In the previous two chapters, we examined the technical performance and financial performance and pricing policy of electricity supply industry in Kenya. In the current chapter, we are going to examine the rural electrification programme in Kenya. We will analyze the growth of rural electricity sector before the introduction of the reforms and after the introduction of reforms.

The electricity market involves a complex system where economic activities, technical, institutional, financial, socio-political and environmental factors influence the demands of different consumers. Among all these factors, the institutions for the delivery of electricity services and the provision of finance to customers greatly affect these markets. In this context, policy refers to any new laws or regulations that promote accelerate or improve electricity services for the rural population. When a government policy seeks to promote access to renewable energy sources, it needs to influence factors such as affordability; disposable income, availability, and high quality of modern source (Barnes et al 2005). In the case of the residential sector, affordability is particularly considered to be one of the main obstacles to the adoption of modern energy.

In the 1970s, the power sector was characterized by state ownership and monopolies. It was then believed that a single national utility operating as a monopoly was supportive to electricity system development and the right of people to low electricity prices. It was thought that this structure would facilitate expansion of power supplies, capture economies of scale, and ensure effective use of scarce managerial and technical skills (World Bank, 1993). This was the foundation of most of the vertically integrated state monopolies in most countries by the start of the 1990s.

However, most of the state-owned companies started experiencing financial problems mainly due to inappropriate pricing policies and poor operating performance due to lack of qualified and experienced personnel. The companies also experienced significant interference in their operations from governments. Politicians influenced
employment and low labor productivities. Meanwhile, most developing countries continued to experience limited access to electricity particularly in rural areas. Lack of financial resources from both the utilities and the public sector resulted in limited investment in system development and maintenance (Kessides, 2004).

6.1: Power Sector Reforms and Rural Electrification

With the introduction of market-based reforms in the power sector in the last decade, there has been an effect in the existing institutional and financial arrangements for rural electrification. With the privatization and commercialization of power supply activities, rural electrification is being classified as a social activity supported by government resources. Consequently, implementation of reforms has affected the rate of electrification and affordability of electricity in rural areas (Haanyika, 2005). Rural areas are usually characterized by low population densities with scattered clusters of premises usually inhabited by poor communities, low consumption and low load factors, particularly in developing countries.

Rural electrification may be understood as a process of empowering the rural and remote areas through the connection of electricity. It can also be termed as “the availability of electricity for use in the rural communities, regardless of the form of generation,” Barnes (1988). “The process of bringing electricity to the rural communities is known as, rural electrification,” Yaron et al (1994). This process is not only to provide electricity for lighting and household purposes, but it also allows for irrigation farming, poultry layering, refrigeration of farm produce, cattle milking and many other farm activities. This will increase efficiency and productivity hence reduces costs of employing more labourers.

Rural Electrification provides a proper path for small business activities and influences people to buy needful domestic and entertainment appliances such as TV, radio, cell phone and much more World Bank (2008:21). Electricity can be used to improve health through use of media, reduce mortality rate and influence family planning, which in turn may control population (World Bank, 2008, 27 & Emeuem, 2007). Rural electrification can make significant positive changes in education as several studies have indicated that household electrification has positive impact on children’s school enrolment and better performance.
6.2: Current Status of Electricity Access in the Rural World

It is believed that, 1,456 billion people (18 percent of the world’s population) do not have access to electricity, of which 83 percent are from the rural areas. In 1990, around 40 percent (2.2 billion) of the world’s population were without electricity (IEA 2009). In Sub-Saharan Africa less than 10 percent of the population is able to access electricity as a source of energy. In Kenya, it is 16 percent in the urban and 5 percent in the rural areas (Economic Survey, 2012). The process seems to progress at a snail’s pace. The IEA has estimated that, if the current trends do not change, then the number of people without electricity will rise to 1.2 billion by the year 2030. This is more likely to happen in Saharan Africa due to its rapid population growth.

6.3: Rural Electrification and Development

Many studies acknowledge that energy and development are closely related to each other. But especially in the rural areas, the provision of energy services remains a challenge. In order to create an understanding of the importance of energy in the development and put rural electrification in a sustainable development context, electricity access is key to development and “no country has managed poverty alleviation without increasing energy access” (Rao et al, 2009). Expressed in numbers 300 million households and 260 million in rural areas do not have access to electricity (World Bank, 2008a). Another billion only has access to instable electricity networks (AGECC, 2010). In 2008, the rural electrification rate in developing countries was only 58.4 percent, with the lowest rate in sub-Saharan Africa 11.9 percent and South Asia 48.4 percent.

Urban electrification rates are significantly higher reaching 90 percent in developing countries (IEA, 2008a). The number showed that rural communities especially suffer from energy poverty and are on the lowest rank of the energy ladder a concept describing the development on the household level is associated with both higher energy consumption and changes in the energy mix towards higher percentage of modern energy. But a universal energy ladder with identical ranks does not exist.
A further implication confirmed by econometric evidence is a positive relationship between energy consumption and household income (Hosier, 2004). For development to be successful it must be sustainable, scalable and to render the growth as a shared one, bringing together all parts of the constituents through focus on poverty reduction. In light of this need for shared and converged growth as fundamental for development and even more important for the legitimacy of the development process, rural electrification is a great enabler for convergent and sustainable growth through human capital accumulation (INSEAD, 2006).

Recent interest in rural electrification has emphasized the importance of linking its development with productive uses for energy and poverty reduction. This has been viewed as necessary to increase the pace of rural electrification and reduce its concentration on a relatively small number of developing countries. Despite this emphasis, progress in electrifying remote rural areas has been slow. In part, this has been attributed to the emphasis on cost recovery and reliance on the private sector to deliver electricity widely (Cook, 2013).

From the economic point of view of investing companies, the social impact on the rural communities is also an important aspect to consider convincing the participating rural communities to take part. Rural electrification can bring information from the outside world, this will be critical in eliminating several social practices in the villages. People would become more aware of their own rights and responsibilities. It would be easy to connect the rural communities through televisions and even the internet. One of the key tools of exploitation in rural communities is the advantage of possessing information which is not distributed evenly and fairly.

The model of involving low scale and off-grid electrification will be sustainable independently. Such model would also keep citizen involvement in utility productions and usage. Solid education can be imparted on the importance of conversation in energy sources and electricity. Several private sector- citizen government partnerships can be setup. This will usher in the true participative democracy that is extremely important. Such model once implemented as small scale projects in some parts of developing world can be easily replicated. The idea is to create localized solutions to generic problems, No one formula can work across all
regions. It has to be studied carefully and local solutions should be implemented and executed for each rural community or groups of communities.

6. 4: Progress of Rural Electrification in Kenya

The process of introducing rural areas to the twentieth-century economy began in Kenya with the creation of the Rural Electrification Programme way back in 1973 with the help of the Government of Kenya following an agreement with East African Power and Lighting Company, but later Kenya Power and Lighting Company Limited took over. Later in the year 2003, it was realized that only 4 percent households in the rural Kenya were able to access electricity. The process was termed to be very slow and the government of Kenya through the Sessional paper 4 of 2004 proposed the establishment of the rural electrification authority to foresee the activities of rural electrification on behalf of the government of Kenya. The Rural Electrification Authority was established under section 66 of the Energy Act, No. 12, 2006 as a body corporate. The authority was created in order to accelerate the pace of rural electrification in the country, a function which was previously undertaken by the Ministry of Energy.

6. 5: Functions of Rural Electrification Authority

1. To manage the rural electrification programme fund.
2. Develop and update the rural electrification master plan.
3. To promote the use of renewable energy sources including small hydro, wind, solar, biomass, geothermal, hybrid systems and oil fired components, and taking into account specific needs of certain areas including the potential for using electricity for irrigation and support of off-farm income generating activities.
4. To implement and source additional funds for the rural electrification programme.
5. Management of the delineation, tendering and award of contracts for licenses and permits for rural electrification.

The Rural Electrification Authority commenced its work later in 2007. It adopted the model of connecting the rural areas with electricity through the grid extension, that’s connecting those areas near to the national grid with electricity, off-grid extension,
and isolated diesel stations means using generators, installation of solar PV, wind and biogas systems in the public institutions. This is because of the nature of the rural household distribution in various parts of Kenya. The Rural electrification Authority which is in charge of the number of projects has to hand them over to Kenya Power and Lighting Company for operation and maintenance as they agreed upon. Though, the projects still remains the property of rural electrification authority (Ayieko, 2011). The motive behind Rural Electrification Authority was to take charge of the rural electrification programme on behalf of the government, to overcome the unwillingness of the private sector to take power to households, farms and business in the sparsely populated regions where profits are too low. The Rural Electrification Authority came up with strategic master plan in 2008 to complete electrifying 200,000 households every year.

There was also target to complete electrification of all public facilities in rural Kenya. This strategic plan was broken down into three phases, phase 1 starting from 2008-2012 and was meant to ensure that all public facilities are connected with electricity, that’s 1 million customers get electricity connection, there is increased connectivity from about 12 percent to 22 percent and lastly to ensure increased electricity access to 100 percent by the year 2012. Phase 2 commenced from 2013-2022, this is meant to connect customers (increase connectivity from 22 percent to 65 percent). The last phase 3 starts from the year 2022-2030. This comes with a plan to increase electricity connectivity from 65 percent to 100 percent through increase of the customer base, which implies that by the year 2030, all households and public facilities in Kenya will be having electricity as a source of energy according to the rural electrification master plan.

6. 6: Rural Electrification and Vision 2030 in Kenya

The government of Kenya introduced a long-term development blueprint for the country in the year 2008. The main aim of this vision 2030 is to have “a globally competitive and prosperous country with high quality of life by 2030.” It aims to transform Kenya into “a newly-industrialized, middle-income country providing a high quality of life to all its citizens in a clean and secure environment.” The vision also aspires to meet the Millennium Development Goals for all Kenyans by 2015. The 2030 Vision aspires for a country firmly interconnected through a network of roads,
railways, ports, airports, waterways, and telecommunications. It should connect electricity, water, and provide modern sanitation facilities to all people both in the urban and the rural Kenya. It is believed that, by 2030 no region in Kenya is to be referred as ‘remote.’ To ensure that the main projects under the economic pillar of the Vision 2030 are to be implemented, investment in the nation’s infrastructure will be given the highest priority (Government of Kenya, 2012).

The demand for electricity supply will increase drastically as the development projects recommended under Vision 2030 and overall economic growth commences. For example the new government of Jubilee under the leadership of President Uhuru Kenyatta and his Deputy William Ruto promised to provide laptops to all class one pupils in all public schools. This already has been implemented in the budget of 2013-2014. In this budget, ksh57 billion has been allocated to the purchase of laptops, of these Ksh15 billion is to be used to connect electricity to schools which are yet to be connected (Government of Kenya Budget, 2013/14). It is a good indicator that electricity demands or any other modern form of energy is going to increase.

6. 7: Major Sources of Energy in the Rural Kenya

Many developing and developed countries were dependent on traditional fuels like wood, animal and plant waste till the first half of 20th century. During the 2nd half of this century all the countries have become independent, and started development activities which have raised the demand for an energy source in a commercial scale (Sarkar, 2006). Kenya is one of those developing countries and has not been left behind. Studies have shown that there is a shift in use from biomass fuel to kerosene and liquid petroleum gas LPG by mid income urban households and to LPG and electricity by higher income households (TERI: 1992; Reddy and Reddy: 1994).

In rural areas the pattern is different. Studies in Western and Central Kenya (Mugo, 1997; 1999 World Bank, 2010) found out that all households regardless of social-economic status used wood or high quality crop residues (like maize cobs) before changing to other forms of biomass energy for cooking. In the Central Kenya, all the coffee and tea pruning and maize cobs were used before the population turned to wood or other lower form of residues. Biomass and wood fuel accounts for 68 percent of the total energy consumed in Kenya followed by petroleum 22 percent, electricity 9 percent and others 1 percent (REP Report, 2010). Mainly, the biomass
used here is consumed more in the rural areas. The others include solar energy because of Kenya being located strategically across the equator. The number of households that use PV system of 12-20 W capacity is 200,000 and the figure keeps on growing by about 20,000 per year.

By June 2009, there was a total target of 189 institutions which were to be electrified using solar PV system financed by Government rural electrification programmes (10-20 KW). The programme was meant to cover schools and health institutions in off-grid areas. In the FY 2009/10 alone, more than 500 institutions were on target for electrification using solar PV (Government of Kenya, 2010). Wind energy is also used in areas like Nairobi, Eastern, North Eastern and Coastal Kenya. The potential of wind energy has not been fully exploited for commercial purposes in Kenya. Electricity occupies only 9 percent hence a clear indication that, there is need to increase electrification rate as this encourages more economic activities, this would in turn lead to increased electricity consumption.

Like any other developing countries, Kenya also faces challenges of shifting to the use of clean and sustainable modern energy like electricity. Consumption of this commodity is limited particularly in the rural areas. The overall electrification rate stands at 20 percent with the urban and the rural areas standing at the figures of 16 and 4 percent respectively (Economic Survey, 2009). Currently, Kenya’s energy costs are higher than those of her competitors. Therefore, Kenya must generate more energy and increase efficiency in energy consumption.

The government is committed to steer up institutional reforms in the energy sector, including a strong regulatory framework, encouraging private generators of power, and separating generation from distribution. New sources of energy have been discovered like the exploitation of geothermal power in the Rift Valley, coal in Kilifi County, oil in the Turkana county, renewable energy sources, and connecting Kenya to the energy-surplus countries in the East African Region like Ethiopia. The failure of the market, which has left rural areas literally and figuratively in the dark, requires an aggressive government initiative to ensure that these areas are no longer comparatively disadvantaged in the twentieth-century Kenyan economy.

Moreover, with significant surge in investment, the accompanying new demand for household electrical appliances has spurred growth in home appliances
manufacturing and spawned the electrical and plumbing trades in rural communities. Electrical service also has brought revolutionary new mediums of communication to the rural farms, firms and households. Radio was followed by television and the new streams of information narrowed the cultural, educational and commercial divide between the urban and the rural Kenya (Census Report, 2009). The type of energy use in the rural households in any country can tell the economic status of the rural population of that country. It can also give the status of rural electrification.

6.8: Source of Investment for Rural Electrification in Kenya

Whether public or private financing, the challenge lays in securing the finances for rural electrification. Both public bodies charged with the responsibility of raising funds for rural Electrification and private entities interested in investing in rural electricity business need to apply innovative but less risky approaches. Common public approaches include mandatory consumer levies though unpopular with consumers already paying taxes to government. Private players are faced with many more opportunities although some are rather unconventional and difficult to materialize. Private options include investment Banks, local entrepreneurs and equipment suppliers with secondary interests of supplying Rural Electrification equipment (Ranganathan, 1992).

The main source of finance since the start of the rural Electrification Programme in 1973 to 2013 has been the internal sources. The 80 percent internal sources are given by the government to fund the rural electrification programme as agreed by the government and Kenya Power and Lighting Company. This entire amount is charged from the customers at a 5 percent levy. This tendency of screwing customers through tariff has resulted to the slow process of rural electrification in Kenya since its inception. It makes electricity not only costly but also less affordable to the rural population.

We intend to analyze the critical changes that have occurred in the rural electrification in Kenya since the inception of reforms through ‘change-point analysis’ by addressing five questions: 1) did change occur at all? 2) Did more than one change occur? 3) When did the changes occur? 4) With what confidence level did the change occur? 5) What might have caused the changes? By answering these five questions in the Kenyan context, the study attempted to identify the commencement of critical
changes and multiple change points in various indicators such as household connectivity, number of schemes undertaken, expenditure, revenue implicitly, with efforts to integrate the changes with policy shift and the government efforts to ensure development in the rural Kenya.

Results

6.9: Household Electricity Connectivity in Kenya.

In Kenya, there has been a tremendous increase in electricity connection to the households. The household consumers of electricity are grouped into two as per the Kenya Power Lighting Company, the urban and the rural household Consumers.

Figure 6.1: Change Point Analysis of Trend on Rural Households Connected with Electricity

Table 6.1: Change Point Analysis on Rural Households Connected with Electricity in Kenya

<table>
<thead>
<tr>
<th>Period</th>
<th>Confidence Interval</th>
<th>Conf. Level</th>
<th>From</th>
<th>To</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>(2000, 2000)</td>
<td>100%</td>
<td>39924</td>
<td>73909</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Annexure-5
Figure 6.1 and Table 6.1 represents a plot of trend and change point estimates of the rural households connected with electricity for the period 1993-2013. For the past 20 years, results indicate that, two major critical change-points have occurred for the rural household connections in Kenya. The first major critical change point happened in 2000 with a confidence level of 100 % while the second major critical change point happened in 2007 with a confidence level of 99 %.

The graphical representation in Figure 6.1 indicates that the trend for growth of number of household connected with electricity at the rural level has been constant from 1993-2000 when the first major critical change is indicated. The increase in trend was as result of the Rural Electrification Master Plan which was adopted in 1998 whose aim was to ensure increased rural electrification. This showed extension of lines for 135 schemes which were implemented at various stages in 1998 and completed in 1999. The number of consumers rose by 6194 from 55242 in 1998 to 61436 in 2000 (Economic Survey, 2000).

Further, a careful observation of trends in short-term intervals indicates that there was some progress till 2006. However, more sustained critical changes in the number of households connected with electricity at the rural level in Kenya occurred in 2007. This second critical change-point is closely attributable to progress in socioeconomic conditions and steady improvements in the economy of Kenya through a wide range of economic policies and power sector reforms. The Energy Act, No.12, 2006 which gave way to the formation of Rural Electrification Authority 2007 to foresee the rural electrification programme on behalf of the government, the Rural Electrification Master Plan 2008 and the Long-Term Economic Development Plan Vision 2030 are the major contributors of the second critical change point.

Figure 6.2: Change Point Analysis of Trend on Urban Households Connected with Electricity, 1993-2013
This trend assessment is about the urban household connected with electricity from 1993-2013 through ‘Change-Point Analysis’. For the past 20 years, Kenya has experienced two major critical change points in its rural household connection as shown in Table 6.2. The first major critical change point happened in 2000 with a confidence level of 99 % while the second major critical change point happened in 2007 with a confidence level of 100 %.

The graphical presentation indicates that the trend in growth of the urban household connections has been constant till 2000 when some increase was detected which again kept being constant till 2007 when the second major critical change point is indicated. This was obvious as the two change points were observed during a time when Kenya had undertaken many policy reforms in the power sector.
Figure 6.3: Change Point Analysis of Trend on National Households Connected with Electricity, 1993-2013

Table 6.3: Change Point Analysis on National Households Connected with Electricity in Kenya, 1993-2013

<table>
<thead>
<tr>
<th>Period</th>
<th>Confidence Interval</th>
<th>Conf. Level</th>
<th>From</th>
<th>To</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>(2000, 2000)</td>
<td>100%</td>
<td>354050</td>
<td>555960</td>
<td>2</td>
</tr>
<tr>
<td>2007</td>
<td>(2007, 2007)</td>
<td>100%</td>
<td>555960</td>
<td>1548400</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Annexure-5

Figure 6.3 and Table 6.3 shows change-point analysis for national households connected with electricity in Kenya for the last 20 years. The results unravel two major critical change-points 2000 and 2007. All the two critical change-points show higher confidence level of 100%. The critical changes are mainly due to the spectacular progress that the government of Kenya has done to ensure the access to electricity in the rural and the urban areas. The Customer Base Policy 2003 with the aim of connecting more customers to the grid, the Constituency Development Fund, the Rural Electrification Authority 2007 with the 2008 Master Plan has played a great role. It is also as a result of increase in development activities that have seen the number of households increased lately.

6. 10: The Rural Electrification Schemes in Kenya
A number of various schemes have been initiated by the government of Kenya since the start of the Rural Electrification Programme in 1973. The schemes receive funding from the government through the 5 percent levy that is charged on customers who consume electricity.

According to the graphical presentation of trend line in Figure 6.4, the number of schemes increased in 1993-1999. There was a decline in 2000-2001 a period when the economy of Kenya suffered due to the severe drought which extend from 2000 to 2002. These three years the economy grew at -0.1, 1.2 and 1.1 percent respectively. This kind of trend is an indication that the much dependency of the sector from the government to fund its projects affected it. When the economy was hit by the severe drought from 1998 to 2002 we see how it affected the funding to the scheme. Though, the trend was different in the periods 2003-2013 where we see an increase in the trend. The highest growth experienced in 2003-2013 is due to the initiative of the Rural Electrification Authority which was formed to look into Rural Electrification Programme on behalf of the government.

Figure 6.4: Change Point Analysis of Trend on REP Schemes in Kenya, 1993-2013

Table 6.4: Change Point Analysis on REP Schemes in Kenya, 1993-2013
The Rural Electrification Authority came up with the Master Plan in 2008 which has brought tremendous results. Table 6.4 also indicates that there are two major critical change points that have happened for the number of schemes for the past two decades. The two major critical change-points happened in 2004 and 2009. All the critical change-points have a higher confidence level of 95%. The first critical change point in 2004 was attributable to the implementation of the REP schemes in the rural areas which shows that the government and the development partners increased funds to the projects. The second critical change point in 2009 was due the efforts made by the Rural Electrification Authority established in 2007 to complete 237 rural electrification projects at the request of the government and also taking up another 295 rural electrification projects in the same year (KPLC Annual Report, 2009)

### Table of Significant Changes for REP Schemes

<table>
<thead>
<tr>
<th>Period</th>
<th>Confidence Interval</th>
<th>Conf. Level</th>
<th>From</th>
<th>To</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>(2001, 2004)</td>
<td>95%</td>
<td>136.27</td>
<td>188</td>
<td>1</td>
</tr>
<tr>
<td>2009</td>
<td>(2009, 2009)</td>
<td>98%</td>
<td>188</td>
<td>316.4</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Annexure-5

The Rural Electrification Authority came up with the Master Plan in 2008 which has brought tremendous results. Table 6.4 also indicates that there are two major critical change points that have happened for the number of schemes for the past two decades. The two major critical change-points happened in 2004 and 2009. All the critical change-points have a higher confidence level of 95%. The first critical change point in 2004 was attributable to the implementation of the REP schemes in the rural areas which shows that the government and the development partners increased funds to the projects. The second critical change point in 2009 was due the efforts made by the Rural Electrification Authority established in 2007 to complete 237 rural electrification projects at the request of the government and also taking up another 295 rural electrification projects in the same year (KPLC Annual Report, 2009)

### 6. 11: Rural Electrification Expenditure and Revenue in Kenya

The amount of money spent on the rural electrification by the government can reflect the government’s seriousness to the welfare of its people in the rural areas. Also the amount of revenue collected from the rural electricity customers can be used to measure the rate of electrification and the affordability of the electricity to the rural areas. The amount recovered through revenue may also indicate the economic viability of the programme to the government. It can also attract or put away the private investors as their objective is to make profits.
Figure 6.5: Change Point Analysis of Trend on REP Expenditure (Kshs million), 1997-2013

Table 6.5: Change Point Analysis on REP Expenditure (Kshs million), 1997-2013

<table>
<thead>
<tr>
<th>Period</th>
<th>Confidence Interval</th>
<th>Conf. Level</th>
<th>From</th>
<th>To</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>(2005, 2007)</td>
<td>99%</td>
<td>770.9</td>
<td>2008.6</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Annexure-5

Figure 6.5 and Table 6.5 presents ‘Change-Point analysis’ trend line plot and estimates of critical change-points for REP expenditure for the last 16 years 1997-2013. The assessment of the trend line plot and estimate of change-points indicates that Kenya experienced one major critical change-point in the year 2007. With a confidence interval of 95% the critical change occurred between 2005 and 2007. The change started being detected in 2005 when the economy grew at 5.8 percent and the government funded a number of projects as they were able to collect enough revenue through the 5 percent tax levy from commercial consumers. The change-point estimate showed greater statistical confidence level of 99%. Through the Rural Electrification Authority established in 2007 the government spent Kshs 2.2 billion to complete the 444 of the targeted 940 rural electrification schemes covering trading centers, secondary schools, health facilities and community water schemes (KPLC Annual Report, 2007).
Figure 6.6: Change Point Analysis of Trend on REP Revenue (Kshs million), 1993-2013

Table 6.6: Change Point Analysis on REP Revenue (Kshs million), 1997-2013

Table of Significant Changes for REP Revenue (Kshs million)
Confidence Level for Candidate Changes = 50%, Confidence Level for Inclusion in Table = 90%, Confidence Interval = 95%,
Bootstraps = 1000, Without Replacement, MSE Estimates, Analyze Ranks

<table>
<thead>
<tr>
<th>Period</th>
<th>Confidence Interval</th>
<th>Conf. Level</th>
<th>From</th>
<th>To</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>(2002, 2007)</td>
<td>98%</td>
<td>946</td>
<td>1757.7</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: Annexure-5

Figure 6.6 and Table 6.6 present a plot of REP revenue trend and change-point estimates for the last 16 years 1997-2013. The results indicate one major critical change-point in the year 2004. The critical change-point shows a high confidence level of 98%. With 95% confidence interval the change happened between 2002 and 2007. In 2002, the economy was recovering from the effect of the 2000 drought. The economy grew at 1.1 percent as the rain started showing up. There was more rain in 2003 which improved the generation of electricity from hydro and reduced the use of the expensive thermal generators which kept customers away. The economy also did well as it grew at the rate of 2.8 percent. During this year, also the Customers Base Policy 2003 was also adopted which was aimed at increasing the customer base. More economic and power policy reforms were undertaken in 2004 as per the suggestions put forward from the Sessional Paper No.4, 2004. These together with improved rains saw the economy grow at 4.9 percent. During 2005-2007, the economy was doing well; it grew at 7.0 percent in 2007 which may be the reason for improvement in
revenue collection together with the establishment of the Rural Electrification Authority 2007 which increased the customer base (KPLC Annual Report, 2007).

The researcher found out that Rural Electrification Programme established in 1973 along with the Rural Electrification Authority that was introduced in 2006 through the Energy Act No.12, 2006 has achieved much progress by initiating a master plan to have all households and public facilities electrified by 2030. The customer base has improved as the Rural Electrification Authority has taken the responsibility of the government to facilitate the Rural Electrification Projects through various schemes funded by the government out of the 5 percent levy from consumption of electricity by all customers and donors. It was also realized by the researcher that biomass and wood fuel dominate at 68 % in the rural energy consumption.

The government still remains the major player in undertaking the rural electrification schemes in Kenya. The highest figure of internal source of 80 percent is a clear indication that still Kenya’s rural electrification is in the hands of the government and thus the reason for high revenue collection. All the critical change-points incidentally, took place with the influence of either weather conditions or when important policy reforms had taken place, especially in 2000, 2004, 2007 and 2009 as shown from Tables 6.1, 6.2, 6.3, and 6.4.

For all Kenyans to realize the fruits of the Vision 2030 as stated by the government of Kenya in their development plan there is a need to liberalize the electricity sector. This will facilitate electricity connections as many private investors will join and the cost of connection will come down. They must also provide room for cheaper and localized solutions to each region according to the availability of the source of energy available in that region.