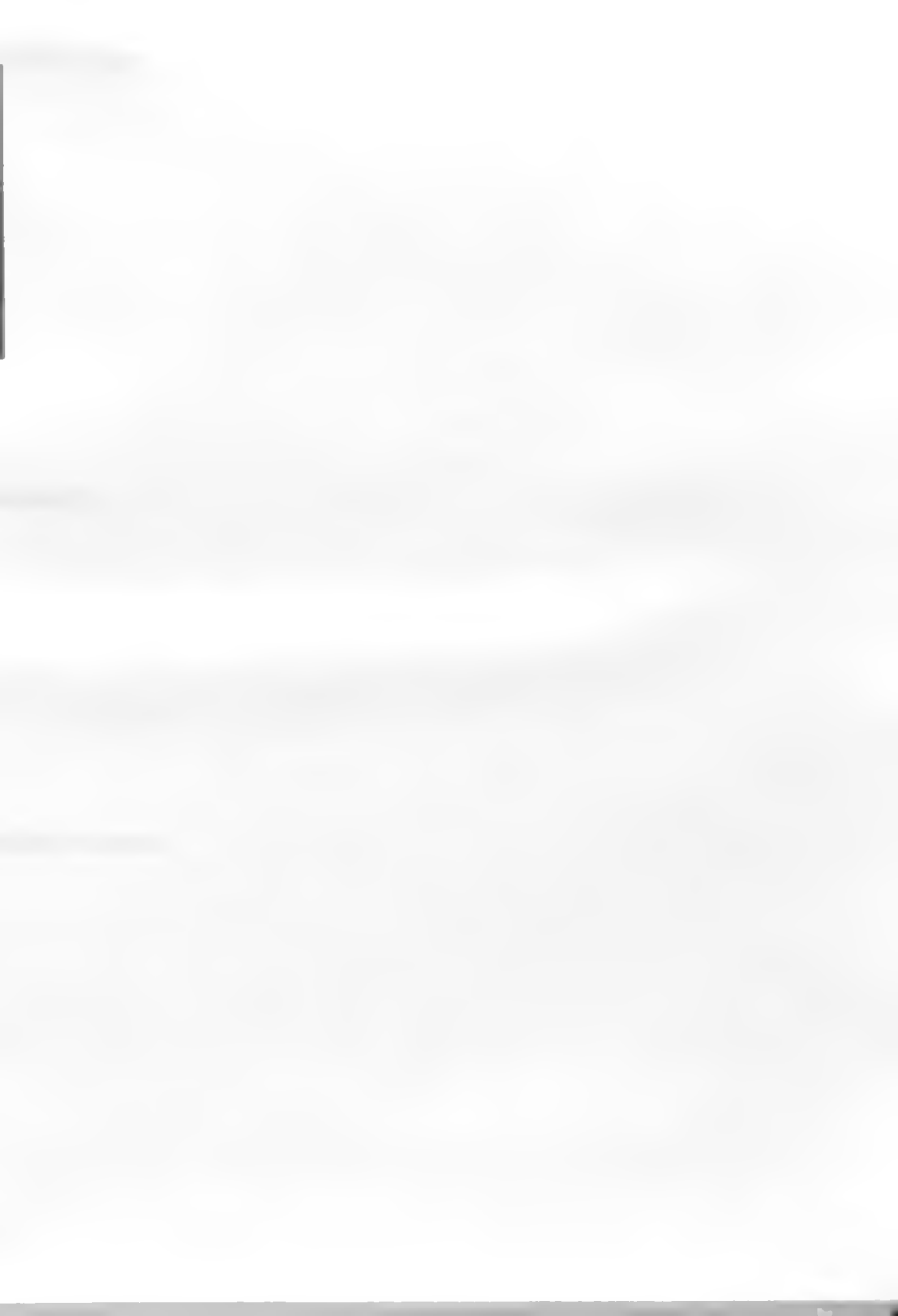
	Duration	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One Hour	70	19.6	35.7	35.7
	Two Hours	48	13.4	24.5	60.2
	Three Hours	21	5.9	10.7	70.9
	Four Hours	29	8.1	14.8	85.7
	Five Hours	7	2.0	3.6	89.3
	More than five hours	21	5.9	10.7	100.0
	Total	196	54.7	100.0	

**Table C.3: Duration of time indoor lights are switched on daily in Sitting room**

	Duration	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One Hour	2	.8	1.1	1.1
	Two Hours	18	5.0	9.6	10.6
	Three Hours	22	6.1	11.7	22.3
	Four Hours	45	12.8	23.9	46.3
	Five Hours	30	8.4	16.0	62.2
	More than five hours	71	19.8	37.8	100.0
	Total	188	52.5	100.0	

**Table C.4: Duration of time indoor lights are switched on daily in Bathroom/Toilet**

	Duration	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One Hour	117	32.7	68.4	68.4
	Two Hours	26	7.3	15.2	83.6
	Three Hours	9	2.5	5.3	88.9
	Four Hours	3	.8	1.8	90.6
	Five Hours	6	1.7	3.5	94.2
	More than five hours	10	2.8	5.8	100.0
	Total	171	47.8	100.0	



**Table C.5: Duration of time indoor lights are switched on daily in Study room**

Duration		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One Hour	14	3.9	18.2	18.2
	Two Hours	19	5.3	24.7	42.9
	Three Hours	12	3.4	15.6	58.4
	Four Hours	6	1.7	7.8	66.2
	Five Hours	12	3.4	15.6	81.8
	More than five hour	14	3.9	18.2	100.0
Total		77	21.5	100.0	

**Table C.6: Duration of time indoor lights are switched on daily in Laundry**

Duration		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One Hour	42	11.7	73.7	73.7
	Two Hours	11	3.1	19.3	93.0
	Four Hours	4	1.1	7.0	100.0
Total			15.9	100.0	

**Table C.7: Duration of time indoor lights are switched on daily in other rooms**

Duration		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One Hour	2	.8	20.0	20.0
	Two Hours	2	.8	20.0	40.0
	Three Hours	1	.3	10.0	50.0
	Five Hours	2	.8	20.0	70.0
	More than five hours	3	.8	30.0	100.0
Total		10	2.8	100.0	



**Table C.8: Duration indoor lighting used in Reading/Children's Homework**

	Duration	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One Hour	38	10.6	29.2	29.2
	Two Hours	45	12.6	34.6	63.8
	Three Hours	20	5.6	15.4	79.2
	Four Hours	14	3.9	10.8	90.0
	More than five hours	13	3.6	10.0	100.0
Total		130	36.3	100.0	

**Table C.9: Duration indoor lighting used in cooking**

	Duration	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One Hour	40	11.2	23.8	23.8
	Two Hours	57	15.9	33.9	57.7
	Three Hours	34	9.5	20.2	78.0
	Four Hours	20	5.6	11.9	89.9
	Five Hours	5	1.4	3.0	92.9
	More than five hours	12	3.4	7.1	100.0
Total		168	46.9	100.0	

**Table C.10: Duration indoor lighting used in eating supper**

	Duration	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One Hour	112	31.3	68.7	68.7
	Two Hours	32	8.9	19.6	88.3
	Three Hours	6	1.7	3.7	92.0
	Four Hours	1	.3	.6	92.6
	Five Hours	1	.3	.6	93.3
	More than five hours	11	3.1	6.7	100.0
	Total		163	45.5	100.0

**Table C.11: Duration indoor lighting used in laundry**

	Duration	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One Hour	80	16.8	69.8	69.8
	Two Hours	17	4.7	19.8	89.5
	Three Hours	3	.8	3.5	93.0
	Four Hours	1	.3	1.2	94.2
	Five Hours	2	.6	2.3	96.5
	More than five hours	3	.8	3.5	100.0
Total		86	24.0	100.0	

**Table C.12: Duration indoor lighting used in Socializing/Relaxing/Entertainment**

	Duration	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One Hour	14	3.9	8.6	8.6
	Two Hours	18	5.0	11.0	19.6
	Three Hours	28	7.8	17.2	36.8
	Four Hours	28	7.8	17.2	54.0
	Five Hours	33	9.2	20.2	74.2
	More than five hours	42	11.7	25.8	100.0
Total		163	45.5	100.0	

**Table C.13: Duration indoor lighting used in other activities**

	Duration	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One Hour	5	1.4	55.6	55.6
	Two Hours	1	.3	11.1	66.7
	Four Hours	1	.3	11.1	77.8
	Five Hours	1	.3	11.1	88.9
	More than five hours	1	.3	11.1	100.0
Total		9	2.5	100.0	

**Table C.14: Ranking in use of indoor lighting for reading**

Ranking		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	First	29	8.1	8.1	71.8
	Second	51	14.2	14.2	86.0
	Third	23	6.4	6.4	92.5
	fourth	23	6.4	6.4	98.9
	fifth	4	1.1	1.1	100.0
Total		358	100.0	100.0	

**Table C.15: Ranking in use of indoor lighting for cooking**

Ranking		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	First	39	10.9	10.9	65.6
	Second	48	13.4	13.4	79.1
	Third	55	15.4	15.4	94.4
	fourth	13	3.6	3.6	98.0
	Fifth	7	2.0	2.0	100.0
Total		358	100.0	100.0	

**Table C.16: Ranking in use of indoor lighting for eating supper**

Ranking		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	First	13	3.6	3.6	62.6
	Second	27	7.5	7.5	70.1
	Third	58	16.2	16.2	86.3
	Fourth	42	11.7	11.7	98.0
	Fifth	7	2.0	2.0	100.0
Total		358	100.0	100.0	



**Table C.17: Ranking in use of indoor lighting for laundry**

Ranking	Frequency	Percent	Valid Percent	Cumulative Percent
Valid First	18	4.5	4.5	80.4
Second	10	2.8	2.8	83.2
Third	8	2.2	2.2	85.5
Fourth	23	6.4	6.4	91.9
Fifth	28	7.3	7.3	99.2
Sixth	3	.8	.8	100.0
Total	358	100.0	100.0	

**Table C.18: Ranking in use of indoor lighting for Socializing/Relaxing/Entertainment**

Ranking	Frequency	Percent	Valid Percent	Cumulative Percent
Valid First	104	29.1	29.1	83.0
Second	22	6.1	6.1	89.1
Third	19	5.3	5.3	94.4
Fourth	9	2.5	2.5	96.9
Fifth	11	3.1	3.1	100.0
Total	358	100.0	100.0	

**Table C.19: Ranking in use of indoor lighting for other activities**

Ranking	Frequency	Percent	Valid Percent	Cumulative Percent
Valid First	3	.8	.8	95.3
Second	3	.8	.8	96.1
Fourth	1	.3	.3	96.4
Sixth	13	3.6	3.6	100.0
Total	358	100.0	100.0	

**Table C20: Communication channels used to get energy efficiency messages**

Channels		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	newspaper	62	17.3	17.3	17.3
	magazines	37	10.3	10.3	27.7
	television	26	7.3	7.3	34.9
	radio	19	5.3	5.3	40.2
	pamphlets	19	5.3	5.3	45.5
	posters	21	5.9	5.9	51.4
	word of mouth	81	22.6	22.6	74.0
	electricity bill message	23	6.4	6.4	80.4
	bulb package	20	5.6	5.6	86.0
	private electrician	31	8.7	8.7	94.7
	exhibition/show	15	4.2	4.2	98.9
	other	4	1.1	1.1	100.0
Total		358	100.0	100.0	

**Table C21: Believability / credibility of various communication channels used to disseminate energy efficiency messages**

Ranking	Newspaper	Magazine	Television	Radio	Pamphlet	Posters	Word of mouth	Electricity bill message	Bulb Package	Salesman	Private electrician	Exhibition	Other
First	2.520	0.0440	0.225		0.07	0.044	3.036	0.102	0.63	0.225	0.044	0.07	0.024
Second	0.408	0.1020	0.176	0.102	0.1020	0.044	0.546	0.003	0.044	0.28	0.14	0.024	
Third	0.176	0.1020	0.225	0.044	0.07		0.044	0.176	0.225	0.006	0.102		
Fourth	0.070	0.2400	0.176	0.07	0.012		0.003	0.006	0.003	0.006	0.024		
Fifth	0.024	0.2400	0.012	0.024	0.012		0.024	0.07	0.003	0.006	0.003	0.003	
Sixth		0.0300	0.012	0.003	0.044	0.024	0.003		0.003	0.006	0.003	0.003	
Seventh	0.024		0.003	0.003	0.024	0.024	0.07			0.003	0.024	0.006	
Eighth				0.003		0.012	0.003			0.024	0.003	0.003	
Ninth											0.003	0.24	
Tenth				0.003									
Eleventh													
Twelfth													
Thirteenth													0.003
WEIGHTED SCORE	3.222	0.7680	0.828	0.262	0.334	0.148	3.728	0.367	0.908	0.668	0.346	0.348	0.027