

**INVESTMENT STRATEGIES BY KENYA POWER AND LIGHTING  
COMPANY WITHIN THE POWER DISTRIBUTION SECTOR**

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**OCTOBER, 2013**

**DECLARATION**

This research project is my original work and has not been submitted for examination in any other university.

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This research project has been submitted for examination with my approval as university supervisor.

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## **DEDICATION**

This research project is dedicated to my Mum and Dad for their love, encouragement and patience throughout my studies.

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## **ABSTRACT**

The main purpose of the study is to determine the investment strategies used by Kenya Power and Lighting Company within the power distribution sector. Adequate investment in capacity and efficient working of transmission and distribution systems in developing economies with high growth of electricity demand are important objectives. The literature review available on investment strategies within the power distribution sector have been captured and the theoretical underpinnings of investment strategies. In many developing countries, the electricity system is too weak to meet growing demand and the availability and reliability of generating capacity is inadequate. Protracted mismanagement, political interference, subsidized pricing, and corruption all undermine the ability of developing electricity supply industries to finance and deliver service or attract new private investment. Spot market pricing is a sufficient condition for an efficient level of investment. Data was collected using interview guides administered to senior managers within the company. This involved sample selection and description, research design, population and sampling design, data collection methods, tools and procedures, and data analysis and reporting. The data was obtained from the various management team members belonging to different departments analyzed and compared against each other in order to get more revelation on the issues under study. The study recommends that electricity sub sector, costs should be reduced and electricity tariff setting harmonized and enhancing information asymmetry between policy makers, deliberate measures to improve penetration of renewable technologies, regulators, providers and consumers. The study suggest further research on Investment Strategies by Kenya Power and Lighting Company within the Power distribution sector to supplement the findings of this study by

providing information on evaluation of Kenya Power and Lighting Company within the Power distribution sector.

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## ABBREVIATIONS

<b>ICT</b>	Information and Communications Technology
<b>IEA:</b>	International Energy Agency
<b>IGCC:</b>	Integrated Gasification Combined Cycle
<b>KPLC:</b>	Kenya Power and Lighting Company
<b>NPV:</b>	Net Present Value
<b>NSE:</b>	Nairobi Stock Exchange
<b>R&amp;D:</b>	Research and Development
<b>REPLF:</b>	Rural Electrification Program Levy Fund
<b>SWER:</b>	Single Wire Earth Return
<b>U.S:</b>	United States

## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background for the study**

The electricity sector is highly capital-intensive, has natural monopoly characteristics (particularly in the transmission and distribution segments) and is poorly internationalized although there are increasing international connections in the transmission network, the exportation and importation of electricity remains very marginal in most countries and is only important in very specific cases (Altomonte, 2011). It is also a strategic sector with a large weight in the economy, whose correct functioning is crucial for all other sectors and the population's well-being. For all of these reasons, the sector is highly regulated in all countries, and in many cases controlled directly by the State. World electricity demand (and production) grew by an average of 3.4% per year from 1973 to 2009, when, in the wake of the economic crisis, demand dropped by 0.7% the first fall since records began. In 2010, demand rebounded vigorously by 6%, and growth is expected to continue in 2011. The International Energy Agency (IEA) is forecasting demand growth of 2.4% per year between 2009 and 2035 (Rozas, 2010).

The power sector, a component of which is the electricity sector of the economy has a great importance to the lives and takes central role in the economic transformation process. The sector itself contributes between 1% and 2% of global GDP, and is present in all countries without exception. As it is highly capital intensive, its share of investment is even larger (Rozas, 2010). The availability, quality and cost of electricity has a direct impact on the economy's systemic competitiveness. Although the price of

electricity mainly affects energy-intensive sectors, a continuous and uninterrupted supply of electricity is fundamental for nearly all sectors, and particularly for small firms that are unable to invest in their own generating systems (Peterson, 2008). For over two decades, Kenya has experienced problem in the area of electricity generation, transmission and distribution. The extent of this is underlined by the fact that Kenya is the largest purchaser of standby electricity generating plants in East Africa. Electricity is an essential feature for economic development. The reason for such necessity lies in the fact that electricity affects every sphere of a nation's economy. Bearing this in mind, both developed and developing nations aim towards establishing an efficient electricity sector.

### **1.1.1 Types of Investment Strategies**

Investment characteristics can be identified for the power sector. Investments are partially or completely irreversible and once made the capital cost can be considered sunk. Uncertainty is always present for future returns and costs. The investment can take place at flexible timing. The investors have the opportunity or option but not the obligation to invest in a project in a period of time. Several different technologies can be used to generate power making the investment decision depending on the available technologies and their associated uncertainties (Lundmark and Pettersson, 2007). The investment model is similar to (Roques et al. 2006) in that it assumes that investment decisions are made in five year intervals.

The second investment timing behaviour introduces an option for the investment not to be made even with a positive NPV. Instead investors has the option to wait with the investment and hope for more favourable market conditions in the future even though an investment in the current time period would yield a positive NPV. In other words, the investment takes place in the time period and in the technology that has the highest positive NPV in all time periods. A prospective investor can choose between offshore wind power, gas-fired power and biomass power. Offshore wind power instead of land-based wind power is chosen due to data availability and in order to compare investments of similar size.

### **1.1.2 Power Distribution Sector**

Adequate investment in capacity and efficient working of transmission and distribution systems in developing economies with high growth of electricity demand are important objectives. Market oriented reform processes are required both for the creation of capacity and for electricity as a product. This invariably requires unbundling of transmission and distribution capacities from generation capacities. In this context alternative governance structures need to be explored. Concretely there has to be major emphasis on development of mechanisms of moving from State owned centralized planned and public sector owned electricity utility systems to public private partnership models for transmission and distribution. Transparency and different bidding procedures are essential during the transition.

Overarching legislative back up to the process and the influence of political interest groups which arise including the need to protect the interests of small consumers and backward regions in a public utility is a policy management challenge in the larger context in which the transition takes place. Examples of the political process of successful management of the newer legislation for PPPs in developing economies are not that many and need analysis as best practice cases.

Regulatory mechanisms including the rules for open access, the development of availability tariffs for inter regional transmission and time of the day and spatially differentiated pricing systems for distribution of energy in large federal countries are discussed in the policy literature but not that many successful examples are there. Examples generated from the literature generated by forward looking regulators and legal case literature, need attention.

### **1.1.3 Kenya Power and Lighting Company**

Kenya Power and Lighting Company is a limited liability company which transmits, distributes and retails electricity to customers throughout Kenya. Kenya Power and Lighting Company is a public company and is listed at the Nairobi Stock Exchange (NSE). Kenya Power and Lighting Company is committed to providing high quality customer service by efficiently transmitting and distributing high quality electricity that is safe, adequate and reliable at cost effective tariffs. The Board, Management and staff of Kenya Power and Lighting Company are committed to effective implementation and continual improvement of the Quality Management System that complies with ISO

9001:2008 in order to consistently meet its customers and other stakeholder's requirements and expectations.

It is government corporate that deals with distribution of power. It serves more about 200,000 customers. It had a turnover of about 60 billion shillings from various business units. The company is majorly divided into four business regions with a mix of 8 business functions. Kenya Power and Lighting Company is a limited liability company which transmits, distributes and retails electricity to customers throughout Kenya. Kenya Power and Lighting Company is a public company and is listed at the Nairobi Stock Exchange (NSE).

Kenya Power and Lighting Company have a staff complement of over 7,000 employees. We recruit and aim at retaining highly motivated professional staff in order to meet our corporate goals. Great importance is attached to ensuring that employees have requisite competencies to perform their work and also realize their potential through regular staff training and development programmes. On-the-job training is the foundation upon which all other training must depend, and we acknowledge the role our experienced employees play in training their colleagues.

#### **1.1.4 Investment Strategies used by KPLC**

Kenya Power and Lighting Company is using transmission expansion strategy to provide for additional energy transmission capacity to meet load growth across the country during the medium to long term period. These projects have been conceptualized, defined and

scaled to meet the development requirements of the Kenya Vision 2030 plan, which includes in the medium term provision of additional capacity to meet the Electricity Access Scale-Up Project that targets connection of an additional one million new electricity customers over a five year period. These projects additionally are necessary to transmit power from the proposed new generation plants (Otieno, and Murray, 2008).

Kenya Power and Lighting Company is also using distribution expansion strategy to expand the national power distribution grid under the Energy Access Scale-Up project, so as to connect over 1 million new customers spread country wide over the 5 year medium term plan period. In addition to new customer connections the new distribution projects will also serve the objectives of system loss reduction by 2 percentage points and improve power supply quality as reflected by 65% reduction in the number of LV breakdowns and 23% improvement in average outage interruption time (Otieno, and Murray, 2008). Distribution Expansion entails construction of an additional approximately 16,000 kms of MV distribution lines, 1,000 MVA of distribution substations, 50,000 kms of LV distribution lines, 3,000 MVA of distribution transformers and 1 million service lines.

The company is doing Underground cabling project in the major cities in order to reduce risk and frequency of power line break downs in urban centres as well as to enhance public safety by minimizing exposure to power lines. The company will spend ksh 20bn in laying out underground cables to replace the overhead power lines in a bid to improve the power supply system The project involves conversion of overhead power lines to an

underground system so as to enhance reliability and quality of power supply to customers (Rowena, and Vennemo, 2008).

The company has introduced digital connectivity project, called Facilities Database worth Sh259 million. It is meant to enable the company remotely identify and locate customers and faults along its transmission and distribution network. “Designers will not be required to physically visit the premises of a person applying for power supply as they will be able to locate a customer’s location on spatial maps from their offices. Consequently, that will reduce the period taken to give power applicants the quotations for supplying electricity to their premises, which in turn will reduce the connection period (Otieno, and Murray, 2008)..

Kenya Power and Lighting Company is investing on dry type transformers that are far less attractive and prone to vandalism and theft since they are bulky to carry. Dry type transformers are also easy to maintain and long lasting. The Company is planning to change from oil type transformers which are prone to vandalism and source smaller size dry type transformers that is easier to install.

Rural electrification strategy is used to connect rural areas. The overall goal is to increase connectivity from the current 12% to 100% by 2030 through a series of 5 year development phases (Rowena, and Vennemo, 2008). The first of the phases as envisioned in the country’s blueprint for economic development – Vision 2030, is to connect all public facilities covering mainly trading areas to 21%. To date a total of

12,000 of these facilities have been connected. This has been achieved through a combination of grid extension, stand alone diesel generators, solar and wind energy.

Financial sourcing, Electricity development is critically dependent on access to financing under attractive conditions. As a result of the global economic contraction that began in 2008, access to financing in general became more challenging, though recent indications are that both access and financing terms are improving (Shanaro, and Bateyo, 2009). The REP funds are obtained from a 5% levy, namely the rural electrification program levy fund (REPLF), which is charged to all electricity users nationwide. The REPLF is one of seven decentralized operational funds in Kenya aimed at alleviating socio-economic disparities at the local level.

Business expansion strategy with a view to taking services closer to its customers and improving efficiency, the Company created branches throughout its four operational regions. The branches, which are headed by senior staff, are located in every county throughout the country. The Company is therefore ready to serve the counties after the implementation of the devolved system of national government in 2013, and to take advantage of the enhanced economic activities at the counties to expand its business (Shanaro, and Bateyo, 2009).

Regional expansion development co-operation with other countries in the region offers an effective and mutually beneficial option. It is critical for Kenya to be proactive in forging cross-national partnerships in exploration, investment, transportation, and distribution.

Opportunities abound with coal and natural gas in Tanzania, oil in Sudan, Tanzania, and Uganda, and hydro power in Uganda and Ethiopia. Kenya ought to adopt the model of China in seeking such partnerships. The power distributor raised Sh9.83 bn towards the end of 2010 from a rights issue following a restructuring process, part of which it planned to invest in improving the distribution system.

## **1.2 Research Problem**

In many developing countries, the electricity system is too weak to meet growing demand and the availability and reliability of generating capacity is inadequate. Protracted mismanagement, political interference, subsidized pricing, and corruption all undermine the ability of developing electricity supply industries to finance and deliver service or attract new private investment. Power sector reform is an acute need in developing countries where implementation of a top-down liberalization approach has been pursued without adequately considering the social, political and economic conditions. The conventional response to low levels of electricity sector investment has been from the top-down: aim to create competitive electricity markets by encouraging new entry into the generation sector and by breaking up vertically integrated power companies (Chang, 1995)

Given the scale of the investments required, the electricity sector has major spill over in other sectors, ranging from construction and associated industries to high-tech component manufacture. As a result, energy policy can have a significant influence on a country's industrial development. Privatizations and market liberalization in the 1990s provided the

big opportunity for transnationals to enter the Latin American electricity sector. At that time, European firms were best placed to invest in the region, given their size, financial capacity and the outward orientation which the process of creating the single European market had encouraged them to adopt. Investment levels can be used as a long term indicator for the future structure and production of an industry sector. Thus, in order to assess the future direction of an industry it is important to understand the rationale for investments.

Many studies have shown that as firms gain more experience in a country they become more likely to reinvest in that country in the future (Davidson, 1980; Chang, 1995; Chang and Rosenzweig, 1998; Song and Kogut, 1999; Barkema and Vermuelen, 1998; Barkema et al., 1997; Kogut and Singh, 1988). Global capabilities, on the other hand, are the generic skills firms possess which enable them to successfully manage foreign operations in any country. Firms with greater levels of international experience have a greater tendency to enter new countries. Local studies done on investment strategies are; Onyango (2011) the relationship between financial performance and investment strategies of pension funds in Kenya, Wachira (2003), investment strategies of investment companies in Kenya and Otieno, and Murray, (2008). *Improving Connectivity: Investing in Transport Infrastructure in Sub-Saharan Africa. Africa Infrastructure Country Diagnostic*, World Bank. This study will shed some light on some of the investment strategies that can be applied in the power sector in order to enhance the continued reliance on electrical power as a primary energy carrier, in order to fill the gap the study will answer the question on the investment strategies employed by Kenya

Power and Lighting Company. The study answers the research question what are investment strategies used by Kenya Power and Lighting Company within the power distribution sector?

### **1.3 Research Objective**

The objective of this study is to determine the investment strategies used by Kenya Power and Lighting Company within the power distribution sector.

### **1.4 Value of the Study**

With power and energy policy central to economic development, the study of KPLC is important beyond the academic debates of ideal electricity investment strategies. Jobs, homes, government resources, and industrial progress all rest on the foundation of delivering energy efficiently. The study will demonstrate the investment strategies employed by KPLC. The findings from the study will also be useful in providing additional knowledge to existing and future institutions on investments inflow into the economy. It is very crucial because it serves as a source of capital. In addition it is equally important in the sense that investments stimulates and promotes economic growth, creates employment opportunities and promotes technology transfer. The trends in investments raise important issues concerning the factors that motivate these flows and their effect on the performance of developing countries to potential and current scholars in Kenya. This will expand their knowledge on inward foreign direct investments and transfer of technology by information technology multinational corporations in Kenya.

The study will be a source of reference material for future researchers on other related topics; it will also help other academicians who undertake the same topic in their studies. The study will also highlight other important relationships that require further research. The research study can be valuable tool to the government in understanding the impact of investments in electric power distribution in Kenya Power and Lighting Company. This will help in coming up with policies and also come up with decision making and implementation processes of the policies.

Most importantly the findings of this study will help in enlightening the key decision makers in investments in electric power distribution in Kenya Power and Lighting Company toward policies formulation. The study will in addition to the above, be useful to policy makers to create a business friendly environment in order to attract not only more but higher quality investments with strong links to the domestic economy.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter shall review the literature available on investment strategies within the power distribution sector. This section will also capture the theoretical underpinnings of investment strategies.

### **2.2 Theoretical Underpinnings**

The study will be guided by the real options theory. Options theory was originally developed in the 1970s (Black and Scholes, 1973; Merton, 1973) to evaluate financial options, but economists realized very soon that option pricing could also provide important insights into decision-making on capital investments. Therefore, with reference to the real assets involved, the term “real options” was established. First applications of real options theory on investment decisions were made by McDonald and Siegel (1986), Pindyck (1993), and Dixit and Pindyck (1994). During the last few years, in a number of studies, real options theory has also been applied to decision-making problems in the energy sector and here especially for investments in new power generation infrastructures. Murto and Nese (2003) focus on the optimal timing and the optimal technology choice for investments in power production technologies. They put their focus on uncertainties arising from input price variations, and investigate the impact on investments in fossil-fueled and biomass-fired power plants. By applying a real options model with stochastic input prices, they show that prices for fossil fuels are the main driver for investment timing and technology choice.

Sundberg and Sjödin (2003) in their research, consider how investment decisions in CHP plants are influenced by the liberalization of the European electricity markets. Their investigation focuses specifically on a co-operation between a paper mill and a municipal utility. With an economic simulation model that is calibrated for the market conditions in Sweden, they show that the optimal technology choice is strongly influenced by the returns required by the investor. Ishii and Yan (2004) investigate how the investment behavior of firms operating in the U.S. power sector depends on uncertainties in the regulatory framework. They find evidence that regulatory uncertainty creates substantial option values, which initiate utilities to delay their investment decisions in order to gather more information and assurance regarding future regulatory change. Hlouskova et al. (2005) consider the commitment problem of an electricity producing turbine in the liberalized German power market and derive profit-maximizing commitment decisions.

### **2.3 Investment Strategies**

Spot market pricing is a sufficient condition for an efficient level of investment. Caramanis et al. (1982; 1986) conclude that optimal spot pricing always give higher welfare than regulated prices and that spot prices should give enough incentive for investments. But uncertainty about price levels may also reduce the investment incentives (Caramanis et al., 1982; Neuhoff and de Vries, 2004). The importance of the spot price to secure supply has been widely studied in the literature.

Other than the price signal, important investment determinants are policy and regulations. Policies affecting investments in renewable energy are analysed by Bird et al. (2004).

Even though it is difficult to pinpoint the exact drivers, the authors suggest that investment in wind power is driven by favourable policies and a growing market. It is important to keep in mind that there are significant barriers to entry in the power market and that policy and regulations can affect these barriers. For instance, the power market is characterised by high capital cost of constructing a competitive plant, long lead-time to bring the plant in operation and sometimes long site approval processes for certain renewable technologies (Moody, 2004; Söderholm et al., 2007). Currently, there is little consensus in the economic literature of how an optimal market should be structured in order to promote investments (Roques et al., 2004). For instance, Takizawa, et al. (2004) analyses investments in the power sector in a regulated market and concludes that the possibilities to invest is better when electricity price is regulated, at least for projects requiring large capital investments per unit of output such as wind power. Than again, a deregulated market could result in a higher market price, but the higher price is necessary for investments to take place (Grobman et al., 2001). Nordleden (2003) analyses the underlying driving forces for investments on the energy market in Sweden. One of the crucial variables is policy stability since fluctuations in policies reduce the investment incentives. Without policy stability the uncertainty increases and thereby also the cost for the investment since a higher uncertainty require a higher level of profit for the investment to take place.

### **2.3.1 Investment within the Power Distribution Sector**

Traditional investment analyses place limited emphasis on the timing of the investment versus market conditions. In these approaches, the value of developing a single large

plant is considered rather than a series of smaller plants, although the smaller plant strategy might have an advantage, *e.g.* if the growth in demand for electricity turned out to be lower than expected. Without a method to quantify the value of this flexibility, the economies of scale evident in larger power plants (in terms of installed cost per kW) trump any concern about risks of adding capacity in larger units (Roques et al., 2004).

Research to apply the same techniques to assess the flexibility value of different strategies for power generation project development is still at an early stage. One study has applied the real options method to estimate the value of developing wind power projects in stages, rather than all at once, in recognition of the inherent flexibility of smaller plants. Another study examined the cost-effectiveness of developing an IGCC plant in phases, initially using natural gas as a fuel and thereby delaying the decision as to when to convert the plant to using gasified coal (Roques et al., 2004).

Investments in new large-scale power plants imply high investment costs and long payback periods, and thus bear significant risks for the investing utility. The risk exposure depends on the development of commodity prices in liberalized energy markets as well as on political and regulatory uncertainties, and hence has serious impact on the investment decision. In the research, we apply a model of decision-making under uncertainty using a real options approach (Dixit and Pindyck, 1994; Trigeorgis, 1996).

### **2.3.2 Investments Renewable Energy Technologies**

Much of the renewable energy literature focuses on technical and economic characterization of different renewable-energy technologies in different applications (see for example Ahmed 1994). Other literature focuses on renewable energy as part of national energy strategies, and the problems of greater adoption (see for example U.S. Department of Energy 1990). Many characterizations of the barriers to renewable energy "dissemination" are given in the literatures (Congress 1994, Grubb 1993, Hurst 1990). Another major theme, especially in developing countries, is the creation of new markets for renewable energy, both on the supply and demand sides (Hurst 1990; World Bank 1981).

The theoretical perspectives used to understand diffusion of renewable-energy technologies in developing countries have been extremely varied and diverse, and no one perspective has emerged to cover all of the cases, technologies, or policy questions. Perspectives have varied from views of the process as "communication systems" among networks of groups, as technological characteristics fitting specific needs of users, as technology adaptation, as a phenomenon of incremental technical change, and as evolution with complexity and feedback. Barnett identifies nine key issues present throughout this literature: the role of market and state, diffusion strategies and the role of participation, the performance of the technology, understanding user needs, the political economy of involved agents, financial returns to the user, the macro policy environment, and overhead and training requirements and costs (Grubb 1993).

Renewable development is also linked to national industrial policy. In the 1980s Denmark made a conscious decision to support a wind-power industry with subsidies and targets, and "Denmark is now established as the world's leading manufacturer of wind turbines, and domestic subsidies have been withdrawn on the grounds that it can now compete unaided" (Grubb 1993).

Government policies to support commercialization of renewable energy were enacted in the 1970s and early 1980s in the United States and several European countries. These policies recognized that a fledgling industry that had to compete in established markets with established industries would need special support. In addition to increased funding for R&D, the U.S. approach was to provide tax credits and deductions for equipment, regardless of its performance. In Denmark, capital grants of up to 40% were given to wind developments, but contingent on performance and environmental criteria (Elliot 1993).

In the early 1990s, an important question was still the comparison of the costs of renewable energy relative to conventional forms of electric power and heat generation, especially since oil prices were lower in real terms than before the oil crisis of the early 1970s (Barnett 1990). Many authors have lamented that low fossil fuel prices, the "baseline" against which renewable energy has to compete, have meant that many renewable-energy technologies are still not competitive and have not fulfilled the promise that many saw in the 1970s and early 1980s. Thus the literature has turned to identifying those technologies and applications that are closest to commercialization by virtue of

their economic competitiveness, and to the problems of developing markets for these technologies. In addition, economic and policy literature has analyzed the addition of environmental, political, and social externality premiums to conventional forms of energy as a way to make renewable energy more competitive in economic evaluations (Hohmeyer 1993).

Another example given by Hurst (1990) is solar hot-water heaters, which have mature markets in many developed countries, like Japan (2 million systems installed), Israel (600,000 systems installed), the United States, and Australia. Solar hot-water heaters have made inroads in developing countries such as China (150,000 square meters installed), Turkey (with 50 domestic manufacturing firms established), Kenya, and New Guinea.

### **2.3.3 The Power generation and Distribution Industry in Kenya**

Following the rapid adoption of privatization and liberalization policies in many countries, firms now have unprecedented opportunities to invest in foreign electricity sectors. Since Chile reformed its electricity sector in 1982, more than 60 countries have begun to move away from the traditional state-owned organizational model by encouraging new private investment in generation, transmission and distribution activities. While the scope of reforms has differed within each country, a common feature has been the increasing level of private sector involvement in the generation sector (World Bank, 1998). In some countries, such as the U.K. and Chile, state-owned generation assets have been sold to private investors as part of broader sectoral reforms,

including wholesale privatization of transmission and distribution assets, creation of a competitive electricity supply market and delegation of policy authority to independent regulatory agencies. In other countries, such as Indonesia and Brazil, reforms have been limited to the introduction of licenses for the sale of private generation output to stateowned utilities. Since 1990, over 350 generation projects involving the private sector have been initiated outside North America, representing over 130 gigawatts of privately-financed new capacity.

Increasing private sector participation in the generation sector is not confined solely to developed Western countries: many less developed countries, anticipating large generation capacity shortfalls as a result of rapid macroeconomic growth, have also looked to the private sector to finance additional investment. Indeed, according to the International Energy Agency (1998), more than 60% of global new generation plant requirements between 1995 and 2020 will be located in non-OECD countries, where the risks of political expropriation are generally higher than in the OECD. A substantial proportion of new investment opportunities therefore exists in countries where the non-market environment offers fewer assurances to private investors about the security of future investment returns.

With growth of power market, power trading activity and Power Exchanges, have enabled availability of power sending signals to market participants both for capacity use and long term planning of investments, but pricing in open access systems has been a problem. The history of parastatal domination and cost plus pricing takes time to change.

Early experiences cast their shadow and irrational pricing was a bottleneck from the first large interregional exchange of electricity.

#### **2.3.4 Infrastructure as a Determinant of Investment**

In developing countries, an essential requirement for economic growth and sustainable development is the provision of efficient, reliable and affordable infrastructure services, such as water and sanitation, power, transport and telecommunications. The availability of efficient infrastructure services is an important determinant of the pace of market development and output growth, and, in addition, access to affordable infrastructure services for consumption purposes serves to improve household welfare, particularly among the poor. In most countries, however, the potential contribution of infrastructure to economic growth and poverty reduction has not been fully realized, and existing infrastructure stock and services fall far short of the requirements.

Utilities such as water supply, gas, electricity and telecommunications and certain modes of transport, e.g. rail, all have natural monopoly characteristics arising from pervasive economies of scale and scope. These characteristics mean that competition is unlikely to develop or, if it develops, it will be uneconomic because of the duplication of assets. Although technological advances, notably in telecommunications, have whittled away some of the natural monopoly characteristics in utilities, permitting economic competition in certain areas of service delivery, each of the utilities retains some natural monopoly features.

### **2.3.5 Market Environment**

IPPs are able to invest in two organizationally distinct types of national generation markets, referred to here as competitive and monopsony. The type of organizational structure has strong implications for the mix of capabilities IPPs require to operate successfully so, to the extent that acquiring new capabilities is costly (Teece, 1997), the decision to enter a country is informed by the match between the firm's prior experience and the type of the generation market. In countries that have adopted the monopsony model (e.g. Brazil, China, Hungary), IPPs own and operate generation facilities, selling output under long-term contracts to a single buyer, usually a state-owned utility. Under this model, governments essentially "bolt on" private generation capacity to the existing state sector infrastructure, without needing to undertake broader privatization or structural reforms.

Thus, in different types of national generation market, IPP performance depends on different combinations of market and non-market capabilities. In both monopsony and competitive market structures, there is clearly an advantage for IPPs with strong technological and cost management skills. IPPs that can offer more competitively priced deals will attract more business in competitive markets and will succeed in winning more competitive tenders in monopsony markets. Well-honed marketing and trading skills, however, are more valuable in the former than the latter. Similarly, the ability to negotiate contracts and resolve disputes ex post with political actors is particularly valuable in monopsony environments. Since the skills firms learn in different generation

markets are largely specific to the type of market structure, firms can build on their expertise by expanding into new countries with the same type of generation market

## **2.4 Risk and Power Generation Investment**

The most fundamental change affecting the value of investments in liberalised markets is the inherent uncertainty about electricity prices in electricity markets. The uncertain future level of prices from investment in generation creates a risk for the investor. While this risk affects all generating technologies<sup>8</sup>, it does so in different ways. Technologies which have a higher specific investment for capacity even though they may have relatively low fuel costs (wind, nuclear) are more greatly affected by this risk because there is less they can do to respond. Thus, although high capital cost and low fuel cost technologies will likely be competitive in the short-run and therefore produce electricity, they will be more exposed to cover capital employed. A firm reliant on such technologies may find itself in financial difficulties if prices slump for a prolonged period (Rothwell, 2006).

Uncertain electricity prices also expose projects that have a long lead and construction time to additional risks. Economies of scale favour large power projects over small ones as capital costs per kW for a given technology generally decrease with increasing scale, or at least appear to do so. However, the combination of a long lead time, uncertain growth in demand for electricity and price, and uncertainty in the total cost of financing construction increase risks for larger projects. Furthermore, very large projects that must effectively be built as a single large plant (*e.g.* a very large hydro dam) are more

vulnerable to this type of risk than projects for which development can be phased in as several smaller power plants in response to market conditions. The cost of fuel can be a significant additional risk to profits, particularly for technologies where fuel costs are a high proportion of total generating costs. Natural gas technologies are particularly sensitive to fuel prices and price volatility, as fuel costs tend to constitute the majority of generating costs (Rothwell, 2006).

Uncertainty in future natural gas prices is increased by the liberalization of the natural gas market, and the disappearance of long-term contracts available for the supply of natural gas for power generation. High volatility of natural gas prices also will tend to increase short-term risks associated with natural gas. If rises in natural gas prices accompany falls in electricity prices, and the generator has not financed the project in recognition of this risk, the financial distress for natural gas power generators can be severe (Copeland and Antikarov, 2001).

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter focused on sample selection and description, research design, population and sampling design, data collection methods, tools and procedures, and data analysis and reporting.

### **3.2 Research Design**

This study was conducted through a case study and it was considered suitable as it allowed an in-depth study of the subject on investment strategies employed by Kenya Power and Lighting Company. According to Mugenda and Mugenda (2003), a case study involves a careful and complete examination of a social unit, institution, family, cultural group or an entire community and embraces depth rather than breath of the study.

This was a research on investment strategies employed by Kenya Power and Lighting Company. This design was most appropriate for a single unit of study because it offered a detailed in depth analysis that gave valuable insights to phenomena.

### **3.3 Data Collection**

The study used primary data which was collected from key informants. To achieve this, an interview guide was used to collect primary data (see appendix). The interview was conducted by the Researcher personally. Such informants comprised of senior managers within the company. These were managers in charge of planning, finance, distribution, commercial services and ICT manager respectfully.

The interview guide had unstructured questions which were used so as to encourage the respondent to give an in-depth response without feeling held back in revealing of any information. With unstructured questions, a respondent's response gives an insight to his/her feelings, background, hidden motivation, interests and decisions and gave as much information as possible without holding back.

### **3.4 Data Analysis**

The data was qualitative in nature, due to this fact; content analysis was used to analyze the data. Mugenda and Mugenda (2003) define content analysis as a technique for making inferences by systematically and objectively identifying specified characteristics of messages and using the same to relate trends.

The data was obtained from the various management team members belonging to different departments and compared against each other in order to get more revelation on the issues under study. This research yielded qualitative data from the interview schedules and analyzed using content analysis because this study seeks to solicit data that is qualitative in nature. Analysis of data collected will be compared with the theoretical approaches and documentations cited in the literature review.

## CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

### **4.1 Introduction**

This chapter entails data analysis discussion and presentation. The main objective of the study is to determine the investment strategies used by Kenya Power and Lighting Company within the power distribution sector. Data was collected using interview guides administered to senior managers within the company. These were managers in charge of planning, finance, distribution, commercial services and ICT manager respectfully.

### **4.2 Projects investment by Kenya Power and Lighting Company**

The Interviewees agreed that Kenya Power and Lighting Company invested in a various projects mainly within the power sector. Interviewees indicated that the company has invested in geothermal power generation and they gave Olkaria geothermal power generation as an example. Interviewees affirmed that the company is licensed to transmit, distribute and retail electricity and thus it has invested in distribution and transmission of power lines.

Interviewees indicated that the company invested largely in Hydro power projects as its major investment and as a primary source of power energy to meet customer needs and demands for power. The researcher found that the company also embarked on the Tana and Athi authority project in huge voltage of power production. The backbone of Kenya Power and Lighting Company is generating power from Hydro power which utilizes water resource for its generation.

Interviewees indicated that Kenya Power and Lighting Company have invested occasionally in construction of power substations, new transmission and distribution power lines. The company also invested in wind energy for the purpose of diverse production of electricity and utilization of wind resource that is abundantly available. Interviewees gave the wind turbines in Ngong hills.

Interviewees indicated that Kenya Power and Lighting Company invested in telecommunication, fibre optic cable and telecommunication equipment's. This was showcased by the Pre-paid conversion of customer's electricity consumption via the M-pesa from post-paid is instrumental investment for the company through telecommunication platform.

The study found that Kenya Power and Lighting Company invested in preparation of electricity wires as well as the preparation of electricity interconnection poles this involved making and importing the right gauge wire and treatment of poles purchased from suppliers respectively. Kakuzi limited is an example of the firms contracted by the company to supply electricity interconnection poles.

The researcher found out that Kenya Power and Lighting Company invested in coal and natural gas power plant. The company capitalized in coal and natural gas power to monopolize the power production sector where it partnered in Turkana drilling projects of coal as well the processing refineries. Interviewees indicated that the company has invested in Stima loan that is mainly busting accessibility of the company connectivity.

The study found that the milestone investment project of the company involves distribution and installation of power line to the customers with either members of the public or institution partly meeting the installation cost in form of deposit. Interviewees stated that the company has invested in nuclear power development and partnered with international companies state like Japan for pilot projects for capacity build-up lying foundation for commercialization.

The researcher found out that Kenya Power and Lighting Company invested in system reinforcement schemes to reinforce the existing power lines and transformers which improve service delivery and minimize destruction of electrical voltage. This is emanated from customer care services, response and rectification of electricity short circuit and transformers breakdowns.

The researcher found that the company invested in Pre-investment schemes/line maximization which helps to reach the customers who are over distance as per the connection policy. This according to Interviewees includes use of high powered generators to production and supply electric power to municipalities and government institution that are not covered by the company hydro-power.

### **4.3 Additions/Improvements investment project to the Current Plant of Operation by Kenya Power and Lighting Company**

Interviewees unanimously agreed that there were a lot of additional and improved projects in the company. The study revealed that there were additional and new projects that were considered investment by the company. Further, fibre optic cable network which involves communication is one of the key projects that the company has engaged in as an additional investment.

The study also revealed that there were reinforcement project that were carried out by the company for investment purposes. Interviewees indicated that upgrading of the substation from 1.5 mv to 7mv, from 7mv to 23mv and recently to 60mv where 40 mv was not enough to meet the demand. This has majorly taken place in the company for investment purposes in order to meet the growing demand. Interviewees also indicated that hydropower project were among the additional and expanded project in the company for investment reasons. Single Wire Earth Return (SWER) is an electricity transmission and distribution technology which, instead of using the conventional 3-Phase system, it uses only one wires with the return path through the ground this has been improved to enhance efficiency.

The researcher indicated that right issue funded project have taken place in the company while at the same time the company undertakes system reinforcement projects as well as contribution of new assets for investment purposes. Interviewees affirmed that addition of

new substation as well as improving on the existing distribution lines have been steadfast in the company for investment.

#### **4.4 Source of Funds for the Investment Project in Kenya Power and Lighting Company**

Interviewees indicated that the company source funds for the investment in its project from different sources. According to interviewees the company sources its funds for investment in its project from sale and purchase of shares. This has been issued by the company in form of ordinary shares through initial public offer (IPO) for public subscription, rights issue and transacting in Nairobi security exchange. Interviewees indicated that the company source funds for the investment for its project from donor funding and has enjoyed various well-wishers, corporate donations and guaranteed loans to meet capital required for infrastructural development and capacity building for nuclear and geothermal projects.

Interviewees indicated that Kenya Power and Lighting Company source funds for the investment in its project from company operations internally generated funds. The company collects revenue from sale of electricity which is collected from individual client, private institution and government institution. The company charge its services at reasonable price to make profit, what they collect in terms of revenues is reinvested after expenses. Interviewees indicated that the company source funds for the investment from banks loans. According to Interviewees Kenya Power and Lighting Company worthiness to credit facility is positive due to its business viability and it occasionally enjoys long-

term bank loans for investment without restriction. According to Interviewees many foreign investors fund Kenya Power and Lighting Company project in order to improve on its distribution capacity.

Interviewees indicated that Kenya Power and Lighting Company source funds for the investment from development partners. According to Interviewees Kenya Power and Lighting Company partners with other sectors, corporate investors and companies in the power sector and they often fund the company project to meet electric power supply within their scheduled time of their project implementation. Also in this case according to Interviewees with infrastructural support and expertise from Kenya Power and Lighting Company to handle high voltage power provision to the partner company operation, they are funded to meet their projects in returns.

Interviewees indicated that the company source funds for the investment from government grants. Kenya Power and Lighting Company get a lot of funds from the government through the ministry of energy; this is because the company is a public limited company which is constituted to serve the public interest. Interviewees also indicated that the company source funds for the investment from customer's capital contribution and gets funds from customer's capital contribution while getting new connection and installation of power lines.

#### **4.5 Motivations to Kenya Power and Lighting Company to undertake the investment projects mentioned**

Interviewees indicated that the reasons and motivation factor for Kenya Power and Lighting Company to undertake the discussed projects is to improve the efficiency of generating, transmitting and distributing electricity to the customers. The company like any other service delivery organisation has undertaken projects to improve the efficiency of its service delivery which are system reinforcement to reinforce the existing lines and transformers. This is fundamental in improving the efficiency of generating, transmitting and distributing electricity to the customers.

Interviewees also indicated that the reasons and motivation factor for Kenya Power and Lighting Company undertake the discussed projects to cater for projected load growth and to improve reliability of power. The company has been steadfast in ensuring reliable services and with pre-paid initiative project the company is instrumental to improve reliability of power supply in Kenya. The researcher found that geothermal power generation at Olkaria is fundamental in energy diversification and expansion for the economic growth of the country in line with vision 2030.

According to Interviewees the company occasional engage in construction of power substations and construction of new transmission and distribution lines to meet profitability of the firm and high revenue returns. Kenya Power and Lighting Company monopolize the power sector and thus capitalize in profit maximization.

#### **4.6 Kenya Power and Lighting Company strategy in investment within power distribution sector**

Interviewees indicated the company has used strategy in investment within power distribution sector the interviewee's mention that the strategy was to obtain funds to enable it in provision of power and to also enhance its quality supply. According to Interviewees the company employed strategic plan to mobilise fund to its activities in its investment and increase shareholders dividend in order to maintain its shares competitive and attracts more investors.

Interviewees indicated that the company has used strategy in investment within power distribution sector which include investment on distribution lines as well as transformers and construction of new substation in order to meet the demand for electricity. Kenya Power and Lighting Company employed strategic plan to expand the distribution and supply of electricity to rural areas and thus cover massive client in this strategy. The company strategy made the company to expand its operation and resulted to high revenue return from untapped areas previously. The researcher found that the company employed strategically rapid expansion which was aimed at blocking some other investors on that line to monopolize the industry and maximizes profit. Kenya Power and Lighting Company employed strategically identify the most profitable projects such as partnering with multibillion projects that require high volumes of power for a long period of time.

The study found that the company has used strategy in investment within power distribution sector to increase efficiency in its business of distribution and transmission of

electricity from one point to another. Kenya Power and Lighting Company employed strategic plan to initiate and achieve the prepaid purchase of electricity which has increased efficiency in its business. The customer care line at Kenya Power and Lighting Company has strategically improved efficiency in its business of distribution and transmission and customer satisfaction.

The researcher indicated that the company has used strategy in investment within power distribution sector to improve safety of power distribution. According to Interviewees the company has strategically installed substation and transformers to reduce breakdown of power from high voltage source with the aim of reducing destruction in power breakdown incidences.

#### **4.7 The extent of Kenya Power and Lighting Company in investment in renewable energy technologies**

Interviewees indicated that the company has invested in renewable energy technologies to smaller extent. Interviewees indicated that the company has constructed in the north eastern part of country wind power energy which is a small investment compared to the plenty availability of wind as a resource that can be utilized for energy production.

Interviewees indicated that Kenya Power and Lighting Company has moderately invested in geothermal power through KENGEN, this is still minimal hence the need to expand investment in this project. Interviewees indicated that the company has not invested in solar energy hence it has not developed a comprehensive plan toward solar energy investment. Interviewees cited that solar power has steadfast in private developers

especially in remote areas. Interviewees indicated that the company renewable technologies investment accounts to 1% power in the industry. Interviewees indicated that technologies such as aerial bundled conductors have been used to reduce the cost of distribution networks by as much as 15%. Interviewees also indicated that the company purchase agreement (PPAs) with project developers under the fit policy meant to scale up uptake of renewable energy technologies to promote the industry.

#### **4.8 Risks of investment in renewable energy technologies in Kenya Power and Lighting Company**

Interviewees indicated that there are risks associated with renewable energy investment since it is quite costly as compared to hydro power generation. According to Interviewees challenge of climate condition which fluctuates with changes in weather is risky when investing in solar energy, during rainy season solar energy might not be effective since it uses heat from the sun.

Interviewees indicated that there is no legal framework that are enshrine on renewable energy. Kenya legislation sometimes is fraudulent and biased to churn away new investor hence lower competitive nature of business. Market and operation risks are high in renewable energy; they cited the cases in Japan associated with nuclear energy. Technology in renewable energy is dynamic hence can become obsolete before settling investment expenses. Environmental degradation is a very risky factor associated with renewable energy that makes the company hesitant in investing in renewable energy. Financing was also found to be another risky factor drawn into attention while investing in renewable energy, there is no commitment from the government to fund renewable

energy. The government only gives initial capital and fail to give additional funds for further connection.

#### **4.9 The extent of Kenya Power and Lighting Company investment in power generation and distribution in Kenya**

Interviewees indicated that there quite a lot of investment in power generation and distribution in Kenya. The company is currently the sole electricity distributors in the country. This was agreed to a large extent because the company's main business is to distribute and retail power in the country; this has enabled approximately 30% of the population to get connected with power. The company has investment to a larger extent in line maximization and customer creation scheme where customers apply as a group for new connection of power.

#### **4.10 Kenya Power and Lighting Company rule for successful and profitable implementation on invested projects**

Interviewees indicated that the company has developed explicit mechanisms in monitoring and evaluation of its operation to maximize profit as well as reduce losses while ensuring quality service to customers. Saving in the losses resulting from reduced loading and length of lines has expounded it operation and resulted to increase in profitability.

Interviewees indicated that Kenya Power and Lighting Company carries cost benefit analysis to draw the financial position of the company in relation to operation expenses and revenue. According to Interviewees computerization has promoted fast trucking of

information in the company to meet customer satisfaction. Interviewees indicated that the company understand and knows that its core mission is to distribute power efficiently to its customers, it therefore meet this objective without diverting from it and thus maximizes profit. Interviewees indicated that a research is carried out before the company commits itself to any investment including the renewable energy technology. Increased electricity sales have been made possible by the new investment in distribution thus promoting profitability.

#### **4.11 Utilization strategy of Infrastructure by Kenya Power and Lighting Company as a determinant of investment**

Interviewees indicated that the company has utilization strategy of infrastructure as a determinant of investment, construction of the fibre optic cable has enabled the company to lease out to other telecommunication companies thereby increase its profits.

The utilization strategy of infrastructure where roads, schools, factories and hospitals are already in place, it's easier for customers to get new connections. This facilitates development thus power will be of great importance, as schools use computer, hospitals use refrigerators to store medicines and factories to manufacturer their products. Kenya Power and Lighting Company has done a lot of electricity installation and distribution in school and other premises. Other investment includes agricultural land, poultry, dairy and overhead irrigation.

#### **4.12 Financial investment in power sector**

Interviewees indicated that the company has financial investment in place of various forms due to their financial muscle, this include shares and treasury bonds traded in Nairobi security exchange, it also has financial investments in money market and fixed deposit.

The company has financial investment from Call accrual through the customer care line charges and services. Interviewees indicated that Kenya Power and Lighting Company has financial investment in infrastructure bond, electricity lines, fibre optic cable and Purchase of stock for construction of lines.

#### **4.13 Market Investment Used By Kenya Power and Lighting Company**

Interviewees indicated that market investment used by Kenya Power and Lighting Company is far reaching to the public while meeting the purpose of advertisement and meeting the objective of the organization. Use of advertisement creates awareness to the customers through the television, newspaper and radio station. Interviewees indicated that the company has used the rural electrification project as market investment strategy through Rural Electrification Authority. The company has also educated people on how to use and save power as well as issuing Stima loan to customers who cannot afford lump sum amount for connection. Interviewees indicated that Kenya Power and Lighting Company have used market investment strategy buying shares from other companies.

#### **4.14 Conclusions**

Kenya Power and Lighting Company source funds for the investment for its project from company operations internally generated funds. According to Interviewees the company collect a lot of revenue from its charges in electricity consumed by individual client, private institution and government institution as well as fibre optic. The study also revealed that there were reinforcement project that have been carried out by the Kenya Power and Lighting Company for investment purposes. Interviewees indicated that there are risk associated with renewable energy investment by Kenya Power and Lighting Company whose ration is quite costing as compared to hydro power generation. Due to the low power demand in rural areas according to the findings, it is sometimes possible to use smaller sizes of conductors. Smaller conductor sizes imply that they less costly hence contributing to lowering the overall costs of rural electrification. Technologies such as aerial bundled conductors have been used to reduce the cost of distribution networks by as much as 15%. Single Wire Earth Return (SWER) is an electricity transmission and distribution technology which, instead of using the conventional 3-Phase system, it uses only one wire with the return path through the ground. This is cheaper and easier to build and maintain as it involves stringing of a single conductor, fewer pole top fittings, graded insulation on transformers, and fewer switching and protection devices all of which lead to reducing connection costs thereby promoting low-cost for rural electrification.

## **CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter presents summary, conclusion and recommendations from the study findings. The main objective of the study was to determine the investment strategies used by Kenya Power and Lighting Company within the power distribution sector.

### **5.2. Summary of findings**

The study findings are summarized according to objectives of the study; In order to minimize the potential negative environmental effects of large scale electricity generation installations, power development planners in the region should consider including small to medium scale but reliable power plant that are also environmentally friendly. Small hydro, wind, solar, biogases-based cogeneration and geothermal energy sources appear to fit into these criteria. In addition, modular development of electricity generation facilities can ensure an incremental growth in generation capacity to meet the increase in demand in an economically and cost-effective fashion.

Kenya Power and Lighting Company invested in electricity wires as well as electricity interconnection poles which involves making and importing the right gauge wire and treatment of poles purchased from suppliers. Interviewees indicated that Kenya Power and Lighting Company source funds for the investment in its project from company operations internally generated funds.

To mitigate the negative trend of having an excessively large share of IPPs generating electricity from fossil fuel-based power plants, it is proposed that the regulatory agencies in collaboration with the Ministries of Energy should set explicit targets for the share of electricity generation from proven renewable energy technologies such as hydro, wind, solar PV, biogases-based cogeneration and geothermal. Kenya provides a model example where such targets have been set. In Kenya, the Government has set a target of 25% of electricity generation to come from geothermal by the year 2020. There is already an IPP actively exploiting this option as part of the process aiming at meeting the year 2020 target.

Service quality and Customer satisfaction: Service quality is the difference between customer expectations of service and perceived service. Outstanding service quality can give the organization a competitive advantage which leads to customer satisfaction superior sales and profit growth. These are dependent on the reliability of the service and responsiveness to customer needs as well as the delivery of the service itself. Hence if the management are to ensure quality service and a satisfied customer, they have to deliver the services in an appropriate way and address any challenge to it including.

Electricity Acts should be amended to ensure environmentally harmful electricity generation, transmission and distribution entities that were installed prior to EIAs becoming mandatory are assessed and mitigating measures carried out. The electricity regulatory agencies could enforce this requirement by linking renewal of licenses and the review of tariffs.

### **5.3 Conclusions**

In conclusion issuing long term licenses and power purchase agreement can ensure that the selling price of electricity is moderated. This is essentially because, long term agreements allow for sufficient time for the investor to pay off project financing debts as well as provide adequate amortization period for the equipment. In overcoming challenges of rural electrification the most common barrier of rural electrification identified is the high cost of grid extension. An immediate option to lower the cost of rural electrification is the use of proven low cost electrification options such as those identified in this study. Another option is the promotion of decentralized electricity generation in rural areas using hydro, wind, biogases-based cogeneration and where applicable geothermal.

The extent of this is underlined by the fact that Kenya is the largest purchaser of standby electricity generating plants in East Africa. Electricity is an essential feature for economic development. The reason for such necessity lies in the fact that electricity affects every sphere of a nation's economy. Bearing this in mind, both developed and developing nations aim towards establishing an efficient electricity sector. Mobilizing local capital investment is essential for examples demonstrate the potential financial and technical capability and viability of local private investors in the power sector.

Appropriate policy and financial incentives such as lowering entry requirements and tax holidays should be enacted to encourage local private investment in a privatized electricity industry. Energy efficiency is one area that power sector reforms have

increasing generation capacity. However, implementation of energy efficiency measures could reduce power demand thereby reducing the deficiency gap between power supply and demand. In addition, it could minimize the need for huge electricity generation installations thereby providing opportunities smaller generation installations that could be met through small hydro, wind, solar, biogases-based cogeneration and geothermal energy sources.

#### **5.4 Recommendations**

Under electricity sub sector, costs should be reduced and electricity tariff setting harmonized to minimize costs transfer to low income households with regard to fuel and exchange rate adjustment costs which have remained high due to over reliance of thermal electricity generation. Note that increasing funding and resources in the electricity sector to increase clean electricity generation from wind energy will not only put more electricity to the national grid, but also ensure improved access and reduction in cost of power as well as protect the environment from carbon dioxide emissions. There is need to ensure that universal access to electricity in the rural areas for majority of citizens is adhered to so as to increase access.

The company should ensure that it has invested on effective power surges in the control rooms, in order to control excess load from burning institutions and other premises. These will minimize the losses incurred when the power comes back after a blackout. Kenya power and lighting should also ensure that it has invested in more power surges as the demand for power is growing by day. When there is overload the power surges should enable the transformer to switch off automatically.

There is need to put in place deliberate measures to improve penetration of renewable technologies by providing fiscal incentives as well as credit facilities for both consumers and providers of energy in this sub sector. The renewable technologies (solar, wind, biogas) are the fuels for rural Kenya since they are stand alone. Moreover, self-regulations in the renewable energy sub sector e.g. in solar and other forms of energy to ensure quality supply of products, should be promoted.

The energy regulation commission needs to enhance consumer satisfaction in the energy sector by ensuring that the welfare and aspirations of energy consumers are met by the energy providers and particularly in electricity and petroleum sub sectors. There is need to continue ensuring that quality products are supplied across all energy services. To ensure efficiency in service delivery and therefore value for money for citizens, there is need for periodic survey to ascertain the levels of consumer satisfaction on the various energy products and providers of services.

From the foregoing, availability of adequate and reliable performance data is a challenge across the entire sector exacerbating the regulatory challenge and enhancing information asymmetry between policy makers, regulators, providers and consumers. Therefore the government invest in and secure the development of good quality data and information to the stakeholders in the energy sector focusing on critical decision influencing parameters namely; the cost of service, quality and availability of service.

## **5.5 Research Limitations**

The researcher encountered various limitations that hindered access to information sought by the study. The main limitation was its inability to include more utility companies. It was a multi case approach focusing on the Kenya Power and Lighting Company. The target population was the staff in Kenya Power and Lighting Company Nairobi. The study could have covered more regions across the country so as to provide a more broad based analysis. However, time and resource constrains placed a limitation on this.

Interviewees were reluctant in giving information fearing that the information sought might be used to intimidate them or paint a negative image about them or the organization. The researcher handled the problem by carrying an introduction letter from the university and which assured them that the information they give would be treated confidentially and it would be used for academic purposes only

## **5.6 Suggestion for further studies**

The study recommends further research on Investment Strategies by Kenya Power and Lighting Company within the Power distribution sector. The recommended further study will supplement the findings of this study by providing information on evaluation of the Kenya Power and Lighting Company within the Power distribution sector. The study recommends carrying out the same study in other countries in the region to find out whether the same results will be obtained.

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**APPENDIX: INTERVIEW GUIDE**

**INVESTMENT STRATEGIES BY KENYA POWER AND LIGHTING COMPANY WITHIN THE POWER DISTRIBUTION SECTOR**

1) Give specific examples of the projects that are typically considered investment for the firm

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2) Has the firm undertaken any investment project, either as additions/improvements to the current plant of operation or establishing new plants, since the initial plant establishment

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3) What was the source of funds for the investment project?

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4) What were the reasons/motivations to undertake the investment projects mentioned above?

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5) How has Kenya Power and Lighting Company used the strategy of investment within the power distribution sector?

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6) To what extent has Kenya Power and Lighting Company Investment in renewable energy technologies?

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7) What is the risk of investments in investment in renewable energy technologies?

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8) To what extent has Kenya Power and Lighting Company Investment in the power generation and distribution industry in Kenya?

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9) What is the rule you use to implement an investment project or asses the future profitability from an investment project?

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10) How has Kenya Power and Lighting Company used investment strategy of infrastructure as a determinant of investment?

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11) What are the financial investments in place in the power sector?

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12) What are the market investments used by Kenya Power and Lighting Company in place in the power sector?

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