# TITLE: ENERGY SUSTAINABILITY IN KENYA'S ELECTRICITY SECTOR: *AN ANALYSIS OF THE INSTITUTIONAL AND LEGAL FRAMEWORK*

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE MASTER OF LAWS (LL.M) DEGREE IN ENVIRONMENTAL AND NATURAL RESOURCES LAW AT THE UNIVERSITY OF NAIROBI.**

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**NOVEMBER 2012**

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## DECLARATION

### Student's Declaration

I declare, that this Thesis is my original work and that it has not been submitted either whole or in part and is not being currently submitted for a degree in any other University.

Signature……Date Submitted 5/12/2012

Name **OSIEMO RAEL MORAA** Registration Number **G62/64867/2010**

### Supervisor's Declaration

I declare, that this Thesis has bee submitted for review with my approval as the University Supervisor.

Signature……

Date 5/12/12

**PROF ALBERT MUMMA**

School of Law

## DEDICATION

Dedicated to my sons; Chris and Stanley, my special friend, Albert and the Osiemo family for their love.

## ACKNOWLEDGEMENT

No researcher is an island entire of itself.

I therefore wish to acknowledge all of you who have made it possible for me to write this thesis by way of material and emotional support known and unknown.

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All of you have been exceedingly helpful and to you all I offer the best I can give;

My humble and hearty thank you!

## Abbreviations and Acronyms

| | |
|---|---|
| AfDB | The African Development Bank |
| AFREPREN/FWD Africa. | Energy Environment and Development Network for |
| ASALs | Arid and Semi Arid Areas |
| CERs | Certified Emission Reductions |
| CDM | Clean Development Mechanisms |
| CFC | Chlorofluorocarbons |
| CIF | Climate Investment Funds |
| CSD15 | Conference on Sustainable Development No 15 |
| EIA | Environmental Impact Assessment |
| EMCA | Environmental Management and Coordination Act |
| ERC | Energy Regulatory Commission |
| ET | Energy Tribunal |
| DSM | Demand Side Management |
| FiT | Feed in Tariff |
| GDP | Gross Domestic Product |
| GEF | Global Environment Facility |
| GHG | Greenhouse gas |
| GNESD | Global Network on Energy for Sustainable Development |
| GWh | Giga Watt Hour |
| HIV | Human Immuno Deficiency Virus |
| HFC | Hydrofluorocarbon |
| KenGen | Kenya Electricity Generation Company |
| KEREA | Kenya Renewable Energy Association |
| KETRACO | Kenya Transmission Electricity Company |
| KPC | Kenya Power Company |
| KPLC | Kenya Power and Lighting Company |
| kWh | Kilo Watt Hour |
| IEA | International Energy Agency |
| IPPs | Independent Power Producers |
| IUCN | International Union for the Conservation Nature |

| | |
|---|---|
| MDBs | Multilateral Development Banks |
| MDG | Millennium Development Goal |
| MW | Mega Watt |
| NEMA | National Environment Management Authority |
| NEPAD | New Partnership For Africa's Development |
| OECD | Organization of Economic Cooperation and Development |
| PPAs | Power Purchase Agreements |
| PV | Photovoltaic |
| REA | Rural Electrification Authority |
| REP | Rural Electrification Programme |
| SCF | Strategic Climate Fund |
| SME | Small Micro Enterprise |
| SREP. | Scaling-Up Renewable Energy Program |
| SSM | Supply Side Manageent |
| SWH | Solar Water Heating |
| TWAS | The World Academy Of Sciences |
| WEHAB | Water Energy Health Agriculture And Biodiversity |
| WCED | World Commission on Environment and Development |
| WSSD | World Summit on Sustainable Development . |
| UN | United Nations |
| UNEP | United Nations Environment Programme |
| UNDP | United Nations Development Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNWCED: Development | United Nations World Commission on Environment and |

## INTRODUCTION

Energy deals with the use of power to enhance performance, it is therefore very central for human survival and development. All energy forms are natural, energy is therefore a natural resource. Before the industrial revolution, humans relied on natural energy flows and on animal and human power for heat, light and work.[1] Energy use per capita did not exceed 0.5 tons of oil equivalent per year.[2] Between 1850 and 2005, overall energy production and use grew more than fifty fold from a global total of approximately 0.2 billion tons of oil equivalent to 11.4 billion tons of oil equivalent per year.[3]

Most of these increases occurred in industrialized societies that now use more than hundred fold the amount of energy that was used by our ancestors before humans had learned to exploit the energy potential of fire.[4] Consumption of commercial forms of energy mostly derived from fossil fuels grew rapidly during the second half of the 20th century.[5]

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[1] Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008) pp 12 available at www.twas.org. at pp 11 available at www.twas.org. Accessed on 10th October 2012

[2] International Energy Agency (2007 )as quoted as quoted in Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008) pp 12 available at www.twas.org. Accessed on 10th October 2012

[3] International Energy Agency (2007) as quoted in Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008) pp 12 available at www.twas.org. Accessed on 10th October 2012 Accessed on 10th October 2012

[4] United Nations Programme For Development Report 2000, p. 3 as quoted as quoted in Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008) pp 12 available at www.twas.org. Accessed on 10th October 20

[5] Sustainable Energy for Developing Countries: A report to TWAS, (2008) pp 12 available at www.twas.org. A The Academy Of Sciences For The Developing World ccessed on 10th October 20

Steady growth in energy consumption has been closely tied to rising levels of prosperity and economic opportunity in much of the world.[6]The intensity in use of energy depends on the extent of output of the country. The kind of dependency on energy by states is therefore proxy for the extent of economic activity in the country. At basic level of development, as it was before the industrial revolution, dependence on energy is limited. In ordinary sense, energy is depended on to achieve output, therefore the level and intensity of energy use in a country is a key indicator of economic growth and development[7]. Hence as economies develop dependence on the intensity of energy use increases. Existing evidence indeed links a country's energy production as being directly proportional to its level of economic development.[8]

This research paper is divided into five chapters as set out herein below ;

**Chapter One**

This is the introduction which briefly outlines the flow of this thesis. It brings out the research issues and the problem that the research project sought to find out. The chapter outlines the research questions, theoretical framework, the hypotheses, the objectives, the methodology and the literature review.

**Chapter Two**

This chapter analyzes the legal and institutional framework in promoting economic sustainability through the electricity sector. The chapter discusses the issues surrounding competition in the sector and the price mechanism used for fixing electrical tariffs and urges that the sector be grounded on an institutional monopoly with a bureaucratic

[6] Sustainable Energy for Developing Countries: A report to TWAS, (2008) pp 9 available at www.twas.org. at pp 11 available at The Academy Of Sciences For The Developing World www.twas.org. Accessed on 10th October 20

[7] Government of Kenya Third Draft National Energy Policy Dated 11th may 2012 at Pp 19 para 1.1

[8] Teklememariam, Meseret. Overview of Geothermal Resource Utilization and Potential in East Africa Rift System at pp, p. 7. Paper Presented at The First International Conference on Geothermal Energy in the East Africa Rift Region November 24th to 26th, 2006, Addis Ababa, Ethiopia

licensing system and regulatory institutions that are not independent. All these hamper fair competition.

With regard to the pricing mechanism, the chapter argues that the pricing mechanism is more protective of the investor than the consumer, hence robbing the consumer the benefits derived from a liberalized economy in form of low prices achieved through market innovation where the market regulates itself.

The chapter proposes that investors require to be given incentives in form of tax exemptions, transparent procurement process and easy licensing procedures, among other recommendations. The chapter also proposes an amendment of the Law to allow the Monopolies Authority to properly coordinate with the Energy Regulatory Commission to successfully regulate monopoly power in the subsector.

The chapter further argues that with proper implementation of devolution under the 2010 Constitution this monopoly power is bound to go but may be transferred to the counties and hence the need to have a strong national Monopoly Authority to oversee that this does not happen, as the provision of energy services is still to be governed by the national policy.

**Chapter Three**

This chapter discusses the aspect of environmental sustainability in the light of the legal and policy framework for Demand Side Management (Energy Efficiency and Conservation.) and Renewable Energy as drivers for environmental sustainability in the electrical energy subsector. The chapter argues that Kenya's electrical energy subsector is not environmentally friendly due to institutional policy and legal regulations that favour supply side management.

**Chapter Four**

The chapter delves into the issues surrounding social sustainability in the sector. The analysis is centred on social equity and access to reliable electricity. The chapter argues that the pricing mechanism is responsible for the high tariff rates charged on electricity, thus being an impediment in accessing electricity for the poor. The electricity subsidy

given to rural habitants and the graduated tariff discriminates against the urban poor as well as large consumers of electricity. The chapter also argues that Demand Side Management does not support social sustainability. It identifies the efforts that are being made in the subsector to promote social sustainability and makes recommendations for implementation to enhance social sustainability pillar in the sector.

**Chapter Five**

This chapter provides the conclusion of the research and proposes the way forward to a sustainable electricity sector. The chapter while proposing some recommendations towards the path to sustainability, concludes that electrical energy in Kenya does not meet the threshold of sustainable electrical energy and proposes for the provision of a strong, responsive Policy institutional and legal framework to enhance fair competition, provide low cost electricity, provide incentives for clean renewable energy and for adoption of energy efficiency measures with adequate enforcement and implementation as a necessary springboard to a sustainable electricity sector in Kenya.

# CHAPTER ONE

## 1.1 BACKGROUND INFORMATION TO THE STUDY

### Introduction

Sustainable energy has been defined as, "the provision of energy that meets the needs of the present generation without compromising the ability of the future generations to meet their needs."[9] It is also defined as "the dynamic harmony between equitable availability of energy intensive goods and service to all people and the preservation of the earth for future generations."[10] These definitions are pointers to the fact sustainable energy must promote the sustainability of the economic, social and environmental pillars. Sustainable energy must be produced and used in ways that support human development over a long time within the social, economic and environmental dimensions.[11]

The question of sustainable energy has emerged as one of the major components of sustainable development globally. The United Nations Development Programme World Assessment Report[12] linked unsustainable energy to most of the ills that affect modern society in both developed and developing countries. The World Summit on Sustainable Development (WSSD) selected energy as one of its five major agenda issues and devised a plan of implementation pointing out the role of energy in poverty eradication[13]. In

[9] International Energy Agency. Renewables in Global Energy Supply. An IEA Fact Sheet. Paris: OECD, 2007 at 3

[10] Tester, Jefferson W. Sustainable Energy. Choosing Among Options. Boston: MIT Press, 2005 at pp 2.

[11] UNEP International Environmental Law Training Manual ( 2006)available at www.unep.org/delc at pp 354

[12] World Energy Assessment, ,New York, United Nations Development Programme ( 2000).

[13] Plan of Implementation for the United Nations World Summit on Sustainable Development, adopted September 4, 2002, Johannesburg, South Africa. At para9 (e) pp 12 para 9 at pp12-13

addition it advocated for policies and regulatory frameworks tailored at promoting the development and dissemination of alternative energy technologies. [14] Consequently emphasis on energy sustainability is of paramount significance.

The Constitution of Kenya 2010 recognizes the concept of sustainability on the environment and natural resources.[15] Further to this, Sustainable Development is also given recognition and cited as one of the National Values and Principles of Governance.[16] These Constitutional provisions have connectivity to the enjoyment of many Fundamental Human Rights set out in the Bill of Rights.[17]

Kenya's Energy Policy has the broad objective of ensuring adequate, cost effective, accessible and reasonable supply of quality energy to meet development needs while protecting the environment.[18] Despite the introduction of structural reforms in the energy sector in the mid 1980s and the enactment of new energy laws Kenya's current energy status remains unsustainable. It is characterized by high tariffs, unreliability in supply and negative environmental impact.

[14] Plan of Implementation for the United Nations World Summit on Sustainable Development, adopted September 4, 2002, Johannesburg, South Africa. At para9 (e) pp 12 para 9 at pp12-13

[15] Constitution of Kenya 2010 in Article 69 (1a)

[16] Constitution of Kenya 2010 in Article 10 (1)(d)l

[17] Constitution of Kenya 2010 in Chapter 4

[18] Government of Kenya National Energy Policy of 2004 at pp 4

### a) Energy Efficiency

According to the Brundtland Report ,[19] world energy was being produced and consumed in a way that does not meet sustainability criteria.[20] Agenda 21 addressed sustainable energy law under "*Changing Consumption Patterns*" under which, states were urged to develop national policies and strategies to encourage changes in unsustainable consumption patterns to encourage greater efficiency in the use of energy and resources[21].

The solution to sustainable energy lies in the exploitation of sustainable energy sources and more efficient means of converting and utilizing energy.[22] This means that, energy efficiency and renewable energy are the key pillars of sustainable energy.[23] Renewable energy include solid biomass, charcoal, biogas, liquid biofuels, municipal waste, hydro power, geothermal energy, solar energy, wind energy and tide/wave/ocean energy.[24]

The available electricity in Kenya, though in constraint supply has a high wasteful loss arising out of system interruptions, a weak distribution network and a transmission

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[19] The Brundtland Report; A Report of the World Committee on Environment and Development (WCED, 1987).

[20] Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008) pp 12 available at www.twas.org. at pp 11 available at www.twas.org. Accessed on 10th October 2012

[21] Agenda 21, Chapter 4

[22] Tester, Jefferson W. Sustainable Energy. Choosing Among Options. Boston: MIT Press, 2005 at pp 2.

[23] Tester, Jefferson W. Sustainable Energy. Choosing Among Options. Boston: MIT Press, 2005 at pp 2.

[24] Tester, Jefferson W. Sustainable Energy. Choosing Among Options. Boston: MIT Press, 2005 at pp 2.

system.[25] The loss of electricity as at 2011 was 1, 2487 KWh million out of a net generation of 7,525.9 KWh translating to a total loss increase of 6.5% compared to the 4.8% in 2010, accounting for 16.5 % of the total electricity demand[26]

**b) Overreliance on fossil fuels and hydro power.**

For Kenya, to attain a consistent and sustainable development, reliable sources of sustainable energy are a prerequisite. The World Summit on Sustainable Development (WSSD)[27] has observed that many countries lay emphasis on fossil fuels which are the primary sources of greenhouse gases that contribute to climate change. The global response to this challenge has been muted in the implementation of the Kyoto Protocol[28]

Presently, the need for sustainable energy in Kenya require to be addressed with urgency given the fact that on average, East African Countries and Kenya in particular rely on 70 to 90% of their energy requirements on fossil fuels which cause environmental degradation.[29] The cost of fossil fuels being high leaves the bulk of the population to rely on wood fuel for energy needs, which is equally not sustainable. "Kenya has a sustainable wood fuel supply of 15 million metric tonnes, leaving a deficit of 20 million metric tonnes which is met through stock depletion and use of agricultural residues.

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[25] Wanyoike Patrick,Permanent Secretary Ministry of Energy ; SUBMISSION of Facts About The Integration of the Lake Turkana Wind Power Plant Into The Grid .Advertiser's Announcement In The Saturday Nation Of 27th October 2012 . Pp15.

[26] Kenya National Bureau of Statistics .Kenya Economic Survey 2012, para, 1018, pp 180.

[27] Bradford, A.J and R.L. Ottinger (ed). Energy, Law and Sustainable Development. IUCN Environmental Policy and Law Paper No. 47(IUCN Environmental Law Program). Cambridge: IUCN, 2003 ,at pp vii.

[28] Kenya ratified UN Framework Convention on Climate Change on 30th August 1994 and its Kyoto Protocol on 18th February 2005 available at ‹www.unfccc.int›

[29] Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008) at pp 7. available at www.twas.org. Accessed on 10th October 2012 at pp 7.

Without policy intervention, this deficit is expected to rise to 33 million metric tones by the year 2020.[30]

There has also been a strong growth in electricity demand in the country the dependence of which is mostly on hydro power and which has proven unreliable due to the effects of drought thus resulting in high tariff rates and increased disparity with regard to electricity supply and access. Volatility in the supply of petroleum or the energy shocks experienced in the early 1970's in the Middle East, the dwindling wood fuel sources all are illustrative of the need for energy sustainability.

Non-renewable, carbon-emitting fossil fuels now supply approximately 80 per cent of the world's primary energy needs.[31] Trends suggest that overall energy use will continue to grow strongly by a double or even triple digit by the year 2050.[32] A business-as-usual trend will see fossil fuel consumption grow by nearly as the total energy consumption while continuing to dominate the overall energy supply mix.[33]

Many oil-producing countries and oil dependent countries are reluctant to accept the need to reduce their reliance on fossil fuels fearing economic detriment.[34] This reluctance was seen during the negotiations towards the Kyoto Protocol which gave a blanket exemption to the developing countries with regard to emission reduction obligations under the principle of Common but Differentiated Responsibility, a perspective continue to bedevil post Kyoto Protocol negotiations.

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[30] Kenya Country Baseline Report and Work plan April 2008 at pp 36

[31] Sustainable Energy for Developing Countries: A report to TWAS, (2008) The Academy Of Sciences For The Developing World ,at pp 11 available at ww w.twas.org. Accessed on 10th October 2012

[32] Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008) , pp 11 available at www.twas.org. Acces sed on 10th October 2012

[33] Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008, at pp 11 available at www.twas.org. Acce ssed on 10th October 2012.

[34] International Environmental Law Training Manual. UNEP ( 2006)available, at pp 355.

c) **Access**

In terms of access, approximately two billion people, one third of the world's population lack access to electricity.[35] A majority of the people in developing countries do not have access to electricity and clean energy, but rely on biomass and animal dung. It is estimated that at least one-fourth of the world's 6.6 billion people are unable to take advantage of the basic amenities and opportunities made possible by modern forms of energy.[36] The number of people without access to electricity worldwide has hardly changed in absolute terms since 1970.[37]

The rural poor in developing countries account for the nearly 90% of households without access to electricity worldwide.[38] In Africa, as in many parts of the developing world, the lack of clean and reasonably priced energy is a significant impediment to sustainable development and a principal contributor to a host of environmental and social problems, particularly health problems.[39]

Access to electricity in Kenya is low with an estimated 77% of the people with no access to electricity connections and about over 85 % of the population rely on traditional fuels

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[35] World Energy Assessment (2004) update part III as quoted by Adrian J Bradbrook;Access to Energy Services In a Human Rights Framework at , pp2 para3.

[36] UNEP International Environmental Law Training Manual , UNEP at pp 21 ( 2006) .

[37]UNDP, 2000, p. 374 as quoted in The Academy Of Sciences For The Developing World Sustainable Energy for Developing Countries: A report to TWAS, (2008) pp 12 available at www.twas.org. Accessed on 10th October 2012. the academy of sciences for the developing world

[38] UNDP, 2000, p. 374 I as quoted in Sustainable Energy for Developing Countries: A report to TWAS, (2008) pp 12 available at www.twas.org. Accessed on , 10th ,October 2012.

[39] Energy Development and Utilization in Africa by Ibibia Worika in Bradford, A.J and R.L. Ottinger (ed). Energy Law and Sustainable Development. IUCN Environmental Policy and Law Paper No. 47(IUCN Environmental Law Program). Cambridge: IUCN, 2003 at vii

such as wood, charcoal, dung, and agricultural residues for cooking and heating.[40] WSSD declared in September 2002, that development required a refocusing of energy as a basic requirement for human dignity.[41] Further the nations agreed to take joint actions to improve access to reliable and affordable energy services sufficient to halving the proportion of people in poverty by 2015.[42]

**d) Energy Regulation**

Agenda 21 and the United Nations' Millennium Development Goals have both accorded energy issues a very peripheral position, yet the Millennium Development Goals and Sustainable Development can never be realized if states continue to operate in the paradigm of unsustainable energy.[43] The 2010 Constitution has enhanced protection and enforcement of fundamental rights amongst other gains. In specific reference to the energy sector, Part 1 of the Fourth Schedule provides that the National Government shall be responsible for:"

> *(a) Protection of the environment and natural resources with a view to establishing a durable and sustainable system of development including water protection, securing sufficient residual water, hydraulic engineering and the safety of dams*
>
> *(b) Energy policy including electricity and gas reticulation and energy regulation*

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[40] Government Of Kenya ; Scaling-Up Renewable Energy Program (Srep) Investment Plan For Kenya Draft May, 2011, at Para 46 Pp 13

[41] Paragraph 18 of the Johannesburg Declaration on Sustainable Development UN Doc. A CONF. 1992 L.6/Rev.3(4TH September 2002), states that; "We welcome the Johannesburg Summit Focus on the Individuality of human dignity and are resolved through the decisions on targets, timetables and partnerships to speedily increase access to basic requirements such as clean water, sanitation, energy, health care, food security and the protection of biodiversity.."

[42] The Johannesburg Plan of Implementation, UN Doc. A/CONF.199/20 (4 September 2002), para. 8.

[43] Adrian J Bradbrook;Access to Energy Services In a Human Rights Framework (2005) at pp 1 available at www.concourt.gov.za/files/grootboom.pdf at pp 1 Accessed on 26th Feb 2012

*(c) Public investment"*

In relation to the County Governments, Part 2 of the Fourth Schedule provides that,

"*County governments shall be responsible for county planning and development including electricity and gas reticulation and energy regulation."*

To embrace equity, Article 204 (2) Constitution of Kenya 2010 empowers the National Government use of the Equalization Fund to provide basic services including water, roads, health facilities and electricity to marginalized areas to the extent necessary to bring the quality of those services in those areas to the level generally enjoyed by the rest of the nation, as far as possible.

Energy Law and Policy in Kenya displays a number of characteristics, it is scattered in various statutes and treaties that lack harmony. The result is that energy laws are not integrated and therefore lack basic principles. The costing of energy is done using public finance laws that do not internalize environmental costs. The energy law is driven by a short term goal of supplying electricity or other energy sources that the market requires.

The energy sector in Kenya is regulated by a plethora of laws that are sectoral in nature. The Constitution 2010, the Energy Act, No. 12 of 2006, the Petroleum (Exploration and Production) Act[44] regulates the importation of petroleum products into the country, road transportation and the storage of related products. The Petroleum Development Fund Act of 1991, the Geothermal Resources Act No. 12 of 1982, deals with exploration of geothermal. The Trade Licensing Act[45] deals with the licensing of activities in the energy sector.

[44] Chapter 308 of the Laws of Kenya available at http://www.kenyalaw.org Accessed on 10th October 2012.

[45] Chapter 497 of the Laws of Kenya available at http://www.kenyalaw.org Accessed on 10th October 2012.

The Local Government Actof 1963 provides for authority for approval by the local authorities of sites for construction and installation of fuel storage and dispensing facilities. The Physical Planning Act of 1998, provides for zoning of areas for storage, distribution and retailing of petroleum fuels. The Weights and Measures Act, of 1988,[46] deals with the storage, dispensing equipment for sale of petroleum products are calibrated and regulated for accuracy. The Standards Act of 1974, deals with minimum quality specifications for materials modes and energy apparatus to be used, the Environmental Management and Coordination Act of 1999 regulates the environment aspect of the energy sector, The Public Procurement and Disposals Act No. 3 of 2005 establishes procedures for efficient public procurement, The Anti Corruption and Economic Crimes Act No. 22 of 2011, The National Land Commission Act of 2012 which establishes the National Land Commission pursuant to section 67 of the 2010 Constitution, The Consumer Protection Act establishes consumer protection regime, The County Government Act of 2012, gives effect to chapter 11 of the 2010 Constitution, The Environment and Land Court Act No. 19 of 2011 among many others.

The Sessional Paper No. 4 of 2004 on Energy articulates the Kenya Government's policy framework on energy in general. Among the characteristics of this policy that stand out for mention is that it lacks an integrated approach to sustainable energy, it is designed on the basis of fossil fuels, it is partially privatized and therefore runs on commercial basis and lastly, is the absence of legal regulations with respect to the question of sustainability.

Kenya's Energy Law, like the rest of Africa, has failed to integrate ecological assessment into its fundamental norms or legal framework.[47] The failure to integrate energy law and environmental law will mean that sustainable development as envisaged by the 1992 UN

[46] Chapter 513 of the Laws of Kenya available at http://www.kenyalaw.org Accessed on 10th October 2012.

[47] UNDP Report 2000, p. 3 as quoted in Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008) Pp 12 Available at www.Twas.Org.

Conference on Environment and Development in Rio de Janeiro is not tenable. Environmental Law has not done in done much in respect to the regulation of the energy sector, it only partially address it. Although Environmental Impact Assessment[48] is a standard requirement for new energy systems before they are licensed, it is more often treated as a routine exercise. Notwithstanding the provisions of the Environmental Management and Co-ordination Act, the Environmental Impact Assessment is not yet structured and able to be used to measure ways in which such systems could be applied to avoid greenhouse gas emissions.

Renewable electrical energy resources, such as solar, wind and geothermal are a viable option for meeting electricity demand. However, there is no clear legal framework that regulates renewable energy sources. For instance, Kenya has initiated a process towards starting a nuclear energy yet the country does not have any specific domestic law in place governing the installation of nuclear energy plants and production of nuclear energy which carry with them special potentially destructive risks to the environment and humans if not properly managed.

The recently discovered oil and coal deposits in Ngamia 1 of Turkana County and Mui within Makueni county, pause insurmountable environmental and social issues given that these energy resources are major emitters of carbon dioxide, which is a major contributor to global warming and also it will require relocation and resettlement of the communities from the area. The legal framework for environmental protection, equitable resource allocation and resettlement of the local communities is inadequate. These issues have raised concerns from the local communities and politicians from the areas, thus raising concerns over political instability associated with what is commonly known as "*the oil curse*"

[48] Section 58 Environmental Management and Co-ordination Act, (No. 8) of 1999 http://www.kenyalaw.org Accessed on 10th October 2012.

The path towards sustainable energy in Kenya is undermined by the absence of an integrated energy planning within the national economic, social and environmental policies. The electricity sector is controlled by the private sector that is not mandated to ensure sustainability of the sector in the public interest. There is no specific law to regulate the management of renewable energy resources such as wind, solar and nuclear. Close linkages between the various energy sub-sectors is essential as the subsectors complement one another. Any regulatory and legal regimes that have a concern for sustainability considerations in the electricity subsector must seek to address the above scenario. Thus the reform of the energy law becomes an essential element of achieving sustainable energy supplies and economic development.

## 1.2 Statement Of The Problem

This paper analyzes the institutional and legal framework for promoting sustainability in Kenya's electricity sector. The pillars of sustainability lie in a sustainable economy, social equity and environmental protection, all in a paradigm of integration. Kenya's electrical energy sub-sector fails the test of sustainability due to institutional monopoly characterized by the desire to make profits with no mandate to protect the environment.

A recent study in eight states in the United States, indicates that between 95.7 to 99.5% of a state's energy efficiency is determined by the kind of Laws and Policies implemented within its jurisdiction.[49] proper coordination between Government agencies charged with enforcement and implementation in the electricity sector to enhance sustainable electrical energy in Kenya is necessary for enhancing sustainability in the sector.

Energy Efficiency and use has not been adequately factored into most of the country's national sectoral development policies and plans. The "*Vision 2030*" which is Kenya's

[49] Bossel, Ulf. Sustainability and Energy. Oberrohrorf: European Fuel Cell Forum, p 3 Available at forum@efcf.com

economic blue print is no exception to this, though it does recognize energy as one its enabling pillar. Market forces in themselves alone cannot bring about energy efficiency without a legal framework on efficiency policies that allow energy firms to profit through investing in energy efficiency.

On the international arena, nations are required to undertake reforms in their energy regimes, to create energy policies and regulatory frameworks that create the necessary economic, social and institutional conditions in the energy sector to improve access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services for sustainable development and poverty eradication.[50]

### 1.3 Objectives of the Research

The objective of this research is to:

1) Critically assess the sustainability of Kenya's electrical energy sector.
2) Add material to the already existing literature on sustainable energy in Kenya.
3) Make an attempt to identify pitfalls in policy, institutional and legal frameworks of Kenya's electrical energy that may impede sustainability in the sector.
4) Demonstrate by use of case studies .how to integrate environmental and socio-economic issues in regulating Kenya's electricity power sector's
5) Propose awareness to the Government and the public that energy sustainability is a multifaceted and critical issue in attaining any meaningful development in all dimensions and that the government should not only put more emphasis towards producing more energy but also put more emphasis on efficient production processes and use of the available energy.

### 1.4 Research Questions

This research was guided by the following research questions:

1) Is Kenya's electrical energy sub-sector sustainable?

[50] Plan of Implementation for the United Nations World Summit on Sustainable Development, adopted September 4, 2002, Johannesburg, South Africa. At para9 (e) pp 12

2) What are the pitfalls or inadequacies in Kenya's electrical energy, legal and policy framework that need to be addressed in order to promote sustainable electricity?

3) In what ways can the electrical energy sub-sector in Kenya be made sustainable?

## 1.5 Hypotheses.

The basic assumptions of this study were that;

1. Kenya's electricity sub-sector is not sustainable.
2. There exists a lacuna in Kenya's policy and legal regimes regulating the electricity energy sub-sector towards achieving sustainable electricity.

## 1.6 Justification For The Study

Sustainable development is one of the National Values and Principles of Governance in Kenya's 2010 Constitution. The 2010 Constitution also contains provisions relating to sustainable resources management, environmental protection, socio-economic rights as well as equitable distribution of resources and access to services.[51] The framers of the 2010 constitution must have then identified a strong need that required to be specially addressed not just by an ordinary Act of parliament but through laying a fundamental basis for their enforcement in the constitution. Hence, the justification for this research is the quest for the implementation of the new constitutional dispensation in line with the concept of sustainable development as one of the national values and principles of governance under the 2010 constitution.

[51] Constitution of Kenya 2010, Article 10(1)d Article 42 Article 43 article 60 (1c&e) and Chapter 5

According to Bradbrook[52] the issue of sustainable energy has previously not been given a lot of attention the world over. The United Nations Framework Convention on Climate Change and its Kyoto Protocol only contain non binding obligations with respect to energy efficiency and renewable energy sources and has not addressed the issue of energy access.[53] The Millennium Development Goals also ignored the issue of access to energy services.[54] This shows that energy was never thought to have a bearing on environmental degradation and even in fighting poverty.

In this regard, issues of sustainable energy have not been given the much attention they deserve the world all over, yet energy sustainability is integral to the realization of the vast bulk of socio-economic rights.[55] Where sustainability in energy is lacking, other urgent human and societal needs often remain unmet, meaning that energy needs compete with other priorities.[56] Sustainable energy is critical for advancing other development objectives. Access to basic energy services has been directly linked to most of the social and economic development targets outlined in the Millennium Declaration[57] as well as to the enjoyment of human rights set out in Municipal and International Legal Instruments.

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[52] Adrian J Bradbrook ;Access to Energy Services In a Human Rights Framework at Pp 1 para1available at www.concourt.gov.za/files/grootboom.pdf . Accessed on 26th Feb 2012 .

[53] Adrian J Bradbrook ;Access to Energy Services In a Human Rights Framework at Pp 7 para 3 available at www.concourt.gov.za/files/grootboom.pdf . Accessed on 26th Feb 2012 .

[54] Adrian J Bradbrook ;Access to Energy Services In a Human Rights Framework at Pp 1 para1available at www.concourt.gov.za/files/grootboom.pdf . Accessed on 26th Feb 2012.

[55] Energy Development and Utilization in Africa by Ibibia Worika in Bradford, A.J and R.L. Ottinger (ed). Energy Law and Sustainable Development. IUCN Environmental Policy and Law Paper No. 47(IUCN Environmental Law Program). Cambridge: IUCN, 2003 at vii.

[56] Sustainable Energy for Developing Countries Report to the Academy of Sciences for Developing Countries (TWAS). at pp 12 (Trieste: Strada Costiea 11, 2008). available at www.twas.org Accessed on 10th October 2012.

[57] WEHAB Working Group, report (2002) para7 the working group was formed as part of the preparations leading to the World Summit On Sustainable Development in 2002.

Accessibility to modern energy services is particularly detrimental to women and children in the developing world.[58] Kenya, like other developing economies requires large quantities of affordable and good quality energy supplies to sustain private investments and growth.[59] Today, the most immediate energy priority for many developing countries is to expand access, provide safe, clean, reliable and affordable energy. A study on sustainable electricity is therefore justified in order to assist in delivering the said energy priorities.

Kenya therefore needs a legal and regulatory regime that directs the country's economic development plans towards the provision of sustainable electrical energy. For this reason, a critical analysis of Kenya's legal and regulatory system is required to establish the legal and regulatory system's adequacy or lack of it in guiding the country towards the path of electrical energy sustainability.

## 1.7 Theoretical and Conceptual Framework

The theory of sustainable development is a multi-disciplinary theory that has come up as a possible solution to some of the socio-economic and environmental challenges facing the world.[60] The theory challenges economic models of development that lead to severe and widespread environmental degradation as well as inter-generational and intra-generational equity.

The theory provides an alternative model of development whose centre piece is to strike a balance between the conflicting goals of economic development, environmental

[58] Energy Development and Utilization in Africa by Ibibia Worika in Bradford, A.J and R.L. Ottinger (ed). Energy Law and Sustainable Development. IUCN Environmental Policy and Law Paper No. 47(IUCN Environmental Law Program). Cambridge: IUCN, 2003 at vii.

[59] Christopher H. Onyango Grace N. Njeru Boaz M. Omori ;Regulatory and Competition-Related Reforms In Kenya's Power and Petroleum Sector final repot October 2009 pp6.

[60]The Brundtland Report; A Report of the World Committee on Environment and Development (WCED, 1987). Our Common Future: From One Earth to One World. In 'Estes, Richard J. Toward Sustainable Development: From Theory to Praxis. Social Development Issues 15(3) 1993, at 1 to 29.

protection and social justice. As such, it has succeeded in uniting widely divergent theoretical and ideological perspectives into a single conceptual framework.

The Theory of Sustainable Development was conceived by the Brundtland Commission[61] as

> "*paths of human progress, which meet the needs and aspirations of the present generation without compromising the ability of future generations to meet their own needs.*"

The Commission viewed sustainable development as a new development paradigm and advocated for a new global system that recognizes that social and environmental problems are inter-connected.

> "*Environmental problems are not limited by international borders, a catastrophe happening in one part of the world affects the entire globe. This requires an application of a sustainable approach to development, so at to protect the earth's fragile ecosystem and achieve human development".*[62]

The Theory of sustainable energy envisages the use of energy in a manner that spurs economic development and social equity within generations and across generations without harming the environment. The concept of sustainability with regard to energy was first postulated in 1713 by Hans Carl Von Carlowitz Supervisor of Mining who postulated that;

[61] The BrundtLand Report Report of the World Committee on Environment and Development (WCED, 1987). Our Common Future: From One Earth to One World. In 'Estes, Richard J. Toward Sustainable Development: From Theory to Praxis. Social Development Issues 15(3) 1993, at 1 to 29.

[62] The BrundtLand Report, A Report of the World Committee on Environment and Development (WCED, 1987). Our Common Future: From One Earth to One World. In 'Estes, Richard J. Toward Sustainable Development: From Theory to Praxis. Social Development Issues 15(3) 1993, at 1 to 29.

*"avoiding future shortages of timber and firewood requires harvesting only the natural growth of wood, not the tree itself."*[63]

Within the broad compass of international policy for Sustainable Development, the desire for economic growth and for widespread energy services has been joined by the need to mitigate Climate Change. These three factors are driving the twin objectives of Renewable Energy generation and efficient use of energy[64].

Energy Laws have tended to lay more emphasis on ensuring an adequate supply of energy, rather than providing energy systems with an emphasis on maximizing efficiency, respecting ecology or ensuring equity in use among all users.[65] As a result, energy law has developed without much regard for the negative environmental impacts of energy generation. Prices for energy services for decades have ignored environmental externalities and most often disregarded whether the poor can access such services.

Principal, among the environmental externalities, are the following: air pollution including "acid rain," waste water pollution, significant solid and hazardous waste products from mining or combustion of coal or use of enriched uranium, disregard for the reclamation of mined lands and their ecosystems, discharge of waste heat from cooling systems into aquatic ecosystems, loss of habitat[66], among many others. The importance of

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[63] Bossel, Ulf. Sustainability and Energy. Oberrohrorf: European Fuel Cell Forum, at pp 1 Available at forum@efcf.com ( quoted from The Sustainability Concept ;Instructions For A Natural Tree Growth by Hann Carl Von Carlowitz published 1713 in Sylvicultura Oeconomica by Johann Friedrich Braun )

[64] Sustainable Energy for Developing Countries: A report to TWAS, the academy of sciences for the developing world (2008) pp 12 available at www.twas.org. at pp 11 available at www.twas.org. Accessed on 10th October 2012. (Trieste: Strada Costiea 11, 2008.

[65] UNDP Report 2000, p. 3 as quoted as quoted in Sustainable Energy for Developing Countries: A report to TWAS, the academy of sciences for the developing world (2008) at pp 12 available at www.twas.org Accessed on 10th October 2012.

[66] Sustainable Energy for Developing Countries: A report to TWAS, the Academy of Sciences for Developing Countries (2008) pp 12 available at www.twas.org. Accessed on 10th October 2012.

energy generation and efficient use is an important part of the concept of sustainability.[67] Every energy legal regime that has concern with sustainability in the electricity subsector must therefore seek to look through the lenses of the concept of sustainable development theory.

## 1.8. Literature Review

The issue of legal regulation of sustainable energy is one that Omolo[68] has followed in discussing the power sector reforms and liberalization in the electricity sector in Kenya to attract participation of independent power producers (IPP). The sectoral reforms, in his admission, were created by the oil shocks of 1970s. The other triggers of reform of the energy sector was dissatisfaction with oil, gas and electricity supplies. Reforms in this sector were targeted at preparing them for commercialization and eventual privatization.

In the opinion of Mumma[69] the legal mandate for sustainable Energy Law, just as it happens in Environmental Law, must be imposed when there is no technology to achieve a given goal in a cost effective manner. That is why the Kyoto Protocol's provisions on emission reduction are envisaged to lead to energy efficiency. This, in the author's view, will lead to remarkable innovation in the elimination of pollutants such as lead from gasoline, chlorofluorocarbons (CFCs) and other programs that will reduce acid rain formation.[70] Mumma supports a free market as the centre piece of low carbon economy

[67] UNEP International Environmental Law Training Manual ( 2006) at pp354

[68] Omolo, Beldine. Competition in Kenya's Electricity Sector. 1st Annual Competition and Regulation in Network Industries Conference 29th November 2008, Brussels, Belgium.

[69] Albert Mumma &David Hodas. Designing a Global Post-Kyoto Climate Change Protocol that Advances Human Development. The Georgetown International Environmental Law Review (2008) 20:619. available at: http://ssrn.com/abstract=1162770

[70] See also Thomas O. McGarity, Radical Technology-Forcing in Environmental Regulation, 27 LOY. L.A. L. REV. 943, 947-52 (1994) (lead in gasoline); Alfred C. Aman, Jr., The Earth As Eggshell Victim: A Global Perspective on Domestic Regulation, 102 Yale L.J. 2107, 2120 (1993) (noting the technology-forcing effects of the Montreal Protocol on ozone depletion); Margaret R Taylor et al., Regulation as the

because it has the freedom to innovate; therefore he argues that developing countries must have cap emissions

In recognizing the caps, Prof Mumma is convinced that the international community must ensure that the energy is used efficiently and maximized to the usage of low carbon energy.Prof Mumma is not convinced that market forces alone can bring about energy efficiency without a legal framework on efficiency policies that allow energy firms to profit through investing in energy efficiency. To the extent that Mumma focuses on the Kyoto Protocol and its envisaged effect on sustainable energy, it does address the challenges posed by the absence of a legal framework for sustainable energy in Kenya.

***A Report to the Academy of Sciences for Developing Countries***[71] has isolated four trends in global energy sources that are relevant to Kenya namely; rising consumption of energy, general improvement efficiency in use and production of energy and energy technologies as well as reduction in the conventional pollutants that are closely associated with the use of energy. These trends pose economic and environmental challenges in form of high world petroleum prices , leading to escalating food prices precipitating concerns about economic and political stability. The environmental challenge is pollution from energy use in power plants, automobiles and heavy equipment that emit effluent that is detrimental to health. The author argues that the goal of reducing green house gas emissions is closely linked to the pursuit of developing renewable sources of energy. The question of legal regulation has however not been analyzed by this report yet the challenges the publication identifies need to be harmonized through an integrated legal framework that is lacking in Kenya and many other developing countries, which is the essence of this study. However the publication proposes some commercial and industrial

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Mother of Innovation:The Case of SO2 Control, 27 L. & POL'Y 348 (2005); see also Richard W. Parker, The Use and Abuse of Trade Leverage To Protect the Global Commons: What We Can Learn from the Tuna-Dolphin Conflict, 12 GEO. INT'L ENVTL. L. REV. 1, 66 (1999) (noting that trade leverage served a technology-forcing function with respect to tuna fishing).

[71] Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008) available at www.twas.org . Accessed on 10th October 2012.

policies and regulations that would significantly increase the share of renewable energy and decentralize energy services in the supply of energy and let the markets regulate themselves to enhance innovation in order to accelerate energy supply and access in Africa to reliable and affordable energy supply to all.

The publication[72] has also addressed linkages between environment, energy and cities. He argues that most of today's commercial and non-commercial energy is used in and for cities, substantially in the household sector thus priority measures should aim at increasing the efficiency of energy use to reduce pollution and to promote the use of renewable energy so as to protect the urban environment. Major policy changes are necessary to re-orient the current focus on energy supply to an end-use oriented approach.

The publication [73] urges developing countries to enhance, capacity-building for appropriate urban energy management as a long-term dynamic process to strengthen the existing strategies, skills and capabilities through:

(a) Environmental research and policy analysis needed to formulate urban environmental strategies and action plans at the local level;

(b) Policy reform, institutional development and resource mobilization; and

(c) Financial support for improving efficiency of urban energy services and for the promotion of renewable energy technologies.

The publication has pointed out that preliminary results of positive power sector reforms undertaken in a number of African countries have been minimally positive, a finding that is attributed to, inter alia, the low interest in the private sector to improve electricity access levels as well as their unwillingness to commit the levels of investment needed to increase generation capacity and improve transmission. The Power sector reforms often entailed negative social and environment implications, such as reduced access to

[72] Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008) available at www.twas.org . Accessed on 10th October 2012.

[73] Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008) available at www.twas.org . Accessed on 10th October 2012.

# CHAPTER 2

# A LEGAL ANALYSIS OF THE LEGAL AND INSTITUTIONAL FRAMEWORK FOR PROMOTING ECONOMIC SUSTAINABILITY

## 2.1. INTRODUCTION

For most of the last 200 years, steady growth in energy consumption has been closely tied to rising levels of prosperity and economic opportunity in much of the world.[81] Consequently energy use is a key indicator of economic growth and human development.[82] In fact Kenya's national economic blue print commonly known as Vision 2030, energy is identified as one of the infrastructural enablers of the blue print's pillars. Virtually every economic and social activity requires some form of energy. For example, energy is required for cooking, providing light, transportation of goods and people, for provision of education and healthcare and recreation as well as for agricultural activities and processes among many others.[83] A successful economy depends on both supply and use being secure, safe and efficient.[84]

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[81] Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008) Trieste: Strada Costiea 11, 2008 at pp 12 available at www.twas.org. at pp 11 available at www.twas.org. Accessed on 10th October 2012. (Trieste: Strada Costiea 11, 2008

[82] Government of Kenya National Energy Policy of 2004 at para 1.2

[83] Ottinger. L. R Energy Resources Framework For Energy Resource Managemnt, UNEP Handbook for Drafting Laws on Energy Efficiency and Renewable (2007). at pp 2.

[84] Energy for Sustainable Development: Policy Options for Africa A UN collaboration mechanism UN sub-cluster on energy in support of NEPAD UN-ENERGY/Africa publication to CSD15 pp 10 para 3.1 available at www.icwbo.org/uploaded files.iccc/policy/environment/energy pdf Accessed On 12th September 2012.

## 2.2. Institutional Framework For Competition

The institutional arrangement of Kenya's electrical energy subsector is set out in the Energy Act of 2006, the Geothermal Resources Act of 1982 and the Kenya Energy National Policy as contained in Sessional Paper No 4 0f 2004. The institutional framework for the electricity sector in Kenya has been historically monopolistic both vertically and horizontally. This is perhaps because previously, the sector was believed to be a natural monopoly by virtue of the characteristic of the electricity generation and transmission. However, with advancement in technology, it has been proved that electricity transmission and generation is not a natural monopoly as several electricity service providers can use the same network to provide the service.

### A. Institutional monopoly

#### a) Generation and Transmission

Competition in electricity generation in Kenya became formally liberalized in 1997 on the enactment of the Electricity Power Act of 1997.[85] The first step towards the Liberalization process in the electricity subsector commenced in 1997 after the enactment of the 1997 Electricity Power Act which saw the unbundling of the then vertically integrated utility into two entities namely; The Kenya Power and Lighting Company (KPLC) whose name had been changed from East Africa Power and Lighting Company in 1983 which then had confined its operations to Kenya, remained with the transmission and distribution function. The Kenya Power Company (KPC) that had been under the management of KPLC since 1954 became responsible for public-funded public power generation and was subsequently renamed The Kenya Electricity Generating Company (KenGen) after a re-launch in 1998.[86]

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[85] Omolo, Beldine. Competition in Kenya's Electricity Sector. 1st Annual Competition and Regulation in Network Industries Conference 29th November 2008, Brussels, Belgium. Pp 4

[86] A Report Of The Parliamentary Committee On Energy Communications And Information On Ownership And Status Of KPLC July 2010, at Para 46

KenGen, which is a public sector electricity-generating company, took over all publicly owned generation assets from KPLC[87]. Initially KenGen was fully owned by the government of Kenya until the year 2006, when the government offloaded 30% of its stake in the company through an Initial Public Offering.[88] The government of Kenya's shareholding in KenGen was 70% against 30% private shareholding as of December 2011.[89] KenGen generates about 76% of the total country output.[90]

Currently, there are six IPPs which contribute total electricity supply of about24%. The IPPs are however not allowed to sell bulk power to any other consumer apart from KPLC.[91] The six IPPs are:[92]

(i) Iberaafrica E.A Company Limited (Thermal Power Plant )
(ii) Mumias Sugar Company Limited (Cogeneration)
(iii) Tsavo Power Company Limited (Thermal Power Plant)
(iv) Orpower 4 Inc (Geothermal Power Plant)
(v) Rabai Power Company Limited (Thermal Power Plant )
(vi) Imenti Tea Factory Company Limited ( Mini Hydro)

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[87] A Report Of The Parliamentary Committee On Energy Communications And Information On Ownership And Status Of KPLC July 2010 ,at Para 46

[88] A Report Of The Parliamentary Committee On Energy Communications And Information On Ownership And Status Of KPLC July 2010 , at Para 24

[89] Government Of Kenya Third Draft National Energy Policy Dated11th May 2012. , at Pp 24 .

[90] Government Of Kenya Third Draft National Energy Policy Dated11th May 2012. , at Pp 71 Para 4.3 .

[91] Omolo, Beldine. Competition in Kenya's Electricity Sector. 1st Annual Competition and Regulation in Network Industries Conference 29th November 2008, Brussels, Belgium , at Pp 4.

[92] A Report of The Parliamentary Committee On Energy Communications And Information On Ownership And Status of KPLC July 2010 , at Para 22.

The disparity in the total electricity generation percentage and in the country's installed capacity as shown in table 1 herein below is a stark reality of monopoly power of KenGen in generation of electricity.

**Table1: Electric Power Producers and Their Generation Capacities**

| **Name Of Licensee** | **Technology** | **Location of Power Plant** | **Installed MW** |
|---|---|---|---|
| Kengen | Hydro | Various | 761 |
| Imenti Tea Factory | Hydro | | 0.1 |
| **Total Hydro** | | | **761.9** |
| KenGen | Geothermal | Olkaria I&Ii | 150 |
| Orpower4 Inc | Geothermal | Olkaria III | 48 |
| **Total Geothermal Generation** | | | 198 |
| **Mumias Sugar Co** | **Cogeneration** | **Mumias** | **38** |
| Kengen | Wind | Ngong | 5.45 |
| Kengen | Thermal (Msd ) | Kipevu, Mombasa | 180 |
| Iberaafrica (Ea) Ltd | Thermal (Msd) | Nairobi | 108 |
| Tsavo Power | Thermal | Kipevu, Mombasa | 74 |
| Rabai Power Ltd | Thermal (MSD) | Rabai, Mombasa | 90 |
| **Total Thermal Generation** | | | **452** |
| Kengen | Thermal Gas Turbine | Embakasi Nairobi | 60 |
| **Name Of Licensee** | **Technology** | **Location of Power Plant** | **Installed MW** |
| Aggreko Kengen | Emergency Power Thermal | Embakasi ,Nairobi | 60 |
| **Total Installed Capacity On The Interconnected System** | | | **1,575** |
| Moe/KPLC/Kengen | Thermal Off The Grid | Various | 18 |

**Source:** Kenya power and lighting company[93]

After the vertical unbundling, the distribution of electricity remained under the absolute monopoly of KPLC,[94] which has since been the only licensed supplier, distributor and

[93] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) , at para 77.

[94] Omolo, Beldine. Competition in Kenya's Electricity Sector. 1st Annual Competition and Regulation in Network Industries Conference 29th November 2008, Brussels, Belgium, at pp 12

retailer of electrical energy in Kenya.[95] KPLC purchases electricity in bulky from KenGen and other Independent Power Producers (IPPs) to transmit, distribute and retail to consumers.[96] The purchase is under bilateral contracts or Power Purchase Agreements approved by the Energy Regulation Commission.[97] Currently, competitors can only access consumers under terms dictated by KPLC, with the only exception being during the Energy crisis, in which case, the government procures electricity through emergency power producers and sells to KPLC. The transmission network was historically developed by the government but is owned by KPLC.[98]

Originally, the government was the sole shareholder in KPLC. Currently, the government shareholding is at 50.1% against a private shareholding of 49.1%.[99] Generators had/have no access to consumers as the transmission lines were/are operated by KPLC notwithstanding the fact that KPLC was also a supplier of electricity then. KETRACO which is fully owned by the government of Kenya was incorporated on 2nd December 2008 under the Companies Act as a distributor pursuant to the provisions of the Energy Act 2006 and the recommendations of the National Energy Policy of 2004 to facilitate horizontal unbundling.[100] To date, KETRACO has not carried out any distribution function as it has no transmission network of its own. The company has however started

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[95] A Report of The Parliamentary Committee On Energy Communications And Information On Ownership And Status of KPLC July 2010, at para 43.

[96] Government of Kenya Third Draft National Energy Policy Dated 11th may 2012, at pp10, para 4.7.

[97] Government of Kenya Third Draft National Energy Policy Dated 11th may 2012, at pp10 , para 4.7.

[98] Parliamentary A Report of The Committee On Energy Communications and Information On Ownership And Status of KPLC July 2010 , at para 28.

[99] Government of Kenya Third Draft National Energy Policy Dated 11th may 2012 , at pp 24.

[100] Parliamentary A Report of The Committee On Energy Communications And Information On Ownership And Status of KPLC July 2010 , at para 31.

construction of transmission lines, especially in preparation for the expected imports from Ethiopia and Southern Africa power pool.

The Rural Electrification Authority (REA) was established in 2007 under section 66 of the Energy Act as a special purpose agency, responsible for managing the Rural Electrification Programme (REP) for the acceleration of the pace of rural electrification.[101] Under the policy, this was intended to facilitate market entry by Independent Power Distributors (IPDs) particularly in areas remote from the national grid. Between 1973 and 2007 the REP was operated by KPLC on behalf of the Ministry of Energy.

The Rural Electrification Authority (REA) develops transmission network in the rural areas using tax payers' money, donor funds and grants and hands over the transmission lines to KPLC to transmit electricity. This mechanism only facilitates KPLC's monopoly power in distribution of electricity by use of an infrastructure developed by tax payers through the rural electrification levy.[102]The lack of competition due to the Institutional Monopoly of KPLC in transmission has been observed and expressed as thus;

"*The country's electrical power transmitter is fast losing favour among consumers and calls for its monopoly on electricity distribution have been snowballing.*[103]

*"The problem we are experiencing in the energy sector emanates from lack of competition, I think Kenya power and Lighting Company needs competition"*[104]

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[101] Government of Kenya Third Draft National Energy Policy Dated 11th may 2012 , at pp 25.

[102] Section 79 of the Energy Act.

[103] Njiranini Muchira ; County Govements To Unlock Kenya Powers Grip On Electricity Distribution , article in the Daily Nation Tuesday 24th July 2012.

[104] Kwame Owino chief executive Institute of Economic Affairs as quoted by Njiranini Muchira ; County Govements To Unlock Kenya Powers Grip On Electricity Distribution , article in the Daily Nation Tuesday 24th July 2012.

The rationale for unbundling was to enhance overall operational efficiency of the power sector by separating the core business units of generation, transmission and distribution into legally and operational distinct and independent entities.[105] It was also aimed at increasing transparency of KPLC on its charges.[106] Currently, the generation and supply of electricity is competitive as electricity generators compete to supply to the national grid under long term contracts, but in high voltage transmission and regional distribution, competition is not accommodated. Due to the fact that KPLC retained absolute monopoly on the distribution and transmission[107]

**b) Exploration of Geothermal**

The Geothermal Development Company (GDC) is a fully state owned corporation, established under the Geothermal Resource Act No.12 of 1982 as a statutory Corporation. It has the mandate for geothermal resource development and assessment in the areas of exploration, appraisal, production, drilling and steam collection for electricity generation. Once the geothermal energy is produced it is regulated by the Energy Act. The Geothermal Resource Act No.12 of 1982 solely placed this mandate on the GDC thereby locking out other multinational companies that may have the financial and technological capabilities for carrying out these functions.

**c) Regulation of monopoly power**

The monopoly power of KPLC as a transmitter and distributor of electricity is supported by the argument that since transmission and distribution are quintessential monopolies due to the fact that their functions entail large sunken capital investment, unbundling such institutions and exposing them to competition would lead to wasteful duplication of

[105] Making Sustainable Energy Regulation and Policy Training Manual , at pp 8, para 3.2.

[106] Making Sustainable Energy Regulation and Policy Training Manual, at pp8 para 3.0.

[107] Omolo, Beldine. Competition in Kenya's Electricity Sector. 1st Annual Competition and Regulation in Network Industries Conference 29th November 2008, Brussels, Belgium, at pp 12.

network resources. [108] The logical solution is then to separate generation from quintessential monopoly and regulate the monopoly; probably it is on the basis of this reasoning that The ERC[109] and The ET [110] were established under the provisions of the Energy Act 2006.

The ERC is charged with the responsibility of economic and technical regulation of electric power renewable energy and downstream petroleum subsectors including tariff setting and review, licensing enforcement, dispute settlement and approval of power purchase and network service contracts and therefore regulates all forms of energy in Kenya. The appointments of the commissioners are made by the minister. [111]

The ET is primarily responsible for determining appeals from the decisions of ERC. The Tribunal has jurisdiction on all matters referred to it relating to the energy sector. The power of appointments to the tribunal just as it is in the ERC is largely by the Executive.[112] Hence, these two important regulatory institutions are not largely free from the manipulations of the executive to accommodate fair play in the sector.

Under the Energy Act, the Ministry of Energy retained the policy making initiative and is responsible for the formulation and articulation of energy policies throughout the country yet the government through its shareholding in KenGen KPLC and KETRACO is a competitor in generation transmission and distribution. The policies made by the ministry are likely to favour or be seen to favour these three institutions against other private IPPs.

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[108] Bringing Competition To Regulated Sectors with a forcus on Kenya.( Position Paper Submitted To UNCTAD's 7th Session of The Intergovernmental Group Experts On Competition Law And Policy At Geneva On 30th October To 2nd November 200 available at http//www.unctad.org/sectors/wcmu/docs/c2dp-ige7p24-en.pdf accessed on 3rd August 2012 .at pp4

[109] Section 4(1) of Energy Act 2006 establishes the Energy Regulatory Commission.

[110] Section 108 (1) of the Energy Act 2006 establishes The Energy Tribunal.

[111] Section 10(1) of Energy Act 2006

[112] Section 108(2a-c) of the Energy Act 2006

## 2.3 Legal Framework for Competition

The existence of Competition laws in Kenya is intended to encourage fair competition in the production of goods and services and reduce direct governmental price controls in the economy. The Restrictive Trade, Monopolies and Price Control Act Cap 504 of 1989 is the main statute that governs fair competition in Kenya. In the electricity subsector, Kenya's national energy blue print as contained in Sessional Paper No. 4 of 2004 and the Energy Act No. 12 of 2006, support competition in the sector through private participation in the development and delivery of electricity. The 2010 Constitution and the Public Procurement and Disposals Act contains provisions relating to competitive public procurement and disposals.

### a) Absence of a clear and coordinated legal framework fair competition

The existing legal framework for private participation in the electricity sector industry, in particular is insufficient. The Restrictive Trade, Monopolies and Price Control Act does not explicitly provide for the control of monopoly dominance behavior. There are also several exemptions to the restrictive trade practices which have the effect of removing the public service sector from the scope of the Act. The utilities sector to which the energy sector (read electricity) falls, lies within these exemptions and is therefore not subject to the general Competition Law.

The legal framework for regulating competition is inadequate because of institutional monopoly and the existence of numerous laws and regulations for the energy *(electricity)* sector in Kenya. For instance, although the provisions of the Electricity Act of 1997 provided for open applications for license for electricity generators and distributors, no entity ever came forth to apply. This is probably due to the existing institutional monopoly, thus making the investment climate not conducive then. The Electricity Power Act of 1997 the therefore had failed to achieve its objectives by failing to provide a legal framework for multiple players hence competition was not possible as the electricity service sector was not bundled then.

### b) Inadequate framework for enforcement of the legal framework

The Competition Authority in Kenya has no jurisdiction over regulated sectors. This is provides a highly uncompetitive arena for the transmission and distribution of electricity in Kenya. Moreover, the decisions of the Competition Authority are also not binding, as they are merely recommendations, which are subject to approval by the minister. This undermines the Authority from effectively discharging its mandate. There is also no clear relationship between the Competition Authority and the ERC . The latter of which has the power to set reviews and adjust electric power tariffs and tariff structures and investigate tariff charges.

### c) Differential Treatment of generators

The IPPs just like KenGen sell their generated electricity to KPLC in bulk with each generating utility entering into a power purchase agreement with KPLC with wheeling charges being imposed on KenGen but not on the IPPs as these charges are covered by the terms of the respective PPAs, which are not standard. This questions the competition rules of the market. It is therefore no wonder that KenGen's total generation and installed capacity is about 76% of the country's net as has been shown elsewhere in this paper in *Table 1.*

### d) Uncompetitive and opaque procurement processes

Most of the initial contracts with IPPs were negotiated at a time when the country was facing a crisis and therefore the issue of competitive contract prices was not exhausted.[113] The IPPs were aware of the energy crisis looming in the country then and therefore took advantage of the situation and sold electricity at exorbitant prices, this implies that the procurement process was not competitive.[114] Another instant where the

[113] Omolo, Beldine. Competition in Kenya's Electricity Sector. 1st Annual Competition and Regulation in Network Industries Conference 29th November 2008, Brussels, Belgium., , at para 2

[114] Omolo, Beldine. Competition in Kenya's Electricity Sector. 1st Annual Competition and Regulation in Network Industries Conference 29th November 2008, Brussels, Belgium. , at para 2

procurement process has also not been competitive, is the PPAs given to Tsavo and Orpower4. Though international competitive bid guidelines were followed, the competition was limited to only three firms.[115]

The vertical unbundling was also not based on a competitive market structure that should have taken into account the size of the market, the nature of the economies of scale considering that electric power is predominately hydro-based and the institutional design of the IPPs and KPLC to enable the industry to adapt to new technologies to enhance efficiency in the sector.[116] The 2010 Constitution has laid down the rule of thumb in public procurement of service and goods.

Article 227. (1) Of the 2010 Constitution provides that;

> *"when a State organ or any other public entity contracts or goods or services, it shall do so in accordance with a system that is fair, equitable, transparent, competitive and cost-effective"*

This Constitutional requirement will help to guide the procurement together with the provisions of the Public Procurement and Disposals Act. The challenge that remains is it proper enforcement.

**a) Overreliance on Hydro Power Generation**

Government policies have tended to lay more emphasize on hydro generation of electricity while ignoring other sources of electricity generation. The economic risk in hydro power projects is higher than on other modes of electricity generation. This is because the projects are capital intensive and wholly depend on hydrology. This may cause uncertainty with regard to power prices in the future. Small hydro projects do

[115] Eberrhard & Gratwick; The Kenyan IPP Experience, at pp 14 (revised November 2005) available at http//pesd.stanford.edu accessed on 10september 2012

[116] Omolo, Beldine. Competition in Kenya's Electricity Sector. 1st Annual Competition and Regulation in Network Industries Conference 29th November 2008, Brussels, Belgium , at pp13

require just about as much human resource to operate as the larger ones.[117] The small projects investors are likely to fall off the competition due to high overheads compared to bigger hydro installations. This is the scenario that has favoured KenGen against the IPPs, forcing the IPPs to resort to thermal electric generation. This therefore stands out as an impediment to fair competition in the sub sector.

Generally, both the institutional and the legal frameworks do not support fair competition in the electricity sector in Kenya. The Energy National Policy 2004 essentially laid the national framework for liberalization in the sector and there were a number of advantages the policy could build on to bring about competition in the sector e.g. there was serious under service in the sector in generation and supply and the fact that monopolist electricity service providers had been established as limited liability companies through a historical accident hence the institutions lacked any statutory mandates to distribute or generate electricity.

**2.4 Pricing Mechanism**

**a) Cost-based tariff**

Electricity tariffs in Kenya are regulated by ERC under a mechanism provided under the provisions of the Energy Act, which requires every tariff structure and terms for the supply of electricity shall be in accordance with principles prescribed by the Commission.[118] Under this Act, the ERC is to ensure that the tariffs established in the contract are just and reasonable, meaning that the tariff must allow the utility to *inter alia*

a) Maintain its financial integrity.
b) Attract capital.
c) Operate efficiently.
d) Fully compensate the investor.

[117] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) , at para 82

[118] Section45(1) of the Energy Act

The above are the four parameters that ERC must take into account when setting up the tariff. This form of tariff rate under this mechanism is based on the costs of the utility in providing the service. All the costs are inbuilt in the current retail electricity tariff structure which is as shown in table 2 herein.

**Table 2: Retail electricity tariff structure reviewed in 2008 (now reviewed with effect from September 2012)**

| Tariff | Type of Customer | Supply Voltage (V) | Consumption (kWh/ month) | Fixed Charge (KES/ month | Energy Charge(KES/ kWh) | Demand Charge(KES/ kVA month) |
|---|---|---|---|---|---|---|
| DC | Domestic Consumers | 240 or 41 | 0-50 | 120.00 | 2.00 | ----- |
| | | | 51-1, 500 | | 8.10 | |
| | | | Over 1,500 | | 18.57 | |
| SC | Small Commercial | 240 or 415 | Up to 15,000 | 120.00 | 8.96 | ----- |
| C11 | Commercial/ Industrial Commercial/ Industrial | 415-3 phase | Over 15,000 No limit | 800.00 | 5.75 | 600.00 |
| C12 | | 11,000 | | 2500.00 | 4.73 | 400.00 |
| C13 | | 33000/40000 | Over 15,000 No limit | 2900.00 | 4.49 | 200.00 |
| C14 | | 66000 | | 4200.00 | 4.25 | 170.00 |
| C15 | | 132000 | | 11000.00 | 4.10 | 170.00 |
| IT | Interruptible Off-Peak supplies | 240 or 415 | Up to 15,000 | 240.00 – when used with DC or SC | 4.85 | ——— |
| SL | Street Lighting | 240 | ——— | 120 | 7.50 | ——— |

*Source: ERC*[119]

[119] Government of Kenya Third Draft National Energy Policy Dated 11th May 2012 . at pp 18.

Under the cost-based tariff, the investor only needs to demonstrate the costs of the investment and thereafter be guaranteed of the tariff. The tariff is in my view intended to attract prospective investors with the requisite technology and resources since it compensates them adequately for the investment risks borne and allows investors to yield sufficient income for the utility over its capital base.[120] The guarantee for recovery of costs as an incentive to attract more investors is necessary since the implications of the utility losing its financial integrity are serious. However, the burden of this incentive ought not to be transferred to consumers as is the case in the existing electricity tariffs wherein taxes on consumer electricity tariffs account for about 50% of the total cost of electricity consumed.[121] The tariff that was last adjusted in July 2008 (now reviewed with effect from 1 September 2012) levied the following taxes;

(i) Fuel Cost Charge — based on the cost of fuel purchased by KenGen during the month of billing. Applied per kWh of consumption.

(ii) Foreign Exchange Rate Fluctuation Adjustment the formula applies a somewhat obscure measure based on the "foreign currency costs incurred by KenGen in the calendar month immediately preceding the month of the billing period".applied per kWh of consumption.

(iii) Inflation Adjustment is another obscure measure based on national inflation measures (such as the Consumer Price Index), which applied per kWh of consumption.

(iv) Energy Regulatory Commission Levy fixed at 3 Kenya cents/kWh

(v) Rural Electrification Programme Levy fixed at 5% of the base rate

(vi) Value Added Tax applied on the base rate and all previous surcharges at 12% which was reduced from 16% since November 2008.

[120]Electricity Regulatory Board; Retail Electricity Review Tariff Policy September 2005 at para 1 pp8 available at www. erb.go.ke accessed on 10 october 2012

[121] Available at www.kplc.org.ke Accessed on 3rd October 2012.

The high rate of taxation is a major contributor to the current existing high electricity tariffs in Kenya. The cost of energy has significant impact on economic activities particularly those that are energy intensive.[122] In a liberalized economy such as is the case in Kenya, energy prices are a significant determinant of competitiveness of local manufactures relative to imports.[123] High energy prices impact negatively on domestic wealth creation, balance of payments and employment creation since consumers opt for cheaper imports.[124] The position currently is that high energy costs and erratic power supplies continue to put Kenya's manufacturing sector more in a quandary.[125]

**b) Regulated prices**

Regulating pricing for electrical supply or any other form of energy may open up agitation for the regulation of other goods and is retrogressive in a free market economy, because it may kill innovation and fair competition necessary for the growth of a vibrant economy.[126]

> "*The move to control prices was not well thought out as it is killing the spirit of innovation and competition.*"

Electricity tariffs in Kenya are influenced by many factors, besides excessive taxation, inadequate infrastructure, inefficiency, corruption and also demand and supply law as

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[122] Government of Kenya National Energy Policy of 2004 , at pp 3

[123] Government of Kenya National Energy Policy of 2004 , at pp 3

[124] Government of Kenya National Energy Policy of 2004 , at pp 3

[125] Njiranini muchira County Governments To Unlock Kenya Powers Grip On Electricity Distribution. Daily Nation Tuesday 24 July 2012

[126] Mr Yasin Hussein, Lunar Service Station. Why petroleum price control is justified; Available at http://www.businessdailyafrica.com/Opinion+++Analysis/Why+petroleum+price+control+is+justified/-/539548/949084/-/view/printVersion/-/148tnpp/-/index.html(Accessed on 12th July 2011)

well as weather patterns. Some of these factors can be avoided through market innovation and wise investment which cannot thrive where the investor is guaranteed to recoup the cost of his investment besides making profit as is the case now under the existing parameters for fixing electricity tariffs. Thus it is no wonder that the electricity tariffs in Kenya have continued on an upward trend over the years as the consumers are deprived of the benefits that accrue from a free market economy.

## 2.4 Mechanism for state remuneration from the exploitation of electricity power resources

### a) Negotiations in Production sharing agreements

The mechanism for state remuneration in exploration of geothermal and petroleum is by way of production sharing agreements. The use of Production Sharing Agreements is advantageous because it allows states to develop their own refineries and develop marketing systems as well as develop local capacity required to handle the product. However, the challenge in using this mode is that often negotiations are made when there is no enough information on the part of government and the contracting companies normally have more information than the government. Consequently, the terms may often end up being disadvantageous to the government in terms of returns. e.g. in the Production Sharing Agreement between Kenya and Tullow Oil Company over the recently discovered oil in Turkana, Kenya will reap the full benefit of the oil as from the 5th year, the resource will be shared as shown in Table 3. The question to ask is whether is guaranteed to benefit in the fifth year.

**Table 3: Production Sharing Between Kenya and Tullow Oil Company**

| Year | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Tullow Co | 80 % | 60 % | 40% | 20% | 0% |
| Kenya | 20% | 40% | 60 % | 80 % | 100% |

*Source: The Standard Newspaper, Wednesday March 28th 2012*

**b) Implied Minimum works obligations**

In every geothermal and petroleum exploration agreement, there is an implied obligation that the contractor will perform certain minimum work and incur certain minimum expenditure during the course of exploration[127]. This provision as a mechanism for state remuneration, is in my view intended to secure serious companies to venture into the exploration operations, which is a highly risky venture but may turn out to be an obstacle to private attraction as the investors are not guaranteed of making a viable discovery.

**c) Payment of royalties**

The royalties and other payments payable under or by virtue of a geothermal and petroleum resources license are required to be set out in the license and may be based on a percentage of what is exploited or a fixed sum or percentage based on the income or profit. On fixed the sum mode there is guaranteed return for the government. The challenge in using this mechanism is; what if the value of the resources appreciates? Who is to ascertain the true amount of what is exploited or profit made? This mechanism of payment may provide a fertile seed bed for disputes.

**d) Remuneration for conservation of Biological Diversity.**

Though section 6(1)f of the Geothermal Resources Regulations 1990 prohibit exploration of the resources in Game Reserves, most of Kenya's Geothermal Resources are found in areas within Kenya's Game Reserves, which are habitats to wildlife, a major income earner for the tourism industry. The Acts have not provided a mechanism for state remuneration for purposes of conserving of Biological Diversity, yet the exploration processes are potentially dangerous to biological diversity if permission for exploration is allowed, as is most likely to be granted where there are high chances of discovery of viable deposits.

[127] Section 2(1)d of the Geothermal Resources Act of 1990 and section 6(1)e of the (Petroleum Exploration and Production) Act Cap 308

## 2.6 Conclusion

The generation and supply of electricity is competitive but in high voltage transmission and regional distribution, competition is not accommodated.[128] What is required hence in the Energy Act is the provision of an institutional framework to facilitate competition by establishing a generator that is independent of the distributor and facilitating IPPs entry into the market. The framework should also allow generators access to the distributors.

Kenya's framework for the electricity subsector is created on an institutional monopoly that operates under weak Competition Laws and under a regulated pricing mechanism that fails to internalize the true cost of electricity. The epicenter of the government in the provision of electricity has been through hydro generation. It is until recently that the government has started focusing on geothermal and wind energy and other alternatives. An electricity sector operating under this kind of scenario cannot support economic sustainability. Betty Maina, Chief Excutive of Kenya Association Of Manufacturers (KAM) Commenting on the inability of the electrical energy subsector to promote economic sustainability states,

> "*Often industries go up for to for six hours a week or more without power, this is unfortunate for a country whose long term economic blue print hinges on on the growth of the manufacturing sector* "[129]

Under the 2010 Constitution, the county governments and other distributors will be able to buy electricity directly from generators to sell to consumers. In fact KETRACO has already made an application to ERC for a license to transmit and supply electricity in bulk.

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[128] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) , at Para 71.

[129] Njiranini muchira, "County Governments To Unlock Kenya Powers Grip On Electricity Distribution" The Daily Nation Tuesday 24 Jul 2012

# CHAPTER 3

# A LEGAL ANALYSIS OF THE LEGAL AND INSTITUTIONAL FRAMEWORK FOR PROMOTING ENVIRONMENTAL SUSTAINABILITY

## 3.1 INTRODUCTION

Many nation have tended to favour energy supplies exclusively through economic sector preferences and Energy Law only superficially addresses how energy supplies could better take economic social and ecological responsibilities for the adverse effects of their processes and services. [130] Little attention has bee devoted to how the energy sector relates to the broader environmental context in which it is embedded. E.g. hydropower systems and their dams have been obliged to consider alternative uses of rivers and lakes because of navigation or fishing interests.[131]

States that have decided to require supplies to consider social and environmental issues have chosen to establish regulatory systems to ensure that energy pricing is balanced between[132]

a) Generating fees sufficient to pay for the investment in building and operating the energy systems
b) Providing reasonable profits to the governmental parastatal or private enterprises that build and operates the energy system
c) Ensuring that the public can afford to pay the fees and showing that the fees appear fair to the users

[130] Bradford, A.J and R.L. Ottinger (ed). Energy, Law and Sustainable Development. IUCN Environmental Policy and Law Paper No. 47(IUCN Environmental Law Program). Cambridge: IUCN, 2003 ,at pp viii

[131] Bradford and Otinger ,at pp viii

[132] Bradford, A.J and R.L. Ottinger (ed). Energy, Law and Sustainable Development. IUCN Environmental Policy and Law Paper No. 47(IUCN Environmental Law Program). Cambridge: IUCN, 2003 ,at pp viii

### 3.2 Institutional Framework for Demand Side Management (Energy Efficiency and Conservation)

Demand Side Management (DSM) is the use of market management strategies to meet electricity demand without enhancing supply. It refers to strategies that improve efficient use of electricity while eliminating the need for new electricity generation.[133] It is a means of energy conservation and efficiency that aims at reduction of energy consumption without sacrificing productivity or increasing costs. [134] Demand Side Management in the electricity sector entails the carrying out of energy audits and promoting of energy conservation by customers, as well as putting in place strategic plans and policies on energy conservation and efficiency in production, transmission and use. Energy efficiency and conservation is one of the key elements of Sustainable Development in National Energy Policies that is emphasized in the Brundtland Report.[135] Wasteful loss of a lot of electricity in Kenya is high and is on the increase despite new technological advancement.

The Ministry of Energy has the overall mandate in respect to policy formulation and implementation of energy efficiency and conservation, while the Energy Regulatory Commission is the regulatory body in the energy sector. The Kenya Power and Lighting Company (KPLC) and KenGen as the main electricity transmitter and generator respectively do have a role to play in this regard. Other institutions that will also have a role to play as far as electricity efficiency and conservation is concerned once the Energy

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[133] Mumma Albert.,2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) , at para 82.

[134] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) , para 241.

[135] UNEP International Environmental Law Trainining (Manual 2006), at pp 354.

Management Regulations are made and adopted under the Energy Act include The Kenya Bureau of Standards[136] and National Standards Council.[137]

### a) Profit motive

The Institutional Framework of electricity supply in Kenya is corporatized. The rationale for corporatization is to ensure that the utility is run as a business; hence the main objective is to make profit. This promotes the need to supply more and more electricity in order to make profits. The management of demand for electricity in Kenya is therefore through supply side management. KPLC and KenGen both of which are the main transmitter and generator of electricity respectively, are Corporations registered under the Company's Act and therefore motivated more in making profits just like any other commercial venture.

Market driven institutions leave the management of electricity in the supply side management which has little concern for environmental conservation. The institutions' drive to make profits is evidenced in the existing correlation in supply and demand balance trends over the past four years, which clearly shows demand and supply being almost at par. Such a scenario is a likely consequence of the player's tactical manipulations on the laws of supply and demand as shown in Table 4.

[136] A body corporate established under section 3 Standards Act cap 496 a Standards Regulator body with its functions set out in section 4.(1) of the said Act.

[137] Established under section 6.(1) Standards Act Cap 496.

**Table 4: Electricity supply and demand balance in the years 2008-2011**

| | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|
| Domestic &Small Commercial | 2,000.8 | 2,058.1 | 2,169.3 | 2,433.9 |
| Large& Medium | 3,019.8 | 3,058.1 | 3,204.9 | 3,440.3 |
| Off Peak | 66.2 | 36.8 | 69.2 | 75.4 |
| Street Lighting | 26.3 | 21.3 | 20.5 | 17.9 |
| Rural Electrification | 239.1 | 254.4 | 290.8 | 306.1 |
| **Total Domestic demand** | **5,352.2** | **5428.7** | **5,754.7** | **6,273.6** |
| Exports To Uganda | 41.0 | 27.0 | 29.6 | 37.3 |
| Transmission voltage losses and unallocated demand | 1062.4 | 1051.5 | 1191.5 | 1248.9 |
| **Total demand=total supply** | **6455.6** | **6507.2** | **6975.8** | **7559.8** |
| Of which imports from Uganda and Tanzania | 25.0 | 39.0 | 30.0 | 33.9 |
| Net generation | **6430.6** | **6468.2** | **6945.8** | **7525.9** |

*Source: Kenya Power and Lighting Company*[138]

**b) Institutional monopoly and regulated pricing.**

The institutional structure for electricity generation and transmission is dominated by monopolies and a market of regulated prices that is cost based. One of the challenges identified in respect to the supply of electricity services in Kenya and which necessitates the need for Demand Side Management measures is the inefficient use of electricity and inaccessibility to affordable electricity due to high tariffs, low consumer incomes[139] and an inefficient transmission system and distribution system which courses an estimated loss of electricity of between 15% to 20%.[140] As alluded to earlier in this paper the

[138] Kenya Bureau Of Statistic Kenya Economic Survey ,at Pp 180.

[139] Government of Kenya National Energy Policy of 2004, at para 2.1.4 .

[140] Government of Kenya National Energy Policy of 2004, at para 7.0.

rationale for unbundling the electricity sector was to enhance overall operational efficiency in the core business units of generation, transmission and distribution.

## 3.3 Legal framework for Demand Side Management

### a) Constitution of Kenya 2010

The 2010 Constitution sets a constitutional basis for a legal framework for Demand Side Management of Natural Resources (*read electricity*)

*"Article 69 (1) of the 2010 Constitution provides that the State shall;*

*(a) Ensure sustainable exploitation, utilisation, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;*

*(b) Work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya;(c) protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities;*

*(d) Encourage public participation in the management, protection and conservation of the environment ;(e) protect genetic resources and biological diversity;*

*(f) Establish systems of environmental impact assessment, environmental audit and monitoring of the environment.*

*g) Eliminate processes and activities that are likely to endanger the environment; and (h) utilize the environment and natural resources for the benefit of the people of Kenya.*

*(2) Every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources"*

The Constitution also confers to,

> *" every person the right to have the environment protected for the benefit of present and future generations through legislative and other measures and to have obligations relating to the environment fulfilled*[141] *and the right to seek redress from the court to enforce the right."*[142]

It is the researcher's view that Demand Side Management of electricity can be interpreted today be interpreted to find its anchorage on these Constitutional provisions.in regard to these provisions it is therefore the duty of both the citizens and the state to ensure sustainable utilization and exploitation of resources, in this case electricity.

**b) Energy Act**

Section 104 of the Energy Act, obligates the Minister of Energy, to develop and manage a prudent National Energy Efficiency and Conservation Programme. Under this section, the Act provides that,

> "*The minister's powers in managing the said programmes shall include but not limited to the following roles;*
>
> a) *Making, in consultation with the Kenya Bureau of Standards, requirements for the particulars to be displayed on labels on equipment or on appliances;*
> b) *Taking all measures necessary to create awareness and for the disseminations of information for efficient use of energy and its conversation;*
> c) *Strengthening consultancy services in the field of energy conservation;*
> d) *Promoting research and development in the field of energy conversation;*

[141] Article 42 (a) and (b) of the 2010 Constitution.

[142] Article 70 of the 2010 Constitution.

e) *Formulating and facilitating implantation of pilot projects and demonstrating projects for promotion of efficient use of energy and its conversation.*

f) *Giving financial assistance to institutions for promoting efficient use of energy and its conservation*

g) *Supporting the preparation of educational curriculum on efficient use of energy and it conservation for educational institutions and coordinate with them for inclusion of such curriculum in the syllabus.*

h) *Implementing international cooperation programmes relating to efficient use of energy and its conservation.*

i) *Giving financial incentives for any investment made to replace or install additional capital investments to improve energy efficiency.*

j) *Making it mandatory in collaboration with Kenya Bureau of Standards the importation of efficient but cost effective technologies."*

This requirement is strengthened by the consumer rights spelt out in Article 46 of the 2010 Constitution which states that;

" *Consumers have the right;*

*(a) To goods and services of reasonable quality;*

*(b) To the information necessary for them to gain full benefit from goods and services;*

*(c) To the protection of their health, safety, and economic interests; and*

*(d) To compensation for loss or injury arising from defects in goods or services.*

It is important to note that when consumers are enlightened on the availability of goods in the market and their quality they acquire capacity to make informed choices. Further to these rights, Sub Article (2) obligates,

*"Parliament to enact legislation to provide for consumer protection and for fair, honest and decent advertising"*

The Energy Act 2006 provides that;

> *"The ERC shall in consultation with the minister designate factories or buildings and electrical appliances by types, quantities or methods of energy utilization for purposes of energy efficiency and conservation."*[143]

This system of type approval of appliances has not yet been put in place either because of technical incapacity or inefficiency and lack of good will on the institutions mandate to carry out the task.

**c) Energy Management Regulations 2011 (Draft )**

Energy Management Regulations 2011 (draft regulations) are intended to give effect to the provisions of the Energy Act 2006 in connection with Demand Side Management of electricity. The regulations are yet to be approved since the Energy Act came into effect in July 2007. Currently, there is lack of a comprehensive reliable energy audit data and information covering various sectors and subsectors.[144] Thus the legal framework for Demand Side Management of electricity/energy is yet to be fully established.

**d) Energy National policy**

The Kenya government's policy on managing energy demand leans more towards subsidizing the supply of energy than its conservation, for example in almost all past national budgets more revenue allocation was given towards supply of energy than towards energy conservation. Installation of new electrical plants whether for generation, transmission or extraction the electrical resource often requires new sites yet land has been diminishing with the rising demographic population . The government of Korea, for instance found it growingly difficult to secure suitable sites and financially expensive to

[143] Section 106 of The Energy Act 2006

[144] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) , at para 248

construct new power supply stations and instead opted to pursue Demand Side Management.[145]

### 3.4 Enforcement of the legal framework for Demand Side Management

There exists a legal framework that supports Demand Side Management of electricity; however the problem is poor enforcement. The Minister of Energy has not developed the programme for managing Demand Side Management since 2006 when the Energy Act became operational. Hence, there are no standard codes of practice including regulatory mechanisms for their enforcement.[146] There is also inadequate capacity to promote and monitor implementation. [147]

### 3.5 Pricing Mechanism

#### a) Cost-based price regulation

One of the aims of energy pricing regulation as recommended in the Kenya's National Energy Policy of 2004 is to eliminate wasteful consumption and promote conservation and sustainable use of the resources.[148] The Policy identifies price as a key component of Demand and Supply Management which provides appropriate signals to both the

[145] UNEP, International Law Training Manual (2006) ,at pp 361

[146] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) ,at para 248

[147] Mumma Albert.,2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished, at para 248

[148] Government of Kenya National Energy Policy of 2004 at at para 5.3

consumer and the producer on which goods and services are desired by the market at a given time.[149]

The Energy Act 2006 provides a mechanism for pricing regulation[150], which is cost-based and therefore supports supply side management than demand side management with no formula for rates chargeable that compensates the investor based on efficient generation of electricity. The rate is exclusively based on financial and economic criterion and ignores the environmental cost externalities in the provision of energy. This could therefore be the reason why electrical transmission losses are on an upward trend as shown in Table 4.

Under this price mechanism the only option for making profits is to increase supply to the market. The utility has no incentive to be innovative and apply efficient, conservation and environmental friendly measures in the generation and transmission of the energy for the investor is assured of recouping his economic costs and often ignores environmental costs, thus Encouraging Supply Side Management rather than Demand Side Management. The price as it currently determined, its formulae does not unbundle the integration of costs in order to adopt a formula of compensating the utility on the basis of efficient transmission and production of electrical power for developing and adopting energy production and transmission efficiency measures rather than compensating the utility based on general production costs, including costs which the investor could have avoided.

**b) Graduated tariff rate**

The Energy Act 2006 has sought to use price as a component of Demand and Supply Side Management through consumer electricity tariff rate in Kenya that is based on a graduated scale.[151] This is not an adequate incentive to the low end user to adopt energy

[149] Government of Kenya National Energy Policy of 2004 at para 5.3

[150] Section 43 of the Energy Act 2006

[151] KPLC Tariff Rate Schedule available at wwwkplc.org.co.ke.

efficiency measures. The low end user consumes less not by choice but by need. The high end user will choose to consume less given a choice, therefore if such a user is given an incentive to adopt energy efficiency measures the incentive will be highly effective.

**c) Uniform tariff for peak and off peak hours**

The nature of electricity is that there is a variance on consumption and cost of generation, this notwithstanding the rate charged is uniform. This makes it difficult for consumers to charge their consumption behavior to a more efficient one as it undermines the capacity of the user to shift demand when the production cost is low.

**d) Environmental costs not internalized**

In calculating the cost of the provision of energy there are many environmental externalities that are not factored into the equation e.g. carbon emission and other environmental health and safety considerations. These externalities have significant costs. Hence the true costs of meeting the energy requirement are not factored in the formula. From the point of view of sustainability, the question that must be addressed is the formula in which all costs are internalized so that the consumer is called upon to meet the true costs of the energy. In the absence of such a formula, the consumer enjoys a hidden subsidy which makes consumers not to be efficient users. The competition between water and energy needs represents a critical business, security, and environmental issue, but has not yet received the attention that it merits. Energy production consumes significant amounts of water; providing water, in turn, consumes energy. In a world where water scarcity is a major and growing challenge, meeting future energy needs depends on water availability and meeting water needs depends on wise energy policy decisions.[152]

[152] Diamond Glassman etal; the water energy nexus; adding water to the energy agenda. World policy institute (march 2011 ) at pp 4.

**e) Cross subsidy**

The tariff has adopted a policy that internally offers a cross subsidy to the low end user who is cushioned from the cost of production and only pays for generation. The low end consumers are those who utilize less than 50 Kwh of electricity per month.[153] The reality is that the cost of delivery of electricity to low end users is not different from that of high end users. What this means is that the low end user has no incentive to appreciate the true costs of generation and distribution of energy so as to appreciate the need to use the energy more efficiently. This Cross subsidy encourages behavior which is not energy efficient among low end users.

**f) Inadequate fiscal incentives and lack of awareness**

There is inadequate fiscal incentives and lack of awareness of the existing fiscal legal and regulatory incentives frameworks as well as of opportunities offered [154]e.g. distribution of energy saving bulbs, tax holidays, generation plant and equipment tax to encourage efficient use of energy by switching to highly efficient energy appliances, among others are a contributing factor to continued apathy towards a conservatory and efficiency culture.

It is costly to introduce the necessary technologies to replace already installed equipment with the new ones. The government has not developed an elaborate mechanism for providing incentives to enable such replacement.

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[153] Government of Kenya; Scaling-Up Renewable Energy Program (Srep)Investment Plan For Kenya (Draft) May, 2011 at para 69.

[154] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) at para 248

### 3.6 Efforts to Promote Demand Side Management

The rationale for investing in energy efficiency measures is that energy efficiency measures allow the users to be able to achieve better or same end result by using less energy and the user saves money. There exists a myth that "conservation saves money". Sustainability dictates that the sum total of available energy be used to meet more and more of energy demand because the majority of energy sources are exhaustible. Conservation enables the same pool of energy to be spread to many users.

The Government has started to pursue Demand Side Management through collaboration and partnerships with other stakeholders and has undertaken a number of energy efficiency and conservation initiatives to address the ever rising demand for electricity.[155] Today, it is a government policy objective in Kenya to promote energy efficiency and conservation by putting appropriate measures in place for the adoption of energy efficiency and conservation technologies and measures.[156] This Policy objective is to be achieved through the following means;

a) Encouragement of private participation in providing technical and financial support to enhance the provision of energy audits and advisory services by the Ministry of Energy to institutions and companies including sensitization of industries and financial institutions on benefits of energy conservation.
In this regard Efforts been made to promote energy efficiency and conservation equipments. For instance. KPLC procured and distributed 1.25 million compact energy saving fluorescent lamps to 400,000 consumers for free. The problem is that the distribution was done in a transparent manner and many people were not aware. At the moment the

[155] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) para 244

[156] Section 104 of The Energy Act 2006

campaign to switch to energy saving bulbs has lost the vigour with which it was initiated.

The cost price of energy saving bulbs is way above reach for most Kenyans and most of these bulbs in the market are counterfeits and quite a number of them are not designed to fit bulb holders of most houses. A utility-led Efficient Lighting Program in Bangalore, India in which The Bangalore Electric Supply Company (BESCOM), is a success story that KPLC can learn from the Bangalore Electric Supply Company (BESCOM), the company successfully carried out distribution of energy efficiency bulbs, carried out the marketing, monitoring and evaluation of the project for nine months with sponsorship being given for the bulbs alone.[157]

b) Establishment of energy and equipment testing laboratories for efficiency and accelerated equipment ageing testing.

c) Dissemination of energy efficiency and conservation information to consumers. KPLC also runs an energy conservation campaign on its website this is intended to equip consumers with energy saving tips. Campaigns to websites may not be as effective as through radios televisions road shows etc which are more interactive and accessible to majority of Kenyans.

d) Encouraging Demand Side Management by industrial and commercial sectors corncens in large buildings . in regard to this the government is to enforce use of solar water heating and natural ventilation in all new large building buildings by amending building by laws under the Local Government Act Cap 265 to make it mandatory to have buildings in urban areas to have hot water

[157] Sustainable Energy for Developing Countries: A report to TWAS, The Academy Of Sciences For The Developing World (2008) at Pp37 www.twas.org. Accessed on 10th October 2012

systems in building designs and require all new buildings to have cost effective energy conservation matters and the local authorities to lead by example.

e) The ministry of energy and electric power utilities to where necessary provide the necessary technical support.

f) Development of standards codes of practice on cost effective energy use.

g) Promotion of cost effective industrial energy efficiency and conservation measures within economic sectors through exposure to competition. Under this programme there is an energy management award given to the utility found to be the best in efficient use of energy.

h) The government is to enforce use of solar water heating and natural ventilation in all new large buildings by amending building bye laws under the Local Government Act Cap 265 to make it mandatory to have buildings in urban areas to have hot water systems in building designs and requires all new buildings to have cost effective energy conservation matters and the local authorities to lead by example. The mandatory solar heating regulations are yet to be applied. However, they are yet to be approved.

i) The Ministry of Energy and electric power utilities are required to, where necessary, provide the necessary technical support e.g. The provision of technical assistance to conserve energy through energy audits and in establishment of energy management training programmes aimed at achieving greater levels of energy efficiency as well as undertake demonstration projects to show benefits from investment in energy efficiency and conservation.

j) The government has initiated a standard and labeling project to establish and implement minimum energy performance standards for selected energy consuming equipments like motors, refrigerators. The Centre for Energy Efficiency and Conservation (CEEC) through an agency agreement with Kenya Association of Manufacturers (KAM) undertakes among other things energy audits in service training of employees on energy management, industrial and SME sectors. Kenya Association of Manufacturers has a department of Energy Efficiency and Conservation.

k) The Government has also given financial aid to KPLC to rehabilitate and improve its transmission capacity to avoid electricity losses. A pilot project for the installation of digital electricity meters in Mombasa and Nairobi has been conducted. It is hoped that through this assistance KPLC may be able to conserve electricity hence reducing overhead costs and translating into low tariff charges for electricity supply thus cushioning the consumers and enhancing demand for electricity. The challenge here is in respect to the existing system of governance that is riddled with poor governance, corruption and poor prioritization, misappropriation and embezzlement of the finances advanced.

l) Introduction of "Energy Accord", in which case large electricity consumers, particularly energy intensive industries are encouraged to voluntary sign an Accord setting targets and making an undertaking on the energy efficiency performance targets that they endeavor to achieve. currently 23 companies have signed the Accord.

### 3.7 Challenges in achieving energy efficiency and conservation

The following have are the challenges that have been put forth with regard to energy efficiency and conservation in Kenya.[158]

a) Growth in population and the economy means that more energy is required or available for more use.
b) Lack of awareness of potential benefits from efficient use and utilization of energy efficiency practices technology and appliances.
c) Apathy as long as there is good supply for current use changes in behaviour are difficult to come by.
d) Lack of use of available conservation tools, new technology with increased efficiency leads to energy wastage.
e) Limited technical capacity , training and expertise in energy management and conservation to operationalize the requirements of sections 104, 105 and 106 of the energy Act.2006
f) Lack of a comprehensive reliable electrical energy audit data and information covering various sectors and subsectors.
g) Response to conservation opportunities and measures is irrational due to inappropriate pricing market distortions and socio economic factors.
h) Lack of financing, inability to mobilize credit and difficulties in obtaining finances for energy efficiency and conservation projects are impediments to investment in this area.
i) Lack of standardized equipments and appliances that would benefit from tax rebates and fiscal incentives.
j) Lack of effective coordination and regulation. The energy regulatory commission currently lacks the capacity and infrastructure to formulate and implement regulations to operationalize the Energy Act 2006.
k) Lack of awareness of the existing fiscal, legal, regulatory incentives and frameworks and mechanisms such as tax holidays , generation plant and

[158] Mumma Albert. The Energy Sector In Kenya; An Overview Of The Legal Nd Institutional Framework , Position Paper, 2011, (Unpublished) at Para 248

equipment tax rebates emerging credit facilities such as green energy facility grants and loans carbon credits from clean development mechanisms

### 3.8 Case study; Energy Conservation and Efficiency in Croatia[159]

Early 2011 energy specialists in Croatia's ministry of justice noticed abnormal consumption rates of water use in Lepoglava prison, through the metering of energy and water consumption which had been introduced, without which the loss could have gone unnoticed .

City mayors and county prefects have signed a an energy charter in which they pledged to implement energy management in the facilities under their jurisdiction within eight months all the mayors and county prefects had signed the charter and is prominently displayed in all city halls in Croatia and 15 ministries out of 16 have made the same commitments . Under the programme energy efficiency managers are identified and trained for each public building, individual building. A registry of public building is created and the buildings are included in the programme's energy management information system which monitors energy and water usage. About 10,000 civil servants have been trained and the number of public buildings is risen to about 6,000 which is more than 50% of Croatias public buildings

Energy audits have stimulated energy efficiency projects worth $30 million underlying the potential for budget saving and future green job creation. The programme embarked on an ambitious public information campaign on energy efficiency and conservation on face book in schools. A network of information centres was set up to give citizens hands-on information and advice on energy efficient technologies for residential houses. There is also partnership with private companies that produce energy efficient construction materials and appliances in which the companies fund the centre for the possibility of displaying their products. 96 information centres have been established in 43 towns and 12 counties.

Energy use in more than 50% of Croatia's public buildings is monitored under systems introduced by the programme. By 2008 the programme had produced some$18million cost saving and cut annual green hose emission by 63000 tons equivalent through measures costing little or nothing. Public sector energy audits introduced by the programme have stimulated energy efficiency investment projects worth430 million creating hundreds of job.

The project established energy efficiency as a policy priority and practical tool for effective house keeping in the whole public sector in Croatia. The programme runs

[159] United Nations Development Programme, Case Studies of Sustainable Development in Practice, Triple Wins for Sustainable Development. (June, 2012.) at pp38

entirely on government funding which has survived budget cuts during Croatia's prolonged recession following the 2008 global financial crisis.[160]

### 3.9 Clean and Renewable Energy

The dilemma for developing and developed countries is to come up with development models of developments for clean renewable energy alternatives not dependent on fossil fuels. Renewable energy systems for electricity generation tend to be decentralized, small-scale in nature and located in rural and sometimes remote areas.[161] Power system planners are generally used to and comfortable with centralized and large- scale electricity generation options, and are main largely unfamiliar with renewable energy options[162].For example, the severe generation capacity shortfalls in several African countries did not trigger the potentially significant role for renewable energy in Addressing the issue. Instead Independent Power Producers (IPPs) have been brought in to install relatively large power generation systems using fossil fuel-based thermal plants only.[163] Consequently, renewables have not attracted significant level of investment.[164] However these alternative models provide the pathway to sustainable electrical energy in line with the concept of Clean Development Mechanism.

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[160] United Nations Development Programme, Case Studies of Sustainable Development in Practice, Triple Wins for Sustainable Development. (June, 2012.) at pp 40

[161] Sustainable Energy Regulation and Policy making Training Manual For Africa. Impact Of Different Power Sector Reform Options On Renewables Module 8 Pp at8.3

[162] Sustainable Energy Regulation and Policy making Training Manual For Africa. Impact Of Different Power Sector Reform Options On Renewables Module 8 Pp at 8.3

[163] Sustainable Energy Regulation and Policy making Training Manual For Africa. Impact Of Different Power Sector Reform Options On Renewables Module 8 at Pp 8.3

[164] Sustainable Energy Regulation and Policy making Training Manual For Africa. Impact Of Different Power Sector Reform Options On Renewables Module 8 Pp at 8.3

## 3.10 Legal framework for Electrical Energy from Clean and Renewable Resources.

### a) Constitution of Kenya 2010

The 2010 Constitution provides that every consumer has a right to goods and services of reasonable quality, information necessary for them to gain full benefit from goods and services, the protection of their health, safety and economic interests and compensation for loss or injury arising from defects in goods or services.[165] This has a direct link to the electricity service sector, it is incumbent upon the government to ensure that citizens have access to reliable and efficient, clean energy systems and that the citizens have full knowledge of the sources of energy available.

### b) Energy Act 2006

The Energy Act advocates for the promotion of renewable energy as alternatives in addressing demand for electricity.[166] Section 103 (1) of The Energy Act 2006 provides "that the Minister shall promote the development and use of renewable energy technology ,including but not limited to Biomass, Biodiesel, Bioethanol, Charcoal, Fuel wood, Sola, Wind, Tidal Waves, Hydro Power, Biogas,and Municipal Waste" in line with this provision, an Investment Plan has been developed for the development of renewable energy in the country under the Scaling-up Renewable Energy Program in Low Income Countries (SREP) funding.[167]

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[165] Article 46 (1) Of the 2010 Constitution of Kenya

[166] Section 103 of The Energy Act 2006

[167] Kenya is one of the six pilot countries selected to benefit from SREP. The SREP program will support Kenya's initiatives towards achieving a transformational change that will lead the country towards low greenhouse gas (GHG) emission development pathway by harnessing the renewable energy resources. SREP operates under the Strategic Climate Fund (SCF) that supports programs with potential for scaled-up, transformational action aimed at a specific climate change challenge. SCF is part of the Climate Investment Funds (CIF), which promote international cooperation on climate change and support developing countries

### c) United Nations Framework Convention for Climate Change

Under the Kyoto protocol, the protocol to United Nations Framework Convention For Climate Change both of which Kenya is a state party to and which now forms part of the Law of Kenya under the 2010 constitution, state parties agreed to take certain measures geared towards using flexible mechanisms to reduce greenhouse emissions. These measures are:

a) **Emissions trading;** which is basically at the country level for one economy

b) **Joint implementation** this applies at the regional level in which case a very efficient economy that achieves reduction of a certain percentage in excess of its cap allows the inefficient state to benefit from its excess.

c) **Clean Development Mechanism** (CDM). This is an arrangement under which a developed country is able to implement projects in developing countries that have no reduction obligations to enable the developed country to meet its reduction targets. It's basically emission avoidance. The emissions achieved are quantified and attribute it to the country that has aided in the Clean Development Mechanism for the country that has no emission reduction obligations. Kenya has now shown great interest in undertaking the Clean Development Mechanism as a number of projects have been developed and submitted for consideration under CDM as shown in the Table 5.

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as they move toward climate resilient development that minimizes green house gas (GHG) emissions and adapt to climate change. CIF resources are available through Multilateral Development Banks (MDBs), and in case of the SREP program for Kenya, the African Development Bank (AfDB) and the World Bank

**Table 5: Projects developed and submitted for consideration under CDM in Kenya**

| Project Type | Investor Type | Company | Estimated Annual Emission Reduction (000tco2e |
|---|---|---|---|
| 35 Baggasse Based Cogeneration | Japan Carbon Finance | Mumias Sugar Co Ltd | 96,000 |
| Sondu Miriu Hydro | Danish Carbon Fund (World Bank) | KenGen | 21,068 |
| Large Scale Geothermal Grid Connected | To Be Identified | Orpower4 | 177.00 |
| Olkaria 11 Geothermal Expansion Project | Community Development Fund (World Bank) | KenGen | 171,00 |
| Conversion Of The Kipevu Open Cycle Gas Turbine To Combined Cycle Operation | Development Carbon Fund(World bank) | KenGen | 44,808 |
| Redevelopment Of Tana Hydro Power Station | Development Carbon Fund(World bank | Kengen | 38,376 |
| Optimization Of Kiambere Hydro | Development Carbon Fund(World bank) | KenGen | 38,758 |
| 6 Bagasse Cogeneration Project | Pioneer Carbon (Uk) | Muhoroni Sugar | 16,758 |

Source; Government of Kenya Third Draft National Energy Policy May 2012 at pp103

### 3.11 Policy Interventions To Promote Electricity Generation From Clean Renewable Resources.

#### a) Vertical unbundling

The impact of vertical unbundling on renewables in Kenya has largely been positive. It encourages the generation utility to make maximum use of least-cost options as a way of ensuring profitability while encouraging diversification of electricity generation options and the maximisation of locally available energy

resources.[168] This is illustrated by the fact that KenGen, has shown significant interest in renewables by investing in the expansion of geothermal electricity generation capacity and has pledged to partner with the private sector and is willing to invest up to 50% of the capital costs for attractive small-hydro and bagasse-based cogeneration projects.

**b) Mandatory regulations for solar water heating**

ERC has prepared mandatory regulations for solar water heating to promote uptake and guide the incorporation of low temperature solar water heating systems in industrial, commercial and residential buildings under a proposed solar water heating project that involves the replacement of existing electrical water heaters with Solar Water Heating (SHW) systems.[169] The Solar Water Heating Regulations, are intended to deliver the following benefits;

(a) Development and utilization of indigenous energy resources;

(b) Enhanced national energy security through diversification of energy supply mix and reduction in the over reliance on petroleum imports.

(c) Reduced demand for expensive fuel fired peaking power plants resulting from grid electricity peak demand attributed to water heating.

(d) Increased environmental conservation through reduction of GHG.

(e) Increased employment, capacity building and income generation resulting from the expanded solar water heating industry.

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[168] Mariita N.obuya.;The Impact Of Large-Scale Renewable Energy Development On The Poor: Environmental And Socio-Economic Impact Of A Geothermal Power Plant On A Poor Rural Community in Kenya. Energy Policy, Vol. 30 Issues 11-12, at pp 29. A Available at africa-toolkit.reeep.org/modules/Module8.pdf also at w.unido.org/fileadmin/import/83255_Module9.pdf

[169] Government Of Kenya; Scaling-Up Renewable Energy Program (SREP)Investment Plan For Kenya Draft May, 2011 ,at para 30.

Solar energy in Kenya has been largely private sector driven and has been for many years without a regulatory mechanism and standards. The formation of Kenya Renewable Energy Association (KEREA) is now expected to introduce self regulatory practice in solar energy. All these steps are intended to mitigate the challenges faced in exploiting the solar energy resource.[170]

**c) Promotion of use of solar electricity in ASALs**

The Ministry of Energy is also promoting use of solar electricity systems in institutions that are far from the national grid especially those in Arid and Semi Arid Areas (ASALs). Solar panel installations can be placed on buildings and therefore do not require use of more land.

**d) Feed in tariff**

The Government established feed in tariff in 2008 which was revised in 2010 to attract investment capital from the private sector for generation of electricity for renewable energy sources to enable the investors to generate and sell to national grid generated from renewables at a predetermined fixed tariff for up to 20 years which has seen an increase in the number of investors expressing interest in renewable energy.[171] As at 2011, the number of investors who had expressed interest to develop projects under the Feed-in-Tariff Policy was as follows:[172]

(a) 20 small hydropower projects with a total capacity of 84MW

(b) 23 wind power projects with a total capacity of 1327MW

c) 6 biomass energy projects with a total capacity of 270MW

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[170] Government Of Kenya; Scaling-Up Renewable Energy Program (SREP)Investment Plan For Kenya Draft May, 2011 at pp 16

[171] Ministry Of Energy Feed In Tarrifs Policy On Wind ,Iomass, Small Hydro, Geothermal, Bioga, And Solar Resource Generated Electricity (2010). (See Generally)

[172] Government Of Kenya; Scaling-Up Renewable Energy Program (SREP) Investment Plan For Kenya Draft May, 2011 pp 23.

(d) 1 sea wave energy projects with a total capacity of 100MW

The existing Feed-in-Tariff structure for each technology is as shown in the Table 6

**Table 6: Feed-in-Tariff Structure**

| Technology Type | Plant Capacity (MW) | Maximum Tariff US cents / kWh | |
|---|---|---|---|
| | | Firm Power | Non-Firm Power |
| Geothermal | Up to 75 | 8.5 | ---- |
| Wind | 0.5 - 100 | 12 | 12 |
| Biomass | 0.5 - 100 | 8 | 6 |
| Small Hydro | 0.5 – 0.99<br>1–5<br>5.1 - 10 | 12<br>10<br>8 | 10<br>8<br>6 |
| Biogas | 0.5-100 | 8 | 6 |
| Solar | 0.5-10 | 20 | 20 |

*Source:* Government Of Kenya Third Draft National Energy Policy May 2012 at pp *66*

**e) Financial incentives**

Government has zero rated import duty and removed value added tax on renewable energy equipment and accessories and is involved in public awareness campaigns to promote efficient use and conservation of electricity.[173] The Government is to set up a Green Energy Facility to pool donor contributions to lend funds for viable renewable energy projects at concessional rates. The facility is to be established under the National Task Force on Accelerated Development of Green Energy whose mandate is to promote and fast-track the development of renewable energy projects.[174]

[173] Mumma Albert; The Energy Sector In Kenya ; An Ovrview Of The Olicy A Nd Institutional Famework, Position Paper ,2011 (Unpublished) at Para 248

[174] Mumma Albert; The Energy Sector In Kenya ; An Overview Of The Policy and Institutional Framework, Position Paper, 2011 (Unpublished) at para 248.

## 3.12 Challenges In Promoting Electricity Generation From Clean And Renewable Resources.

### a) Regulation of Renewable electrical energy resources

Renewable electrical energy is regulated by several legal regimes that are often uncoordinated. For instance, the production of bio-fuel crops is governed by several policies and regulatory frameworks covering agriculture, sugar, trade and industry sectors. The challenge is on how ERC is to regulate biogas potential in this scenario.

### b) No incentives to invest in renewable electricity generation

The profit-making motive of corporatization of electrical utilities contributes negatively to the promotion of renewable energy for electricity generation because corporatized utilities tend to avoid investments involving relatively high upfront costs as is the case with renewable energy installations and encourages utilities to make investments in generation only when the payback period is attractive[175]. Pay back period for renewables is not always certain as in the case of hydro power which is prone to the vagaries of the weather.[176]

To reduce operational costs corporations tend to offer to buy electricity generated from renewable at below market value citing relatively low or no cost used.[177] In negotiations between KPLC and Mumias Sugar Company which has an electricity cogeneration plant

[175] Impact Of Different Power Sector Reform Options On Renewables; Sustainable Energy Regulation And Policy Making For Africa, at PP 80.

[176] Impact Of Different Power Sector Reform Options On Renewables; Sustainable Energy Regulation And Policy Making For Africa, at PP . 80.

[177] Impact Of Different Power Sector Reform Options On Renewables; Sustainable Energy Regulation And Policy Making For Africa , at PP 82.

often stalled because of the low offer that KPLC was offering to buy the electricity at a very low price arguing that bagasse was after all waste from the sugar factory. [178]

**c) Adverse latent environmental impacts**

It must to be understood that even as we advocate for clean renewable energy these sources of energy come with negative environmental impacts as well. Although the Environmental Impact Assessment[179] is a standard requirement for new energy systems before they are licensed, it is more often treated as a routine exercise. For example, in the construction of wind turbines Turkana and Marsabit may reduce harmful gas emissions but could be a threat to birds as the rotating turbines may be invisible to migrating birds.[180] This fact was ignored by the Environment Impact Assessment that was carried out in respect to the project.

In the United States, generating energy consumes 20% of the water not used by agriculture. Rising demand for energy for both conventional and alternative energy sources has the potential to significantly increase water consumption. As energy producers and consumers seek to reduce carbon emissions, water consumption frequently rises because many cleaner forms of conventional and alternative energy are potentially more water-intensive. Both traditional and renewable energy production are evolving toward potentially more water-intensive technologies, which risks adding to demands on water resources. [181]. New energy technologies are being developed to reduce water

[178] Impact Of Different Power Sector Reform Options On Renewables; Sustainable Energy Regulation And Policy Making For Africa , at PP 81.

[179] Section (58), The Environmental Management and Co-ordination Act, (No. 8) of 1999.

[180] An article By Anthorny Gittenss; Wind Farms Could Pose A Threat To Migrating Birds Saturday Nation of 29th September 2012.

[181] Diana Glassman et al the water-energy nexus adding water to the energy agenda published by world policy institute in march 2011, at pp 6.

consumption. However, they are generally expensive, can reduce energy efficiency, and will need time before they can be commercially available at scale[182].

Major concerns have been raised over the development of large scale hydro power plants. the proposed Bujagali dam in Uganda has faced opposition from environmental lobby groups citing potential environmental destructions.[183]construction of large dams has been shown in some cases to result in significant greenhouse gas emissions particularly in tropical areas where large amounts of fauna and flora are flooded during the construction and after and release significant quantities of methane as decay, some of the large dams that have been constructed in Brazil have generated large quantities of methane gas emissions which more aggressive global warming effect than carbon dioxide.[184]

Lately debates about construction of large scale hydro power have shifted to between poorly designed dams and well designed dams that take into account key socio economic and environmental concerns as outlined in the world commission on dams and development. The construction of the Grand Inga dam in DRC is not opposed as long as it is based on environmentally friendly design.[185]

[182] Diana Glassman et al the water-energy nexus adding water to the energy agenda published by world policy institute in march 2011, at pp 6.

[183] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp xiii.

[184] United Nations Development Programme, Case Studies of Sustainable Development in Practice, Triple Wins for Sustainable Development. (June, 2012.), at pp 36.

[185] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Addis Ababa Ethiopia (2007), at pp xiii-xiv,

### 3.13 Case study; Using Rural Cooperatives for PV electricity in Bangladesh[186]

The Grameen Bank of Bangladesh, a world-renowned micro-lending agency, established a non-profit subsidiary, Grameen Shakti, in 1996 to administer loans for photovoltaic solar home systems to serve those without access to electricity. Initially, Grameen Shakti found that long distances, poor transport infrastructure, periodically flooded and impassable roads, low literacy rates, lack of technical skills and transactions based on barters all contributed to high transaction costs and difficulty in building consumer confidence in their product. In 1998, a Global Environment Facility (GEF) grant enabled Grameen Shakti to offer improved credit terms to its customers and install thousands of systems. They also found that a critical mass of installations in an area (of the order of 100 systems) built consumer confidence, making it easier and less time consuming to expand the customer base. Grameen Shakti now expects to be able to draw additional financing for scale-up activities from commercial banks

### 3.14 Conclusion

Though the 2010 Constitution, The Energy Act and the Sessional Paper No 4 of 2004 on energy have provided the policy direction, legal and institutional framework for renewable and clean energy as well as for Demand Side Management, but there still exists several other technical, financial, social, policy regulatory and legal constraints that require to be addressed.

[186] Making Africa's Power Sector Sustainable. Joint Report By United Nations Commission For Africa And United Natiops Envviromental Programme, United Nations Commission For Africa , Addis Ababa Ethiopia,(2007) at pp 40

## 2.6 Conclusion

The generation and supply of electricity is competitive but in high voltage transmission and regional distribution, competition is not accommodated.[128] What is required hence in the Energy Act is the provision of an institutional framework to facilitate competition by establishing a generator that is independent of the distributor and facilitating IPPs entry into the market. The framework should also allow generators access to the distributors.

Kenya's framework for the electricity subsector is created on an institutional monopoly that operates under weak Competition Laws and under a regulated pricing mechanism that fails to internalize the true cost of electricity. The epicenter of the government in the provision of electricity has been through hydro generation. It is until recently that the government has started focusing on geothermal and wind energy and other alternatives. An electricity sector operating under this kind of scenario cannot support economic sustainability. Betty Maina, Chief Excutive of Kenya Association Of Manufacturers (KAM) Commenting on the inability of the electrical energy subsector to promote economic sustainability states,

> "*Often industries go up for to for six hours a week or more without power, this is unfortunate for a country whose long term economic blue print hinges on on the growth of the manufacturing sector* "[129]

Under the 2010 Constitution, the county governments and other distributors will be able to buy electricity directly from generators to sell to consumers. In fact KETRACO has already made an application to ERC for a license to transmit and supply electricity in bulk.

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[128] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) , at Para 71.

[129] Njiranini muchira, "County Governments To Unlock Kenya Powers Grip On Electricity Distribution" The Daily Nation Tuesday 24 Jul 2012

# CHAPTER 4

# A LEGAL ANALYSIS OF THE LEGAL AND INSTITUTIONAL FRAMEWORK FOR PROMOTING SOCIAL SUSTAINABILITY

## 4.1 Introduction

Beginning with the discovery of fire, the history of the improvement of human welfare is the story of the human ability to harness energy.[187] Energy sustainability improves the quality of life. Energy sustainability promotes health, expands access to employment, increases productivity in the market and facilitates social and even political participation. A survey conducted in the country Kenya indicates that the electrification of the rural areas have numerous benefits to the small and micro enterprises. The following are potential benefits of electricity services to the rural poor identified during the aforementioned survey: [188]

• Value addition to agricultural and dairy products: Reduced post-harvest loses and improved processing of grains, milk, fish and fruits through wider use of electricity-powered machinery for grinding, cooling, and heating.

• Increased household incomes due to income generation activities that can be undertaken beyond daylight hours when electricity becomes available

• Small-scale businesses like hair-cutting, welding, battery charging that use electricity create more employment and reduce time wasted travelling long distances to access these services.

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[187] David R Hodas ; Ecosystem subsidies of fossil fuel; land use journal vol22.2 (spring 2007)available at; http;//ssrn.com/abstract=1117564

[188] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) pp 80

• Improved health and sanitation through provision of water pumped with electricity, refrigeration for health clinics, longer hours available for surgical operations and better access to more advanced health facilities.

• Mortuary services to be provided to local health facilities that will allow local communities adhere to their customs and cultures of honouring their dead for a number of days before they are buried.

• Medical and educational personnel are attracted to work and stay in the rural areas because of availability of electricity and associated modern services and communication facilities.

• Improved communication and educational media through electricity-powered radios, mobile phones and ICT.

• School lighting to allow evening classes.

• Youths enjoying entertainment in Youth Centres powered with electricity.

• Electricity-driven water pumps allow women and girls to have more time to undertake income generating activities and study because less time will now be spent fetching water from long distances.

• Electric-powered public lighting in market places, social centres and compounds improves security and reduces crime rates.

• Better safety through replacement of kerosene lamps/ wicks and candles that cause burns, accidents, house fires with safer electric lighting.

Social equity requires easy availability and accessibility to clean energy to all in the society between generations and over generations. Many people in Kenya today do not have access to clean, reliable and affordable energy. Similarly many social utilities like schools, hospitals and other charities are also faced with this challenge. Social equity can be achieved through subsidized tariffs among other incentives to benefit social utilities like schools, hospitals, charities and the poor. The Constitution, 2010 of Kenya in

Article 170 (d) (f) (g) provides the objects of the devolution of government are among others to; "

*(i) Recognize the right of communities to manage their own affairs and to further their development,*

*(ii) Promote social and economic development and the provision of proximate, easily accessible services throughout Kenya.*

*(iii) Ensure equitable sharing of national and local resources throughout Kenya"*

## 4.2 Access and Reliability

### a) Generation and transmission

The existing transmission is severely constrained especially during peak hours.[189] Trends in electrical demand and supply have been on an increase.[190]and indicate that Kenya continues to rely more on electricity generation from hydro power and thermal. As at June 2010 there were nine generation transmissions with a transformation capacity of 2,841MVA and several distribution substations and over 17,000 distribution transformers with a capacity of 4,688MVA[191].

Demand for electricity was projected to grow from 4950GWh in 2003/4 to 8,561WGh in the financial year 2013/2014[192] and about 1421MW peak demand in 2013/4 against a

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[189] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) at para 100.

[190] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.), at para 70 .

[191] Kenya Bureau Of Statistics, Kenya Economic Survey 2012, at Pp 180

[192] Kenya Bureau Of Statistics, Kenya Economic Survey 2012, at Pp 180.

generating capacity of about 1,645MW.[193] The country's demand for electricity is close to the boundary of the existing plants' output capabilities as shown in Tables 4, 7 and 8.

**Table 7: Installed capacity of electricity in Megawatts 2007-2011**

| | Hydro | Thermal | Geothermal | Cogeneration | Total |
|---|---|---|---|---|---|
| 2007 | 677.3 | 389.3 | 128.0 | 2.0 | 1,196.6 |
| 2008 | 719.0 | 418.9 | 128.0 | 2.0 | 1,267.0 |
| 2009 | 730.0 | 421.5 | 158.0 | 2.0 | 1,311.5 |
| 2010 | 728.0 | 469.2 | 189.0 | 26.0 | 1.412.2 |
| 2011* | 735.0 | 582.7 | 190.6 | 26.0 | 1,534.3 |

1.

Source: Kenya Power and Lighting Company (Government of Kenya ,Scaling-Up Renewable Energy Program (SREP) Investment Plan For Kenya Draft May, 2011.pg 68)

**Table 8: Generation of Electricity in Gigawatt Hour (GWh) by source 2007-2011**

| | THERMAL OIL | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Kengen** | **IPP** | **EPP** | **Total** | **Geothermal** | **Co-generation** | **Hydro** | **Wind** | **Total** |
| 2007 | 365.0 | 847.5 | 523.3 | **1735.8** | 988.9 | 8.3 | 3591.5 | 0.1 | **6324.6** |
| 2008 | 521.4 | 883.0 | 741.0 | **2145.4** | 1039.0 | 4.0 | 3267.0 | 0.2 | **6455.6** |
| 2009 | 654.0 | 1.206.0 | 1,135.0 | **2997.0** | 1293.0 | 50.0 | 2160.0 | 7.2 | **6507.2** |
| 2010 | 291.0 | 1,370.0 | 54-.0 | **2201.0** | 1442.0 | 92.0 | 3224.0 | 16.8 | **6975.8** |
| 2011* | 903.0 | 1,538.8 | 358.7 | **2800.5** | 1443.7 | 80.9 | 3217.2 | 17.6 | **7559.9** |

*Source: Kenya Power and Lighting Company* Government of Kenya ,Scaling-Up Renewable Energy Program (SREP) Investment Plan For Kenya Draft May, 2011, a t pp 67)

[193] Kenya Bureau Of Statistics, Kenya Economic Survey , at Pp 180

**b) Overreliance Reliance on hydro and thermal electricity**

Presently, Kenya's electricity generation from hydro power accounts for 42.6%, Thermal (Petroleum)37%, Geothermal 19.1%, Biomass, Wind and Solar account for the remaining 1.3%.[194] Both hydro and thermal electricity are highly unreliable because of the adverse effect of international market shocks in the world petroleum market often triggering an upsurge in petroleum prices and the vagaries of the weather[195]. In such a case, the resort is normally to use power rationing and emergency electricity supply from independent power generators at prohibitive rates using generators running on diesel to deal with electrical power crises.[196] Unreliability impedes access even when people have the ability to pay for the electricity.

**c) High costs of installations of new electricity plants**

Installation of new electrical plants for generation, transmission or extraction often requires relocation of people and compensation. The amount of compensation that the private investors have to incur in order to relocate people for construction of power projects is too high; this cost is in turn transferred to the consumers in form of high consumer tariffs. It is argued that this high cost of compensation is the main reason why the Magwagwa hydro power has not been implemented.[197]

The hydro power projects have higher economic risks than those of other modes of electricity generation since they are highly capital intensive and wholly depend on

[194] IMumma Albert., 2011. Energy Sector in Kenya; An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) ,at para 82.

[195] Mumma Albert., 2011. Energy Sector in Kenya; An Overview of the Policy, Legal and Institutional Framework. (Unpublished.),at para 82

[196] Mumma Albert., 2011. Energy Sector in Kenya; An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) at para 82.

[197] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.), at para 82 .

hydrology hence vulnerable to climate variations.[198] This causes uncertainty in power prices. Small hydro power projects are likely to incur higher overheads compared to bigger hydro installations as the small projects do require just about as much human and capital resource to operate as the larger ones.[199] The viability of small hydro projects is also not guaranteed due to continued destruction of catchment areas in Kenya.[200]Under such circumstances small hydro projects are therefore likely to fall off the competition leading to increased unemployment, a general fall in the living standards and a decline in the social infrastructure.

### 4.3 Social Equity

The major consumers of electricity in Kenya are large and medium commercial and industrial establishments accounting for about 54.8 % of the total domestic consumption as well as domestic and small commercial establishments accounting for 38.8% of electricity consumption in Kenya is extremely low amounting to about 112% kilowatt-hours per capita and a national access rate of about 15%.[201] Trends in the supply and demand of electricity have been on an upward trend of about 7.3 % and 12.2% for medium commercial and industrial establishment and domestic and small commercial respectively *(see Table 4).*

The objects of devolution in the 2010 Constitution are to promote social and economic development and the provision of proximate, easily accessible services throughout

[198] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework (Unpublished.) , at para 83.

[199] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) , at para 83.

[200] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and InstitutionalFramework. (Unpublished.) , at para 240.

[201] Kenya National Bureau of Statistics .Kenya Economic Survey 2012 , at pp 180,

Kenya.[202] Presence of electricity service does not of itself give the residents the ability to make use of the electricity.[203] . If the electricity service is not affordable, their access is limited, affordability is influenced by peoples income.[204] The escalating electricity tariffs are a contributing factor in the unimaginable rise of prices for basic commodities and general cost of living. Total energy consumption per capita declined by 2.7 % from 110.5 in 2010 to 107.8 in 2011.[205] Inaccessibility to cheap, clean and reliable energy affects the people's quality of life; it is an impediment in accessing quality education, health and information. Yet all these are fundamental human rights are protected in the Bill of Rights.[206]

### a) Regulated pricing

Although the cost based rate tariff may facilitate many entrants to invest in the electricity subsector thus increasing generation and supply, the pricing mechanism is more protective of the investor than the consumer. Price regulations tend to eliminate market uncertainties, the backdrop against which consumers tend to enjoy favorable prices as investors are assured of recouping their costs and are not worried of what their competitors will do and be more innovative as is the case when markets are left to regulate themselves. Under such a mechanism, it is therefore not surprising to have huge transmission losses due to transmission inefficiency on the part of the utility as the costs

[202] Article174 (e) Constitution of Kenya 2010

[203] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 77.

[204] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 77.

[205] Kenya Bureau Of Statistics . Kenya Economic Survey 2012at pp 180

[206] Chapter four of the Constitution Of Kenya 2010 .

are transferred to the consumer. This is reflective in the increased transmission loss by 4.8% in 2011 from the previous year to stand at 16.5% of the total demand.[207]

**b) Consumer inequity**

***(i) Non variance of the tariff rate for peak and off peak consumption***

The nature of electricity is that there is a variance on consumption and the cost of generation yet the tariff rate charged at all times is uniform hence this then undermines the capacity of the consumers to change their consumption behaviour and shift their demand to times when the production cost is low in order to secure a cheaper rate.

The none variance on the rate charged has an effect on the social front on the cost of goods produced since the cost of electricity is among the determinant factors on the price of manufactured goods and other industrial products, which cost is subsequently transferred to the consumers making prices for even basic commodities high and beyond a sustainable reach for the common man.

***(ii) Inequity between the rural and the urban poor consumers***

KPLC has adopted a policy that internally offers cross subsidy of rates through the graduated tariff rate.[208] The current tariff is graduated uniformly throughout the country. Differentiation applies only if it is for domestic, commercial or industrial purpose but within the categories the tariff is uniformly graduated as per consumption. Due of uniformity in the tarriff there is a hidden subsidy that goes particularly to rural consumers which discriminates against the urban poor. This is under the rural electrification levy

[207] Kenya National bureau of statistics. Kenya economic survey 2012 ,at pp 180

[208] KPLC's Tariff Schedule available at http;//www.kplc.co.ke/

charge of 5% of all electricity consumed. Not all poor households are poor, the majority of rural population with access to electricity are probably not poor.[209]

***Inequity between the high and low end users***

Across subsidy also exists in the consumer tariff as low end users are cushioned from paying a higher electricity tariff rate. The life line tariff for the first 50kwh is suposedly aimed at the poor. It is below the true cost of electricity and is therefore subsidized.[210] However in Kenya this tariff applies to every one. In reality, the cost of delivery of electricity to low end uses is not different from that of high end users. What this means is that the low end user does not pay the true cost of generation and distribution of electrical energy. This is discriminative and unfair to the high end user. In South Africa 50kwh of electricity per month for free for the poor in selected areas and this has had a positive impact on poverty reduction.[211]

***.Inequity between the consumer and electricity service provider***

The institutional monopoly in transmission by KPLC coupled with inefficiency in its operations has often led to frequent power surges resulting in consumers incurring huge economic losses. The institutional monopoly operates under a regulated price regime that allows the utility to fully recoup its costs while the consumer pays for the inefficiency of the utility. While the cost based tariff is critical for financial health of the utility, it should

[209] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007), at pp 73.

[210] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007), at pp 68.

[211] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007), at pp 83.

be complimented by system losses reduction and increased customer base through enhanced electrification.[212]

### c) Gender inequity

The lack of access to affordable energy has a number of implications for poor households, and for women *(read female gender*) in particular. [213]

> "(a) *Women and children disproportionately suffer from health problems related to gathering and using traditional fuel and cooking in poorly ventilated indoor conditions. These include respiratory infections, cancer and eye diseases.*
>
> *(b) High opportunity costs related to time spent gathering fuel and water which limits their ability to engage in educational and income-generating activities resulting in dramatically different literacy rates and school enrolment levels between men and women.*
>
> *(c) Lack of electricity in rural areas is an added hindrance to women's access to useful media information such as markets for their produce, health information and civic education."*

Available data show disparities in electricity use between gender headed households. About 15% of male-headed households compared to 11% of the female-headed ones use electricity for lighting, but a larger proportion of female-headed households (81%) use Kerosene lamps or other unspecified sources as compared to male-headed (78%). Female-headed households rely more on the fuel wood than the male-headed

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[212] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 61

[213] Government Of Kenya Scaling-Up Renewable Energy Program (Srep)Investment Plan For Kenya Draft May, 2011 , at Para 47 Pp 13.

households.[214] Table 10 shows the distribution of different kinds of energy used for lighting by gender household head.

**Table 10: The Distribution of various kinds of energy used for lighting in households by Gender Head**

| Gender | Type of Lighting | | |
|---|---|---|---|
| | Electricity | Lantern/ Paraffin lamps | Others |
| Male | 15.2 | 77.9 | 6.9 |
| Female | 10.8 | 81.2 | 8 |

*Source: Kenya Population Census 1999 (Government Of Kenya; Scaling-Up Renewable Energy Program (Srep) Investment Plan For Kenya Draft May, 2011)*

### d) Inter and Intra Generational inequity

Contrary to the principles of intra and inter-generational equity, the cost-based rate supports Supply Side Management and not Demand Side Management. This has seen the government expand fossil fuel and geothermal exploration and activities, as well as construction of more hydro power dams. This has the effect of causing a strain on the natural resources such as land, water and an increased interference with biological diversity ecosystems upon which community rely to sustain their livelihoods.

### e) Inequity to the social fabric

The strain placed on the limited natural resources which support community livelihoods greatly weaken the community's social fabric. This is due to the fact that conflicts arise

[214] Government Of Kenya; Scaling-Up Renewable Energy Program (Srep)Investment Plan For Kenya Draft May, 2011 , at Para 4 9, Pp 14.

as members of the communities scramble for the use of the limited water resources and livelihoods such as land, water and fishing.[215]

The other negative effect of Supply Side Management on social sustainability is that construction of more electrical plants often requires relocation and resettlement of the local communities from the social and physical environment that they are used to for their livelihood and socialization. This is the dilemma that the residents of Mui Basin are faced with. They are concerned about living behind the graves of their departed loved ones, traditions of building houses, merry making with neighbours that cements their relationships as well as their dependence on livestock as their livelihood.[216]

Though the people are compensated for such loss, in my opinion the compensation is not always enough and is often delayed or it is never given. Five families that used to stay in the area now occupied by the Olkaria geothermal project were simply asked to move without any compensation being given.[217] There is now in place law recently enacted by parliament and a national resettlement policy in place to regulate resettlement. The challenge is on whether the law and the policy will be properly implemented.

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[215] Dr Benjamin K Sovacool. In an article Running On Empty; The Electrity-Water Nexus and he US Electric Utility Sector establishes nexus between electricity generation and unsustainable water use.available

[216] Tom Mosoba; Coal Villagers Stare End of their Traditions and Culture In The Face, Daily Nation Friday September 28th 2012

[217] Mariita N.Obuya; The Impact Of Large-Scale Renewable Energy Development On The Poor: Environmental and Socio-Economic Impact Of A Geothermal Power Plant On A Poor Rural Community In Kenya. Energy Policy, Vol. 30 Issues 11-12, at pp 29.

## 4.4 Measures taken to improve access, reliability and social equity

### a) Increased generation and transmission

Currently, a total of 14 major electric power energy generation projects with a collective capacity of 12385.9MW are currently under implementation. The projects include a coal plant in Mombasa ,Olkaria 1 unit4 and 5, Olkaria iv Eburru projects, Karura hydro project, Kindaruma 3rd unit and upgrading of unit 1 and 2 of Masinga dam by 1.5 metres, Isiolo and Ngong wind farm projects.[218]

### b) Unbundling

The incorporation of KETRACO as a transmitter is expected to improve transmission and distribution capacity. KETRACO has identified priority projects for implementation constituting a total of about 1,400 km of 132 kV line, 900 km of 220 kV lines ,125550 km of 400 kV lines and 700 km of 500 kV HVCD lines.[219]

The impact of vertical unbundling on renewable in Kenya has largely been positive, unlike the formerly vertically integrated utility. [220] KenGen, has shown significant interest in renewable investing in the expansion of geothermal electricity generation capacity, has pledged to partner with the private sector and is willing to invest up to 50% of the capital costs for attractive small-hydro and bagasse-based cogeneration projects.[221]

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[218] Kenya Bureau Of Statistics . Kenya Economic Survey 2012 at, pp180

[219] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) para 82 para104

[220] Impact Of Different Power Sector Reform Options On Renewables; Sustainable Energy Regulation And Policy Making For Africa, at pp 68.

[221] Impact Of Different Power Sector Reform Options On Renewables; Sustainable Energy Regulation And Policy Making For Africa, at pp 68

**c) Rural Electrification**

The objective of the Rural Electrification programme is to increase connectivity to rural areas by 22% in 2012 and achieve 100 % by 2030 by installing new distribution transformers and encouraging electricity consumer connections. To accelerate rural electrification different methods are employed such as connection through group schemes and financing through banks, use of a revolving fund *(stima loan)* and payments of connection charges in installments.[222] Currently, a total of 1033 projects implemented across constituencies have benefited 734 markets centers, 535 public schools, 34 polytechnics, 177 health centers, 44 government administrative centers, 31 coffee factories, 75 tea buying centers and 127 water projects. The number of consumers connected under REP rose significantly by 23.2% to stand at 309287 as at June 2011 from 251,05 in the previous year.[223]

Electrification of the poor has not been significantly addressed in Kenya as in other most African countries.[224] Rural electrification levy has provided a more sustainable financing mechanism for rural electrification.[225] However rural electrification authorities in africa have not provided effective and innovative mechanisms that ensures they achieve their

[222] Mumma Albert., 2011. Energy Sector in Kenya – An Overview of the Policy, Legal and Institutional Framework. (Unpublished.) at para 114

[223] Kenya National Bureau of Statistics .Kenya Economic Survey 2012 at pp 182

[224] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) p xiii

[224] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) p xiii

objectives.[226] This is reflected in Kenya's trend growth in rural electrification. In early 1990 rural electrification was at 18.05%, in the post reform period between 1997 and 2004 it declined to an average of 7.8 % despite the introduction of the rural electrification levy. [227] Currently rural electrification in Kenya is at about 23%.[228] Poor management of rural electrification funds by national utilities and agencies have hindered rapid rural electrification.[229]

**d) Improved Investment in electricity generation from clean renewables**

Renewable electrical energy sources hold the promise for a successful rural electrification because their output relatively matches the low electricity demand levels in rural areas. In Kenya, exploitation of renewable energy has a great potential to contribute towards gender equity access to clean energy services. Increased access to non-polluting power for lighting, cooking and other household and productive purposes can increase general women empowerment, which in turn, has significant beneficial consequences for their families and communities.

As alluded to in chapter two, there are quite a number of positive steps that have been taken by the government to promote electricity generation from renewable sources. They include the development of the wind atlas, feed in tariff policy and installation of solar panels in schools in ASALs.

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[226] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) p xii.

[227] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) p 12-13

[228] Kenya Bureau Of Statistics. Kenya Economic Survey 2012 At Pp 180

[229] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 55

### e) Public awareness campaigns

Energy conservation and efficiency use through public awareness campaigns have been intensified in the country. Energy conservation and efficient use once embraced will reduce electricity costs and loss, thus resulting into improved reliability and access.

**Case Study; Use of Renewable Electricity Generation For Rural Electrification In Nepal**[230]

Nepal introduced decentralized renewable energy services some of its remotest parts as a pilot project through national hydro power policy of 2001 which focuses on rural development via low cost hydro power systems. With the primary beneficiaries being the rural communities particularly vulnerable communities like women, the Dalits ( the untouchable/lowest caste) as of 2010 the programme had constructed 317 new micro hydro power plants with a capacity of 5.7 MW, connected 59000 households to hydro micro power installations, 3200 solar water heating. Success is attributed to the following factors

- National ownership and commitment
- Local government's engagement was instrumental in financing capital investment and has worked to integrate the programme into local development planning rather than being stand alone donor funded project.
- Local commitment catalyzed financing from donors and banks
- Community mobilization and local partnerships in which case the programme activities were designed according to the principles of participation, transparency, inclusion and consensus decision making.

### 3.6 Case study; On Corporate Social Responsibility[231]

Mongolia's XacBank whose support for modern corporate governance practices led to the bank joining the UN Global Compact in 2007 introduced a non collateral micro loan targeting marginalized peri- urban. 53% of its clients reside in rural areas it uses a mobile banking system 58% of its clients are women the bank has signed the women's world banking pledge to support the empowerment of low income entrepreneurs leaders and partners for change. Through partnership with the Mongolian women association it

[230] United Nations Development Programme, Case Studies of Sustainable Development in Practice, Triple Wins for Sustainable Development. (June, 2012.) at pp 41

[231] United Nations Development Programme, Case Studies of Sustainable Development in Practice, Triple Wins for Sustainable Development. (June, 2012.) at pp 45-44

has been providing group loans as well as individual loans to vulnerable rural women since 2007,

It has also been giving financial literacy to training in more than 130 schools in collaboration with the Mongolian ministry of social welfare and labour, the national media and private companies. I also has partnered with cooperatives that receive credits from the bank for on ward lending to local communities in rural areas

It became the firs bank to introduce developed energy saving lending products. For purposes of advancing loans to purchase green house gas emission reductions generated by energy efficiency projects. To date its eco product has provided some 4000 loans for procurement of solar heating systems, housing insulation etc. It has also introduced sustainability reporting under the global reporting initiative which allows the bank to track the impact of its clients' activities on the environment and to encourage the clients adopt green technologies microloan clients who have been with the bank for more than 180 days and who fulfil more than 50% of the banks sustainability indicators receive discounted interests. It shows ho w private sector can enhance sustainable development.

This case study is relevant to electricity utility in Kenya in carrying out social corporate responsibility to the local communities in terms of giving favourable terms to electricity connections to social amenity institutions, to partner with financial institutions to advance microcredit financing to consumers, offer training and even provide employment opportunities to the local communities. It is also relevant in encouraging other service providers in being involved in the promotion of environmental protection.

### 4.7. Conclusion

Weak transmission and distribution network, high tariff rates, low countrywide electricity access and over-reliance on hydropower which is vulnerable to vagaries of weather, are some of the challenges facing the social sustainability of the electricity energy sub-sector. Kenya's electricity law provides for social equity under Rural Electrification Fund and rural electrification programme, however the programme has not achieved much since its inception in 1973.

Social equity mechanism is also curtailed by the fact that there is no social subsidy provision of electricity for the urban poor as the one enjoyed by the rural consumer, instead the urban poor is used to subsidize for the rural poor aw well as rich in rural Kenya. The tariffs do not also subsidize consumption for social utilities. The poor are therefore in most cases forced to rely on unhealthy and expensive energy. The cost-based rate also does not take into account social issues such as community resource-sharing benefit. The graduated tariff structure also discriminates the high end user against the low end user.

The 2010 Constitution gives a wake up call to the government to the fact that the National and County governments are obligated to provide and ensure equitable access to essential services by the citizens.

# CHAPTER 5

## 5.1 CONCLUSION AND RECOMMENDATIONS

Sustainable Energy offers clear opportunities for better integration of the pillars of sustainable development. By accessing sustainable energy supplies human development can be attained along the three dimensions [232] the analysis of this paper concludes that Kenya's policy institutional and legal framework for the electricity sector is not adequate to ensure electrical power energy sustainability. To ensure sustainability certain measure have to be taken including making amendments to the legal and institutional frameworks to facilitate increased access to electricity among the majority poor as well as increase the share of electricity from renewables in the power supply mix while encouraging efficiency use of electricity.

## 5.2 RECOMMENDATIONS.

### a) Enhance local Private Participation in IPP development

Experience in Zimbabwe and Mauritius demonstrate the potential financial and technical capability and viability of local private investors in the power sector. [233] Local private investors can own and operate small to medium scale entities in the power sector, in small hydro and wind energy sources as well as through local

[232] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) pp 20

[233] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) pp 72

cogeneration in the agro-based industries, on their own or with foreign partners.[234] Local Private Participation in IPP development is hampered by emphasis on large scale investments which are generally high technology and capital intensive and invariably attract the politically connected rent seeking class.[235] In view of this, this research makes the following proposals.

- The Minimum power wheeling that is fixed is at 25mw to be done away with to enable power be wheeled to even small users and also small power projects be exempted from the statutory requirement of carrying out EIA.

- Appropriate policy and financial incentives such as lowering entry requirements and tax holidays should be enacted to encourage local private investment in a privatised electricity industry.

- Issuing licenses and Power Purchase Agreements (PPAs) covering a longer period may help to ensure moderate the selling price of electricity by IPPs.[236] Longer term agreements allow for sufficient time for the investor to pay off project

[234] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) pp 72

[235] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) ,at pp 72

[236] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007), at pp 111.

financing debts as well as provides adequate amortization period for the equipment. [237]

- There is need to establish clear easy licensing procedures and norms. Lack of clear established procedures and norms makes investors not to believe that the process is transparent thus acting as a disincentive to invest. In Rwanda it only takes 6 months to invest in a major energy project.[238] To enhance transparency and trust, the policy should have clear guidelines on procedures for application to participate as an IPP with a clear fair feed in tariff structure. this will eliminate the challenges associated with the negotiation process

- There should be Standard PPAs in place to enable potential investors get to know what to expect in terms of revenue well in advance, thus making the process of negotiating for PPAs easy.

- A policy on cost guidelines with predetermined market rate return on investment to lure new investors into the sector is required to be developed to act as a mechanism of ensuring continuity of contractual obligations by both the investor and the government.

- The pricing mechanism for electricity tariffs and the mechanisms for state remuneration for geothermal and petroleum exploration under the relevant statutes should be designed in a way that protects the interests of the investors through provision of incentives such as guaranteed exploitation of the resource in

[237] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) ,at pp 111.

[238] Mitigating Risk and Strengthening Capacity for Rural Electrification available at http//mirreia.energy project.net. Accessed on 3rd August 2011.

the event of discovery of viable discovery accompanied by tax incentives and subsidies during the exploration process and an adequate mechanism to remunerate the state.

- To encourage private investment, guarantees against perceived political risks should be provided as a matter of policy to all IPPs requiring them. This may also assist to reduce the bid prices through reduced risk investment and premiums associated with political risks.

**b) Promoting energy efficiency and conservation through the law**

Responsive Demand Side solutions are required to reduce environmental impact of human consumption patterns. Technological innovation is at the heart of this approach.[239] Through certain types of standards the Law can create strong incentives for technological innovations.

- By setting standards to be met and deadlines to meet them, without identifying the specific technology that must be adopted the new law creates flexibility and reward those entrepreneurs who discover less expensive technologies for meeting the standards. [240]

- The law can also be used to create technology forcing standards at a level beyond what current proven technologies can meet..[241] This can spark a flurry of research and development activity as industry looks for profitable ways to meet the regulatory standard.[242] The improvements in refrigerator technology that occurred as a result of appliance efficiency standards in the United States provides

[239] Hunter. D. Salzman. J. and Zaelke. D. International Environmental Law and Policy New York: Foundation Press. (2002), at pp 68

[240] Hunter. D. Salzman. J. and Zaelke. D. International Environmental Law and Policy New York: Foundation Press. 2002)., at pp 68.

[241] Hunter. D. Salzman. J. and Zaelke. D. International Environmental Law and Policy New York: Foundation Press. 2002). at Pp 74

[242] Hunter. D. Salzman. J. and Zaelke. D. International Environmental Law and Policy New York: Foundation Press. 2002), at Pp 74

a compelling example of how public policy intervention can spur innovation, making it possible to achieve substantial efficiency gains while maintaining or improving the quality of the product or service being provided.[243] Expected implementation of stronger regulation in the USA during the 1990 made Europe a promising market for USA environmental technology and services with firms reporting a 60% revenue growth in 1989.[244]

**c) Strengthening regulatory agencies**

Strengthening regulatory agencies to ensure the independence of the regulatory agencies may be the most effective measure in addressing the gaps in the legal and regulatory framework. Performance of regulatory agencies have done little to enhance sustainability, partly due to the weakness to enforce the law, as the entities are relatively new hence not yet built significant capacity or their ability to enforce is compromised by lack of the requisite independence as a result of politically motivated appointments of the members even where capacity exists.[245]

- Regulatory agencies can be strengthened by enhancing the representation among the Board members. For instance having representatives of various segments of consumers and independent Power Producers/ Distributors on the board of the regulatory agencies could ensure that the plight of the disadvantaged is heard especially with respect to electrification and review of electricity tariffs.

- Competition authorities should be delegated the power to implement competition policies at the national level and also guaranteeing their close coordination with

[243] Lighting the way Towards a sustainable energy future InterAcademy Council report October 2007 at pp xix www.interacademycouncil.net

[244] [244] Hunter. D. Salzman. J. and Zaelke. D. International Environmental Law and Policy New York: Foundation Press. 2002), at Pp 77

[245] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) ppxiv

sector regulators.[246] To this end the Restrictive Trade, Monopolies and Price Control Act 504 of 1989 should be amended to efficiently regulate monopoly behavior and other regulated sectors as the overall Monopoly Authority regulator. The Energy Act should be amended to include provisions with linkages between ERC and the Monopoly Authority.

**d) Enhancing capacity building and participation for all stakeholders including the local community.**

- Achieving a sustainable energy future will require an intensive effort at capacity building, as well as the participation of a broad array of institutions and constituencies[247]. This is because the abilities of individuals and institutions to effect positive changes in electrical energy resources and usage is of most significant importance

- All human activity takes place within a cultural context, what we eat need and how we interact with one another, we rarely interact with the environment as purely biological organisms because we are not purely biological organisms.[248]Culture is not only an independent force in changing our behaviour. But also has profound effect on our laws[249] thus it is important to empower the local communities through capacity building and involve them in energy

[246] Christopher H. Onyango et al ;Regulatory and Competition-Related Reforms In Kenya's Power and Petroleum Sector Final Report (October 2009) at pp10 para 3.1

[247] Lighting the way Toward a sustainable energy future InterAcademy Council Report ( October 2007) at pp iv www.interacademycouncil.net

[248] Hunter. D. Salzman. J. and Zaelke. D. International Environmental Law and Policy New York: Foundation Press. 2002), at pp 145

[249] Hunter. D. Salzman. J. and Zaelke. D. International Environmental Law and Policy New York: Foundation Press. 2002). at pp 149

efficiency and conservation campaigns as well as in decision making, formulation of legal and policy instruments.

**e) Enhance electrification of rural and marginalized areas.**

An immediate option to lower the cost of rural electrification is the use of proven low cost electrification options such as the following;

- Promotion of decentralized electricity generation in rural areas using hydro, wind, bagasse-based cogeneration and where applicable geothermal can greatly reduce the need for transmission lines to the national grid. Regulatory agencies in collaboration with the ministry of energy to set can play a significant role in promoting electricity generation from these options by setting explicit targets for a share of electricity generation from these renewable.[250] This will mitigate the trend of reliance on thermal electricity especially by IPPs and on hydro power.

- Establishment of power pools as well as cross boarder electricity distribution should continue to be enhanced this will reduce inequitable geographical distribution of electricity transmission and access, dependence on fossil fuels and to improve energy security.

- Contract renewals for REA's Board members and executive employees should be linked to electrification targets for electrifying the poor. The targets should be part of the authority's annual reporting.[251] Although the government introduced

[250] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007), at pp 112.

[251] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007), at pp 106

performance contracts to civil servants, there has been laxity in implementation hence they have not yielded the desired results.

- Use reduced distance between distribution transformers currently KPLC uses a standard of 600 metres is used irrespective of consumer density or load demand. By contrast, Uganda's transformer locations are determined on a line-by-line basis depending on current and future demand growth. In rural Uganda where demand is low and characterized by slow growth, distances between transformers of up to 1,000 meters are common. Optimal design criteria should therefore be adopted in this project without ignoring voltage drop problems. [252]

- Use of Shorter, smaller and fewer poles in some rural areas subject to design criteria such as climatic conditions, terrain and safety factors. On average, for grid extension, extra poles are often required for a distance of more than 30m. However, with appropriate design that takes account of prevalent climatic and safety issues, studies have shown that the number of poles per kilometre could be reduced without adversely affective performance and safety [253]

- Use Pre-fabricated wiring systems, also known as ready boards, it is a single multi-socket outlet fixed in a room into which various electrical household appliances can be plugged. Ready boards are used extensively in South Africa, and to a lesser extent in Malawi, and reports indicated that they are well suited for low-income households. For example, in South Africa, they have been tested successfully in various types of houses, from mud plastered to concrete blockhouses, where they are reported to provide savings of up to 75% when compared to the conventional internal wiring of houses (Thom, 2000). Ready

[252] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 106

[253] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 106 -107

boards (usually coupled with prepayment meters) are now standard features in some of South African urban low-income housing schemes.[254]

- Use of Load limiters rather than meters. Load Meters are miniature circuit breakers limiting the amount of electricity, which could be used by a household. These are ideal for households whose monthly consumption is very low - typical of the urban poor and rural households. Load limiters rather than meters can reduce the service connection cost, as they have a lower capital cost and reduce the size of cable required..[255].

- Use Single Wire Earth Return for transmission and distribution instead of using the conventional 3-Phase system, Use Single Wire Earth Return , 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 distribution transformers, and fewer switching and protection devices all of which lead to reducing connection costs thereby promoting low-cost rural electrification.[256] These systems are popular in rural Australia where nearly 200,000 km of lines are already in use the system[257]. The system's inherent disadvantages are associated with load balance on the primary distribution line, restricted load capacity, and the inability to provide a three-phase supply are

[254] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 107

[255] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 107.

[256] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 107.

[257] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007), at pp 108.

outweighed by its many advantages in using the systems in sparsely settled areas.[258] Such as ;

- Low capital cost — through fewer conductors, fewer pole-top fittings, graded insulation on distribution transformers, and fewer switching and protection devices. [259]

- Simplicity of design, which allows for speed of construction. This particularly applies to the stringing of a single conductor.

- Reduced maintenance costs, because there is only one conductor and no cross arm.

- Fewer bush-fire hazards, because conductor clashing cannot occur in high winds.

❖ .Due to the low power demand in rural areas, it is possible to use smaller sizes of conductors. Smaller conductor sizes imply that they cost less hence could contribute 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% in Zimbabwe.[260]

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[258] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 108.

[259] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 108.

[260] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 108.

- Use of high-mast community floodlights for providing light to centralized groups of households especially in low-income urban areas[261]. A pilot programme on use high-mast community floodlights has been to light up slum areas in Nairobi. This application can be used to provide lighting in market places and fish landing sites. These would have the positive impact of extending useful hours of operation for the community, thus leading to higher household incomes, thus reducing levels of poverty Floodlighting also improves security[262].

**f) Political good will**

The Government has a key role in technology development and distribution acting as a catalyst and amplifying the conditions for innovation.[263] Markets will not produce desired outcomes unless the right incentives and price signals are in place. [264].

- A progressive regulatory approach can have long term benefits for a country's economy through stimulating demand for environmentally friendly products or raising standards for product performance this can place domestic produces in a position of competitive advantage relative to their international competitors.[265]

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[261] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 108.

[262] Making Africa's Power Sector Sustainable An Analysis Of Power Sector Reforms In Africa. . A Joint power sector Report By United Nations Economic Commission For Africa And UNEP. United Nations Commission For Africa, Aaddis Ababa Ethiopia (2007) , at pp 108

[263] Hunter. D. Salzman. J. and Zaelke. D. International Environmental Law and Policy New York: Foundation Press. 2002), at Pp 74

[264] Lighting the way Toward a sustainable energy future InterAcademy Council report October 2007 at pp xx- xxi www.interacademycouncil.net

[265] Hunter. D. Salzman. J. and Zaelke. D. International Environmental Law and Policy New York: Foundation Press. 2002), at Pp 75

- Governments have a vital role to play in creating the conditions necessary to promote optimal results and support long-term investments in new energy infrastructure, energy research and development, and high-risk/high-payoff technologies. Where the political will exists to create the conditions for a sustainable energy transition, a wide variety of policy instruments are available, from market incentives such as a price or cap on carbon emissions to efficiency standards and building codes, which may be more effective than price signals in bringing about change on the end-use side of the equation.[266].

**5.3 Conclusion.**

This analysis of the legal and institutional framework, for socio-economic and environmental electrical energy sustainability in Kenya concludes that the legal and institutional framework are inadequate to ensure the sustainability of power sector. To ensure the sector's sustainability, reforms have to be redesigned to ensure that access to electricity by the majority of the population, is enhanced. The sustainability of the sector can also be enhanced by ensuring a favourable share of renewable in electricity generation mix. Above all, the electricity regulatory agencies must carry out their mandate by protecting the poor to ensure increased access to electricity and promoting proven renewable energy options for electricity generation. There is also need to address the identified gaps and barriers in the legal and institutional framework as proposed in this study to ensure that the Kenya electricity power sector is made sustainable.

[266] Lighting the way Toward a sustainable energy future InterAcademy Council report October 2007 at pp xx- xxi www.interacademycouncil.net

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